

# GLOBAL KNOWLEDGE INDEX 2021



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# FOREWORD

## United Nations Development Programme

The Global Knowledge Index (GKI) continues to serve as a vital tool to monitor the knowledge status of countries in key areas including education, innovation and information and communications technology (ICT). Now covering 154 countries and 232 indicators, the 2021 GKI is helping to guide policymakers, researchers, civil society, and the private sector as they nurture knowledge-based societies and bridge knowledge gaps. In particular, the GKI shows how emerging trends in technology, learning and innovation are radically reshaping our societies. Countries must now leverage their knowledge infrastructure to open-up new opportunities in the form of jobs and livelihoods, driving forward sustainable development. They must also utilise its immense potential to drive decisive climate action and spur new efforts to protect and restore our natural world. Crucially, the GKI is helping countries to identify how and where they must invest to build these cutting-edge, knowledge-based societies. Indeed, the GKI can also feed into key measurements such as UNDP's Human Development Index.

The GKI shows, for instance, how many countries in Africa need more support to address knowledge gaps in key areas like quality education, decent work, and regulatory frameworks, whilst highlighting new opportunities. Consider Mauritius, for example, where investments in ICT contribute to its strong performance on the Index. Indeed, many developing countries are demonstrating notable advances in key knowledge sectors. That includes Barbados in pre-university education; the Philippines in technical and vocational education and training; Lebanon in higher education; or Bahrain in ICT. The GKI also reflects the unprecedented wave of innovation and adoption of new technologies as countries and communities looked to find much-needed solutions to COVID-19. The United Nations (UN) is at the forefront of efforts to support this innovation surge -- everything from helping countries like Nigeria and Honduras to leverage the power of digital finance to support financial inclusion and sometimes lifesaving electronic cash transfers; to the 3-D printing of much-needed personal protective equipment for health workers, an effort assisted by the United Nations Development Programme's (UNDP) Accelerator Labs network. Indeed, the Labs are making a concerted effort to pool the world's collective intelligence to address persistent development challenges, part of efforts to help countries build knowledge-based societies.

As countries aim to build forward better from this devastating pandemic, the 2021 GKI reinforces the need for strategic South-South and triangular cooperation to narrow the gap between knowledge sectors, helping to scale-up development impact. It also recognises that 3.7 billion people remain trapped offline, unable to have their say in decisions that will affect their lives and livelihoods. Yet a worthwhile investment of \$428 billion could achieve universal broadband connectivity by the end of the decade. The UN is also supporting global efforts to boost the digital capacity of vulnerable and marginalised groups, including women and persons with disabilities, so that they can play their role in shaping the future that they want.

I would like to express my sincere gratitude to His Highness Sheikh Mohammed bin Rashid Al Maktoum for his continued support to global efforts to create and sustain knowledge-based societies. I would also like to thank the many experts who contributed to the development of the Index. As we aim for the Global Goals, the UN and partners like the Mohammed bin Rashid Al Maktoum Knowledge Foundation will continue to support knowledge and scientific initiatives that are helping to both envision -- and create -- a greener, more inclusive, and more sustainable future for all.

**Achim Steiner**

*Administrator, United Nations Development Programme (UNDP)*



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# GLOBAL KNOWLEDGE INDEX 2021

## PREFACE

In light of various ongoing global developments—including successive scientific and technological revolutions, economic and social crises, and the health emergency induced by the spread of the COVID-19 pandemic—the race to develop knowledge to ensure competitiveness, achieve growth and sustain universal and equitable human development around the world has intensified.

The product of a joint initiative of the United Nations Development Programme (UNDP) and the Mohammed bin Rashid Al Maktoum Knowledge Foundation (MBRF) established in 2017, the Global Knowledge Index (GKI) represents a key contribution to our understanding and use of development indicators to assess contemporary knowledge and development conditions across the globe.

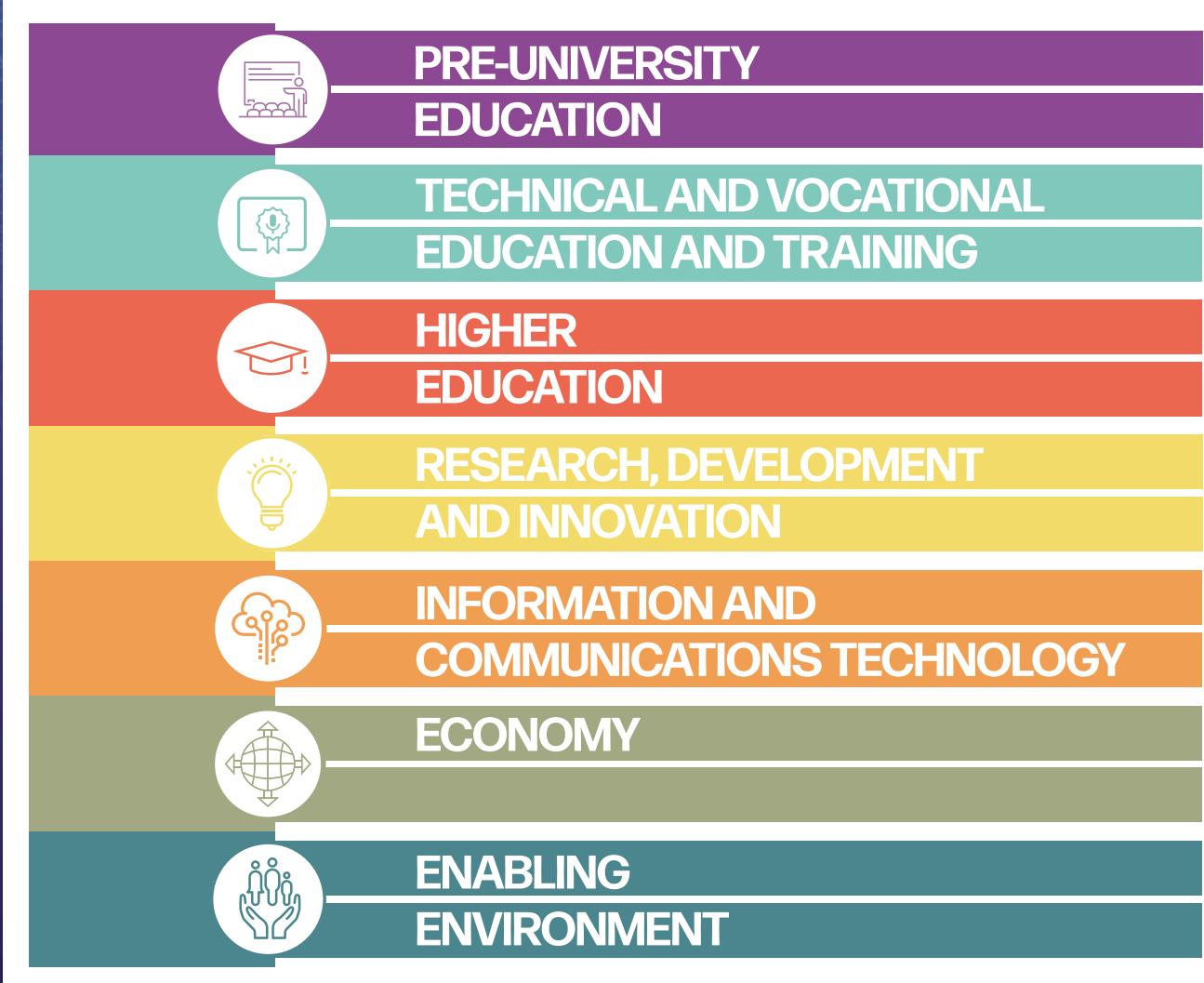
Given the increasing demand for indices—partly driven by the implementation of the 2030 Agenda—and the scarcity of reliable data to monitor progress in these vital areas, the GKI provides a reliable, practical and scientific tool with which to chart cognitive and developmental realities, and support effective policymaking.

The GKI comprises composite sub-indices that highlight the performance of six vital sectors: pre-university education; technical and vocational education and training; higher education; information and communications technology; research development and innovation; and the economy. It also features a composite enabling environment sub-index that captures the social, political, economic, health and environmental context across these sectors.

The previous edition of the GKI, released in 2017, has undergone a comprehensive review involving a high-level advisory board, including international experts drawn from a variety of fields directly related to the sectors of the Index. The aim of this review has been to develop the Index in line with recent changes in data type and availability. This updated version of the Index therefore employs the most recent data for 154 countries around the world available in international databases.

Full country profiles featuring interactive sectoral tables, the index's methodology and information about the variables in terms of definitions and sources can be found at [www.knowledge4all.org](http://www.knowledge4all.org).







# GLOBAL KNOWLEDGE INDEX 2021

World average: 48.4

Rank	Country	Value
1	Switzerland	71.5
2	Sweden	70
3	United States	70
4	Finland	69.9
5	Netherlands	69.5
6	Singapore	69.3
7	Denmark	69
8	United Kingdom	69
9	Norway	68.7
10	Iceland	67.5
11	United Arab Emirates	67.3
12	Luxembourg	67.3
13	Germany	66.9
14	Austria	66.8
15	Estonia	66.7
16	Belgium	65.5
17	France	64.9
18	Israel	64.6
19	Ireland	64.5
20	Australia	64.2
21	Korea (Republic of)	63.8
22	Slovenia	63.7
23	Japan	63.3
24	New Zealand	63.3
25	Czechia	62.4
26	Malta	61.9
27	Portugal	61.8
28	Spain	61
29	Hong Kong, China (SAR)	61
30	Hungary	60.2
31	Latvia	60.1
32	Slovakia	59.8
33	Poland	59.6
34	Cyprus	59.3
35	China	59.2
36	Lithuania	59.1
37	Italy	58.8
38	Qatar	58.7
39	Croatia	58.5
40	Saudi Arabia	57.6

World average: 48.4








Rank	Country	Value
41	Montenegro	56.4
42	Bulgaria	55.8
43	Serbia	55.5
44	Seychelles	55
45	North Macedonia	54.9
46	Belarus	54.7
47	Chile	54.5
48	Kuwait	54.5
49	Mauritius	54.4
50	Romania	54.3
51	Malaysia	53.6
52	Oman	52.3
53	Egypt	52.3
54	Russian Federation	52.3
55	Bahrain	52.2
56	Uruguay	51.7
57	Greece	51.5
58	Costa Rica	51.4
59	Brunei Darussalam	51.3
60	Georgia	51.3
61	Ukraine	50.9
62	Barbados	50.8
63	Moldova (Republic of)	50.7
64	Philippines	49.6
65	Bosnia and Herzegovina	49.6
66	Viet Nam	49.6
67	Colombia	49.5
68	Thailand	49.5
69	Mongolia	49.4
70	Botswana	49
71	Armenia	48.9
72	Panama	48.9
73	Peru	48.8
74	Mexico	48.7
75	Bolivia (Plurinational State of)	48.7
76	Trinidad and Tobago	48.3
77	Turkey	48.2
78	Kazakhstan	48
79	Brazil	47.7
80	Argentina	47.7








Rank		World average: 48.4
81	Albania	
82	Guyana	
83	Tunisia	
84	South Africa	
85	Kyrgyzstan	
86	Sri Lanka	
87	Indonesia	
88	Suriname	
89	Ecuador	
90	Jamaica	
91	Saint Lucia	
92	Lebanon	
93	Cabo Verde	
94	Paraguay	
95	Dominican Republic	
96	Azerbaijan	
97	India	
98	Namibia	
99	Belize	
100	Uzbekistan	
101	Morocco	
102	El Salvador	
103	Jordan	
104	Iran (Islamic Republic of)	
105	Kenya	
106	Palestine, State of	
107	Ghana	
108	Bhutan	
109	Timor-Leste	
110	Lesotho	
111	Algeria	
112	Cambodia	
113	Honduras	
114	Nicaragua	
115	Rwanda	
116	Tajikistan	
117	Malawi	
118	Eswatini (Kingdom of)	
119	Guatemala	
120	Bangladesh	

Value	Rank	World average: 48.4	Value
47.6	121	Lao People's Democratic Republic	38
47.4	122	Uganda	37.9
47.2	123	Pakistan	37.9
47.1	124	Nigeria	37.6
46.8	125	Gambia	37.1
46.6	126	Venezuela (Bolvarian Republic of)	36.7
46.3	127	Zambia	36.6
46	128	Nepal	36.4
45.9	129	Liberia	35.9
45.6	130	Zimbabwe	35.1
44.9	131	Sierra Leone	34.9
44.8	132	Tanzania (United Republic of)	34.7
44.7	133	Togo	34.4
44.6	134	Senegal	34.2
44.6	135	Cameroon	34.1
44.6	136	Myanmar	34
44.3	137	Iraq	33
44.3	138	Côte d'Ivoire	32.9
43.7	139	Ethiopia	32.6
43.7	140	Madagascar	32.2
43.5	141	Burundi	31.9
42.6	142	Benin	31.6
42.5	143	Mozambique	31.2
42.4	144	Burkina Faso	30.9
42.1	145	Sudan	30.4
42	146	Guinea	29.6
41.3	147	Mauritania	29
41	148	Angola	28.9
40.5	149	Mali	28.7
40.5	150	Yemen	28.6
40.3	151	Afghanistan	28.4
40.1	152	Congo (Democratic Republic of the)	27.1
40.1	153	Niger	26.5
39.7	154	Chad	24.9



# HEATMAP

RANK	COUNTRY	GLOBAL KNOWLEDGE INDEX							
1	Switzerland	71.5	81.2	72.4	71.3	57.2	67.8	70.3	84.4
2	Sweden	70	80.7	63.7	69	56.4	70.3	69.7	85.6
3	United States	70	77.4	73.5	68.5	56.7	72.4	74.3	65.5
4	Finland	69.9	82.7	68.8	64.1	51.7	74.3	67.9	85
5	Netherlands	69.5	80.7	70.6	68.5	52.7	68.5	67.9	81.2
6	Singapore	69.3	77.8	66.3	60.7	49.6	72.2	82.1	80.1
7	Denmark	69	81.7	62	66	50.5	70.3	74.5	82.5
8	United Kingdom	69	78.6	63	69.7	56.5	71	70.1	76.3
9	Norway	68.7	81.2	67	67.8	42.2	70.5	70.1	88.4
10	Iceland	67.5	76.3	64	68.7	46.7	72.7	63.2	87.9
11	United Arab Emirates	67.3	80.9	70.1	64	42	65.9	79.8	69.3
12	Luxembourg	67.3	71.3	65.6	68.4	50.2	70.6	67.5	82.3
13	Germany	66.9	77.5	72.8	64.8	48.4	60.4	69.8	78.9
14	Austria	66.8	73.2	71.3	67.3	46.7	65	68.4	80.7
15	Estonia	66.7	77.3	65.9	64.8	46.9	71.1	67.6	76.2
16	Belgium	65.5	80.7	67.4	65.6	45	58	68.4	77.1
17	France	64.9	81.5	61.4	61.5	47.8	62.6	68.2	75.1
18	Israel	64.6	78.7	57.1	63.8	56.7	65.2	68.3	61.2
19	Ireland	64.5	70.8	61.4	59.3	45.7	62.8	76.9	79.7
20	Australia	64.2	73.6	65.8	65.6	43.8	62.2	67.4	74.4
21	Korea (Republic of)	63.8	78.5	61.8	48.3	51.5	69.2	71.7	66
22	Slovenia	63.7	80.3	64.7	60.1	43.6	60.6	65.8	74.8
23	Japan	63.3	80.3	63.8	49.3	48.8	64.5	67.6	71.6
24	New Zealand	63.3	64.4	68.5	61.2	44.8	61.4	67.5	81
25	Czechia	62.4	78.8	66.6	57.6	42.7	56.8	64.7	73.5
26	Malta	61.9	78.5	53.7	60.2	41.1	59.1	71.5	72.3
27	Portugal	61.8	78.8	62.7	63.5	38.3	55.7	61.7	77.4
28	Spain	61	75.1	63	56.6	40.8	60.7	62.2	72.9
29	Hong Kong, China (SAR)	61	80.7	47.5	60.5	47.9	60.3	78.2	47.7
30	Hungary	60.2	74.2	71	50.6	39.2	56.9	64.7	67.6
31	Latvia	60.1	78.8	65.2	53.7	37.4	58.5	64	65.2
32	Slovakia	59.8	77.7	70.5	53.8	35.4	54.4	60.7	69.2
33	Poland	59.6	79.2	58.7	55.9	34	62.9	60.7	68.5
34	Cyprus	59.3	73.4	53.6	52.8	40.1	64	66	68.2
35	China	59.2	80.8	65.7	39.1	49.5	59	63.1	56.6
36	Lithuania	59.1	70.9	55	59.4	32.2	61.3	65.2	74.3
37	Italy	58.8	74.9	60.3	52.9	46.2	52	60	68.5
38	Qatar	58.7	80.2	53.3	61.4	36.6	52.5	67.8	59.4
39	Croatia	58.5	75.5	62.3	55.5	36	57	59.3	66.3
40	Saudi Arabia	57.6	72.2	69.6	52.8	36	58.2	60	52.4
41	Montenegro	56.4	76.5	56	50.5	39.8	55.3	57.1	61.5
42	Bulgaria	55.8	58.5	57.8	60.9	39.1	55	59.2	62.1
43	Serbia	55.5	75.1	62.9	47.5	33.9	56.7	55.4	57.8
44	Seychelles	55	74.3	53	49	27.3	59.3	63.7	60.2
45	North Macedonia	54.9	73.6	60	48.6	38.2	49.9	55.8	59.6
46	Belarus	54.7	79.4	61.3	50.2	36.1	54	48.1	52.9
47	Chile	54.5	67.6	52.4	47.1	37.6	54.4	59	67.8
48	Kuwait	54.5	68.6	67.6	41.7	23.3	62.7	63.5	53.7
49	Mauritius	54.4	74.9	53.4	45.8	28.6	53.6	62.2	65.9
50	Romania	54.3	56.5	55	57.7	35.3	52.6	62	64.2
51	Malaysia	53.6	60.9	58.3	41.9	35.5	55.5	65	60.2
52	Oman	52.3	74.4	66.6	38.6	28.9	53	54.9	48.7
53	Egypt	52.3	67.1	53.4	54.6	32.7	50	56.7	51.2
54	Russian Federation	52.3	78.8	54.5	43.8	32.7	50.5	54.5	50.8
55	Bahrain	52.2	68.4	51.8	45.4	27.6	59.6	60.8	51.1
56	Uruguay	51.7	68	49.2	48.3	28.6	48.1	50.6	77.3
57	Greece	51.5	66.1	47.1	48.7	37	51.2	50.1	64.8
58	Costa Rica	51.4	69.1	53.6	45.8	30.3	49.4	50.4	65.6
59	Brunei Darussalam	51.3	69.5	53.8	49.7	20.6	50.2	55	64.5
60	Georgia	51.3	70.4	44.5	49.7	31.3	48.2	56.7	61.2
61	Ukraine	50.9	78.5	50.5	49.3	30.6	48.2	45.9	54.4
62	Barbados	50.8	74.8	48	42.3	32.5	49.9	48.7	63.4
63	Moldova (Republic of)	50.7	71.9	54.4	41.4	30.9	51.7	52.4	53.4
64	Philippines	49.6	70.5	61.6	49.6	25.7	40.7	51.1	47.6
65	Bosnia and Herzegovina	49.6	66.6	56.7	48.5	31.2	44	49.2	51.8
66	Viet Nam	49.6	74.4	54.5	35.8	28.2	40.9	60.1	55.2
67	Colombia	49.5	66.9	49.7	45.8	36.8	42.1	53.3	53.4
68	Thailand	49.5	67	43.4	37	32	48.6	64.1	57
69	Mongolia	49.4	71	52.8	40.8	30.9	39.6	56.9	56.3
70	Botswana	49	57.5	64.7	47.6	32.7	33.1	54.3	55.2
71	Armenia	48.9	67.2	45.4	49.3	30.9	49	47.2	55.8
72	Panama	48.9	52.4	42.7	54	31.7	44.5	61.1	59.7
73	Peru	48.8	66	44.2	47.9	30.7	41.8	57	56.7
74	Mexico	48.7	64.8	55.3	44.7	25.9	44.1	55.8	51.1
75	Bolivia (Plurinational State of)	48.7	72.3	58.6	49.8	30.7	35.9	44.2	49.6
76	Trinidad and Tobago	48.3	73.9	47.5	40.4	20	49.5	55.2	53.3
77	Turkey	48.2	57.3	56.9	34	36.1	49.4	53.6	50.9

RANK	COUNTRY	GLOBAL KNOWLEDGE INDEX							
78	Kazakhstan	48	71.8	43.5	46.3	21.8	46.4	51.9	57.1
79	Brazil	47.7	61.7	55	42	30.6	45	47.6	54.6
80	Argentina	47.7	62.5	49.8	48.9	29.2	45.6	42.5	58.9
81	Albania	47.6	71.1	38.8	48.3	26.8	46.2	47.3	58.6
82	Guyana	47.4	58.2	53	54	31.7	33.4	52.4	50
83	Tunisia	47.2	70.5	47.5	40.8	26.8	44.9	48.8	53.4
84	South Africa	47.1	56.1	55.3	40.6	34.9	41.2	49.9	53.7
85	Kyrgyzstan	46.8	78.3	54	37.7	28.4	37.7	45.5	45.9
86	Sri Lanka	46.6	65.9	53.7	40.8	28.8	36.5	48.7	54.6
87	Indonesia	46.3	57.6	49.5	45.3	23.3	40.5	57.9	52.1
88	Suriname	46	62.4	55.9	48.5	31.2	37.2	37.2	51.2
89	Ecuador	45.9	68.5	46.5	43.5	28.1	38.1	46.4	52.8
90	Jamaica	45.6	65.2	46.2	42.5	25.9	34.8	50.7	58.5
91	Saint Lucia	44.9	72.6	29.1	50.3	28.8	28.2	50.8	58.8
92	Lebanon	44.8	47.6	47.6	56.7	35.5	36	48.8	39.5
93	Cabo Verde	44.7	64.7	47.4	43.9	16.3	32.9	49.2	65.6
94	Paraguay	44.6	53.1	52.5	41.2	25.8	41.2	46.4	55.7
95	Dominican Republic	44.6	59	42	46.8	21.5	40.9	50.9	54.5
96	Azerbaijan	44.6	64	48.6	39	27.3	41.5	45	47.8
97	India	44.3	52.6	43.2	35.3	36.4	42	55.3	45.9
98	Namibia	44.3	51.7	56.1	45.2	26.6	32.2	43.8	59.1
99	Belize	43.7	66.5	44.9	46.4	19	36.1	48.7	45.2
100	Uzbekistan	43.7	73.9	48	34.9	16.7	35.4	51.6	46.6
101	Morocco	43.5	57	50.1	30.7	25.2	44.5	48	52.3
102	El Salvador	42.6	56.2	46.8	35.9	25	37.6	49.3	50.3
103	Jordan	42.5	55.3	43.9	35.9	27.5	37.6	50.8	49
104	Iran (Islamic Republic of)	42.4	57.2	55.2	33.1	33.1	39	42.5	34.1
105	Kenya	42.1	54.1	45.2	40.6	32.1	30.8	46.8	46.7
106	Palestine, State of	42	66.8	47.1	37.5	27.7	25.5	46.6	42.6
107	Ghana	41.3	50.1	43	45.1	24.2	36.8	41.6	52
108	Bhutan	41	55.7	34.5	36.1	18.6	35.8	50.6	62.7
109	Timor-Leste	40.5	56.2	36	37.9	31.6	31.5	44.8	48.4
110	Lesotho	40.5	52.3	59.3	41.4	19.1	24.8	45.2	41.9
111	Algeria	40.3	66.2	44.7	38.6	17	32.8	38.9	45.2
112	Cambodia	40.1	43.3	43.3	32.5	23.7	39.7	52.5	48.8
113	Honduras	40.1	40.8	54.6	42.9	28.3	28.7	43.6	42.8
114	Nicaragua	40.1	43.9	46.1	42.7	26.9	31.5	44.7	46.9
115	Rwanda	39.7	39.9	49.5	30.4	28.2	30.8	45.5	60.2
116	Tajikistan	39.5	69.7	45.7	37.3	20.4	26	36.9	41.2
117	Malawi	39	35.8	41.7	52.6	27.8	23.6	46.6	48
118	Eswatini (Kingdom of)	38.5	52.5	44.2	41.5	29.6	25.3	35.6	42.2
119	Guatemala	38.1	37	48.6	38	22.3	31.1	49.3	41.7
120	Bangladesh	38.1	44.7	51.5	36.3	19.2	28.3	46.9	41
121	Lao People's Democratic Republic	38	50.1	42.1	42	19.9	23.1	45.1	46.7
122	Uganda	37.9	41.9	39.1	39.2	25.4	24.9	49.9	48.1
123	Pakistan	37.9	42	46.3	42.8	23.1	29.5	45.8	34.4
124	Nigeria	37.6	47.3	46.8	41.9	23	25.3	43.8	33.6
125	Gambia	37.1	42	35.5	35.7	36.3	27	42.2	43.1
126	Venezuela (Bolivarian Republic of)	36.7	62.1	46.9	33.1	18	26.2	30.2	42
127	Zambia	36.6	43.6	42.7	31.3	22.2	22.6	50.6	46.7
128	Nepal	36.4	52.8	33	30	23	23.2	48.9	47.1
129	Liberia	35.9	38.6	35.9	44.3	35.6	17	41.7	39.4
130	Zimbabwe	35.1	46.5	38.9	27.2	26	30.1	37.6	41.5
131	Sierra Leone	34.9	36.9	42.3	49.9	22.7	18.5	35.6	40.1
132	Tanzania (United Republic of)	34.7	29.3	36.2	39.4	26.9	21.4	46.2	48
133	Togo	34.4	38.1	38.6	36.8	19.6	24.9	43.3	41.9
134	Senegal	34.2	32.6	40.1	32.1	18.4	29.4	41.9	50.5
135	Cameroon	34.1	38.7	45.3	33.2	21.7	23.3	38.5	39.8
136	Myanmar	34	44.3	41	26	19.6	26.6	42.4	40.4
137	Iraq	33	42.7	37.2	47.6	11.8	24.2	33.4	34.2
138	Côte d'Ivoire	32.9	37.5	36.5	33.2	14.8	23.2	45.2	43.2
139	Ethiopia	32.6	34.3	36.4	37.2	15.9	15.9	46.1	47.5
140	Madagascar	32.2	32.3	43.4	38.5	16.1	18.1	37.7	43.3
141	Burundi	31.9	34.5	33.5	39.5	24.5	21	32.3	41.1
142	Benin	31.6	31.3	37.9	30.1	19.4	25.2	39	42
143	Mozambique	31.2	31.3	27.8	32.4	24.5	21.2	44.2	40
144	Burkina Faso	30.9	30.2	40	33.2	14.4	22.7	39.6	38.7
145	Sudan	30.4	37.1	29.9	26.8	31.1	17.7	38.9	32.2
146	Guinea	29.6	21.8	37	35.5	16.8	24.6	37.6	36.1
147	Mauritania	29	33.7	36.1	20.7	18.4	23.9	37.7	34.4
148	Angola	28.9	27.1	30.7	38.2	14.2	26.1	27.4	43.2
149	Mali	28.7	20.3	39.8	23.6	23.4	21.5	40.4	34
150	Yemen	28.6	32.5	22.2	33.4	29.9	22.1	35.5	23
151	Afghanistan	28.4	36.8	34.3	28	20.3	22.2	32	23.4
152	Congo (Democratic Republic of the)	27.1	25.6	28.8	22.9	19.8	21.7	39.2	33.7
153	Niger	26.5	9.7	42.6	25.8	17.6	17.9	37.4	38.3
154	Chad	24.9	14.5	34.3	30.6	18	15.9	31.4	31.8



# SECTORAL INDICES



**PRE-UNIVERSITY  
EDUCATION**



**TECHNICAL AND VOCATIONAL  
EDUCATION AND TRAINING**



**HIGHER  
EDUCATION**



**RESEARCH, DEVELOPMENT  
AND INNOVATION**



**INFORMATION AND  
COMMUNICATIONS TECHNOLOGY**



**ECONOMY**



**ENABLING  
ENVIRONMENT**



# PRE-UNIVERSITY EDUCATION

Rank	Country	World average: 60.8	Value	Rank	Country	World average: 60.8	Value
1	Finland		82.7	78	Algeria		66.2
2	Denmark		81.7	79	Greece		66.1
3	France		81.5	80	Peru		66.0
4	Switzerland		81.2	81	Sri Lanka		65.9
5	Norway		81.2	82	Jamaica		65.2
6	United Arab Emirates		80.9	83	Mexico		64.8
7	China		80.8	84	Cabo Verde		64.7
8	Netherlands		80.7	85	New Zealand		64.4
9	Belgium		80.7	86	Azerbaijan		64.0
10	Sweden		80.7	87	Argentina		62.5
11	Hong Kong, China (SAR)		80.7	88	Suriname		62.4
12	Japan		80.3	89	Venezuela (Bolivarian Republic of)		62.1
13	Slovenia		80.3	90	Brazil		61.7
14	Qatar		80.2	91	Malaysia		60.9
15	Belarus		79.4	92	Dominican Republic		59.0
16	Poland		79.2	93	Bulgaria		58.5
17	Czechia		78.8	94	Guyana		58.2
18	Portugal		78.8	95	Indonesia		57.6
19	Russian Federation		78.8	96	Botswana		57.5
20	Latvia		78.8	97	Turkey		57.3
21	Israel		78.7	98	Iran (Islamic Republic of)		57.2
22	United Kingdom		78.6	99	Morocco		57.0
23	Ukraine		78.5	100	Romania		56.5
24	Malta		78.5	101	El Salvador		56.2
25	Korea (Republic of)		78.5	102	Timor-Leste		56.2
26	Kyrgyzstan		78.3	103	South Africa		56.1
27	Singapore		77.8	104	Bhutan		55.7
28	Slovakia		77.7	105	Jordan		55.3
29	Germany		77.5	106	Kenya		54.1
30	United States		77.4	107	Paraguay		53.1
31	Estonia		77.3	108	Nepal		52.8
32	Montenegro		76.5	109	India		52.6
33	Iceland		76.3	110	Eswatini (Kingdom of)		52.5
34	Croatia		75.5	111	Panama		52.4
35	Serbia		75.1	112	Lesotho		52.3
36	Spain		75.1	113	Namibia		51.7
37	Italy		74.9	114	Ghana		50.1
38	Mauritius		74.9	115	Lao People's Democratic Republic		50.1
39	Barbados		74.8	116	Lebanon		47.6
40	Viet Nam		74.4	117	Nigeria		47.3
41	Oman		74.4	118	Zimbabwe		46.5
42	Seychelles		74.3	119	Bangladesh		44.7
43	Hungary		74.2	120	Myanmar		44.3
44	Trinidad and Tobago		73.9	121	Nicaragua		43.9
45	Uzbekistan		73.9	122	Zambia		43.6
46	North Macedonia		73.6	123	Cambodia		43.3
47	Australia		73.6	124	Iraq		42.7
48	Cyprus		73.4	125	Gambia		42.0
49	Austria		73.2	126	Pakistan		42.0
50	Saint Lucia		72.6	127	Uganda		41.9
51	Bolivia (Plurinational State of)		72.3	128	Honduras		40.8
52	Saudi Arabia		72.2	129	Rwanda		39.9
53	Moldova (Republic of)		71.9	130	Cameroon		38.7
54	Kazakhstan		71.8	131	Liberia		38.6
55	Luxembourg		71.3	132	Togo		38.1
56	Albania		71.1	133	Côte d'Ivoire		37.5
57	Mongolia		71.0	134	Sudan		37.1
58	Lithuania		70.9	135	Guatemala		37.0
59	Ireland		70.8	136	Sierra Leone		36.9
60	Philippines		70.5	137	Afghanistan		36.8
61	Tunisia		70.5	138	Malawi		35.8
62	Georgia		70.4	139	Burundi		34.5
63	Tajikistan		69.7	140	Ethiopia		34.3
64	Brunei Darussalam		69.5	141	Mauritania		33.7
65	Costa Rica		69.1	142	Senegal		32.6
66	Kuwait		68.6	143	Yemen		32.5
67	Ecuador		68.5	144	Madagascar		32.3
68	Bahrain		68.4	145	Benin		31.3
69	Uruguay		68.0	146	Mozambique		31.3
70	Chile		67.6	147	Burkina Faso		30.2
71	Armenia		67.2	148	Tanzania (United Republic of)		29.3
72	Egypt		67.1	149	Angola		27.1
73	Thailand		67.0	150	Congo (Democratic Republic of the)		25.6
74	Colombia		66.9	151	Guinea		21.8
75	Palestine, State of		66.8	152	Mali		20.3
76	Bosnia and Herzegovina		66.6	153	Chad		14.5
77	Belize		66.5	154	Niger		9.7



# TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

Rank	Country	World average: 51.2	Value	Rank	Country	World average: 51.2	Value
1	United States		73.5	78	Ukraine		50.5
2	Germany		72.8	79	Morocco		50.1
3	Switzerland		72.4	80	Argentina		49.8
4	Austria		71.3	81	Colombia		49.7
5	Hungary		71.0	82	Indonesia		49.5
6	Netherlands		70.6	83	Rwanda		49.5
7	Slovakia		70.5	84	Uruguay		49.2
8	United Arab Emirates		70.1	85	Azerbaijan		48.6
9	Saudi Arabia		69.6	86	Guatemala		48.6
10	Finland		68.8	87	Barbados		48.0
11	New Zealand		68.5	88	Uzbekistan		48.0
12	Kuwait		67.6	89	Lebanon		47.6
13	Belgium		67.4	90	Hong Kong, China (SAR)		47.5
14	Norway		67.0	91	Trinidad and Tobago		47.5
15	Czechia		66.6	92	Tunisia		47.5
16	Oman		66.6	93	Cabo Verde		47.4
17	Singapore		66.3	94	Palestine, State of		47.1
18	Estonia		65.9	95	Greece		47.1
19	Australia		65.8	96	Venezuela (Bolivarian Republic of)		46.9
20	China		65.7	97	Nigeria		46.8
21	Luxembourg		65.6	98	El Salvador		46.8
22	Latvia		65.2	99	Ecuador		46.5
23	Botswana		64.7	100	Pakistan		46.3
24	Slovenia		64.7	101	Jamaica		46.2
25	Iceland		64.0	102	Nicaragua		46.1
26	Japan		63.8	103	Tajikistan		45.7
27	Sweden		63.7	104	Armenia		45.4
28	Spain		63.0	105	Cameroon		45.3
29	United Kingdom		63.0	106	Kenya		45.2
30	Serbia		62.9	107	Belize		44.9
31	Portugal		62.7	108	Algeria		44.7
32	Croatia		62.3	109	Georgia		44.5
33	Denmark		62.0	110	Eswatini (Kingdom of)		44.2
34	Korea (Republic of)		61.8	111	Peru		44.2
35	Philippines		61.6	112	Jordan		43.9
36	France		61.4	113	Kazakhstan		43.5
37	Ireland		61.4	114	Thailand		43.4
38	Belarus		61.3	115	Madagascar		43.4
39	Italy		60.3	116	Cambodia		43.3
40	North Macedonia		60.0	117	India		43.2
41	Lesotho		59.3	118	Ghana		43.0
42	Poland		58.7	119	Zambia		42.7
43	Bolivia (Plurinational State of)		58.6	120	Panama		42.7
44	Malaysia		58.3	121	Niger		42.6
45	Bulgaria		57.8	122	Sierra Leone		42.3
46	Israel		57.1	123	Lao People's Democratic Republic		42.1
47	Turkey		56.9	124	Dominican Republic		42.0
48	Bosnia and Herzegovina		56.7	125	Malawi		41.7
49	Namibia		56.1	126	Myanmar		41.0
50	Montenegro		56.0	127	Senegal		40.1
51	Suriname		55.9	128	Burkina Faso		40.0
52	Mexico		55.3	129	Mali		39.8
53	South Africa		55.3	130	Uganda		39.1
54	Iran (Islamic Republic of)		55.2	131	Zimbabwe		38.9
55	Lithuania		55.0	132	Albania		38.8
56	Brazil		55.0	133	Togo		38.6
57	Romania		55.0	134	Benin		37.9
58	Honduras		54.6	135	Iraq		37.2
59	Viet Nam		54.5	136	Guinea		37.0
60	Russian Federation		54.5	137	Côte d'Ivoire		36.5
61	Moldova (Republic of)		54.4	138	Ethiopia		36.4
62	Kyrgyzstan		54.0	139	Tanzania (United Republic of)		36.2
63	Brunei Darussalam		53.8	140	Mauritania		36.1
64	Malta		53.7	141	Timor-Leste		36.0
65	Sri Lanka		53.7	142	Liberia		35.9
66	Costa Rica		53.6	143	Gambia		35.5
67	Cyprus		53.6	144	Bhutan		34.5
68	Egypt		53.4	145	Afghanistan		34.3
69	Mauritius		53.4	146	Chad		34.3
70	Qatar		53.3	147	Burundi		33.5
71	Seychelles		53.0	148	Nepal		33.0
72	Guyana		53.0	149	Angola		30.7
73	Mongolia		52.8	150	Sudan		29.9
74	Paraguay		52.5	151	Saint Lucia		29.1
75	Chile		52.4	152	Congo (Democratic Republic of the)		28.8
76	Bahrain		51.8	153	Mozambique		27.8
77	Bangladesh		51.5	154	Yemen		22.2





# HIGHER EDUCATION

Rank	Country	World average: 46.1	Value	Rank	Country	World average: 46.1	Value
1	Switzerland		71.3	78	Namibia		45.2
2	United Kingdom		69.7	79	Ghana		45.1
3	Sweden		69.0	80	Mexico		44.7
4	Iceland		68.7	81	Liberia		44.3
5	United States		68.5	82	Cabo Verde		43.9
6	Netherlands		68.5	83	Russian Federation		43.8
7	Luxembourg		68.4	84	Ecuador		43.5
8	Norway		67.8	85	Honduras		42.9
9	Austria		67.3	86	Pakistan		42.8
10	Denmark		66.0	87	Nicaragua		42.7
11	Belgium		65.6	88	Jamaica		42.5
12	Australia		65.6	89	Barbados		42.3
13	Estonia		64.8	90	Lao People's Democratic Republic		42.0
14	Germany		64.8	91	Brazil		42.0
15	Finland		64.1	92	Nigeria		41.9
16	United Arab Emirates		64.0	93	Malaysia		41.9
17	Israel		63.8	94	Kuwait		41.7
18	Portugal		63.5	95	Eswatini (Kingdom of)		41.5
19	France		61.5	96	Lesotho		41.4
20	Qatar		61.4	97	Moldova (Republic of)		41.4
21	New Zealand		61.2	98	Paraguay		41.2
22	Bulgaria		60.9	99	Tunisia		40.8
23	Singapore		60.7	100	Mongolia		40.8
24	Hong Kong, China (SAR)		60.5	101	Sri Lanka		40.8
25	Malta		60.2	102	Kenya		40.6
26	Slovenia		60.1	103	South Africa		40.6
27	Lithuania		59.4	104	Trinidad and Tobago		40.4
28	Ireland		59.3	105	Burundi		39.5
29	Romania		57.7	106	Tanzania (United Republic of)		39.4
30	Czechia		57.6	107	Uganda		39.2
31	Lebanon		56.7	108	China		39.1
32	Spain		56.6	109	Azerbaijan		39.0
33	Poland		55.9	110	Oman		38.6
34	Croatia		55.5	111	Algeria		38.6
35	Egypt		54.6	112	Madagascar		38.5
36	Guyana		54.0	113	Angola		38.2
37	Panama		54.0	114	Guatemala		38.0
38	Slovakia		53.8	115	Timor-Leste		37.9
39	Latvia		53.7	116	Kyrgyzstan		37.7
40	Italy		52.9	117	Palestine, State of		37.5
41	Cyprus		52.8	118	Tajikistan		37.3
42	Saudi Arabia		52.8	119	Ethiopia		37.2
43	Malawi		52.6	120	Thailand		37.0
44	Hungary		50.6	121	Togo		36.8
45	Montenegro		50.5	122	Bangladesh		36.3
46	Saint Lucia		50.3	123	Bhutan		36.1
47	Belarus		50.2	124	El Salvador		35.9
48	Sierra Leone		49.9	125	Jordan		35.9
49	Bolivia (Plurinational State of)		49.8	126	Viet Nam		35.8
50	Brunei Darussalam		49.7	127	Gambia		35.7
51	Georgia		49.7	128	Guinea		35.5
52	Philippines		49.6	129	India		35.3
53	Armenia		49.3	130	Uzbekistan		34.9
54	Ukraine		49.3	131	Turkey		34.0
55	Japan		49.3	132	Yemen		33.4
56	Seychelles		49.0	133	Burkina Faso		33.2
57	Argentina		48.9	134	Côte d'Ivoire		33.2
58	Greece		48.7	135	Cameroon		33.2
59	North Macedonia		48.6	136	Venezuela (Bolivarian Republic of)		33.1
60	Bosnia and Herzegovina		48.5	137	Iran (Islamic Republic of)		33.1
61	Suriname		48.5	138	Cambodia		32.5
62	Albania		48.3	139	Mozambique		32.4
63	Uruguay		48.3	140	Senegal		32.1
64	Korea (Republic of)		48.3	141	Zambia		31.3
65	Peru		47.9	142	Morocco		30.7
66	Iraq		47.6	143	Chad		30.6
67	Botswana		47.6	144	Rwanda		30.4
68	Serbia		47.5	145	Benin		30.1
69	Chile		47.1	146	Nepal		30.0
70	Dominican Republic		46.8	147	Afghanistan		28.0
71	Belize		46.4	148	Zimbabwe		27.2
72	Kazakhstan		46.3	149	Sudan		26.8
73	Costa Rica		45.8	150	Myanmar		26.0
74	Colombia		45.8	151	Niger		25.8
75	Mauritius		45.8	152	Mali		23.6
76	Bahrain		45.4	153	Congo (Democratic Republic of the)		22.9
77	Indonesia		45.3	154	Mauritania		20.7



# RESEARCH, DEVELOPMENT AND INNOVATION

Rank	Country	World average: 31.4	Value
1	Switzerland		57.2
2	United States		56.7
3	Israel		56.7
4	United Kingdom		56.5
5	Sweden		56.4
6	Netherlands		52.7
7	Finland		51.7
8	Korea (Republic of)		51.5
9	Denmark		50.5
10	Luxembourg		50.2
11	Singapore		49.6
12	China		49.5
13	Japan		48.8
14	Germany		48.4
15	Hong Kong, China (SAR)		47.9
16	France		47.8
17	Estonia		46.9
18	Austria		46.7
19	Iceland		46.7
20	Italy		46.2
21	Ireland		45.7
22	Belgium		45.0
23	New Zealand		44.8
24	Australia		43.8
25	Slovenia		43.6
26	Czechia		42.7
27	Norway		42.2
28	United Arab Emirates		42.0
29	Malta		41.1
30	Spain		40.8
31	Cyprus		40.1
32	Montenegro		39.8
33	Hungary		39.2
34	Bulgaria		39.1
35	Portugal		38.3
36	North Macedonia		38.2
37	Chile		37.6
38	Latvia		37.4
39	Greece		37.0
40	Colombia		36.8
41	Qatar		36.6
42	India		36.4
43	Gambia		36.3
44	Turkey		36.1
45	Belarus		36.1
46	Croatia		36.0
47	Saudi Arabia		36.0
48	Liberia		35.6
49	Lebanon		35.5
50	Malaysia		35.5
51	Slovakia		35.4
52	Romania		35.3
53	South Africa		34.9
54	Poland		34.0
55	Serbia		33.9
56	Iran (Islamic Republic of)		33.1
57	Russian Federation		32.7
58	Egypt		32.7
59	Botswana		32.7
60	Barbados		32.5
61	Lithuania		32.2
62	Kenya		32.1
63	Thailand		32.0
64	Guyana		31.7
65	Panama		31.7
66	Timor-Leste		31.6
67	Georgia		31.3
68	Bosnia and Herzegovina		31.2
69	Suriname		31.2
70	Sudan		31.1
71	Armenia		30.9
72	Moldova (Republic of)		30.9
73	Mongolia		30.9
74	Peru		30.7
75	Bolivia (Plurinational State of)		30.7
76	Brazil		30.6
77	Ukraine		30.6

Rank	Country	World average: 31.4	Value
78	Costa Rica		30.3
79	Yemen		29.9
80	Eswatini (Kingdom of)		29.6
81	Argentina		29.2
82	Oman		28.9
83	Saint Lucia		28.8
84	Sri Lanka		28.8
85	Uruguay		28.6
86	Mauritius		28.6
87	Kyrgyzstan		28.4
88	Honduras		28.3
89	Rwanda		28.2
90	Viet Nam		28.2
91	Ecuador		28.1
92	Malawi		27.8
93	Palestine, State of		27.7
94	Bahrain		27.6
95	Jordan		27.5
96	Seychelles		27.3
97	Azerbaijan		27.3
98	Tanzania (United Republic of)		26.9
99	Nicaragua		26.9
100	Tunisia		26.8
101	Albania		26.8
102	Namibia		26.6
103	Zimbabwe		26.0
104	Mexico		25.9
105	Jamaica		25.9
106	Paraguay		25.8
107	Philippines		25.7
108	Uganda		25.4
109	Morocco		25.2
110	El Salvador		25.0
111	Burundi		24.5
112	Mozambique		24.5
113	Ghana		24.2
114	Cambodia		23.7
115	Mali		23.4
116	Indonesia		23.3
117	Kuwait		23.3
118	Pakistan		23.1
119	Nepal		23.0
120	Nigeria		23.0
121	Sierra Leone		22.7
122	Guatemala		22.3
123	Zambia		22.2
124	Kazakhstan		21.8
125	Cameroon		21.7
126	Dominican Republic		21.5
127	Brunei Darussalam		20.6
128	Tajikistan		20.4
129	Afghanistan		20.3
130	Trinidad and Tobago		20.0
131	Lao People's Democratic Republic		19.9
132	Congo (Democratic Republic of the)		19.8
133	Myanmar		19.6
134	Togo		19.6
135	Benin		19.4
136	Bangladesh		19.2
137	Lesotho		19.1
138	Belize		19.0
139	Bhutan		18.6
140	Senegal		18.4
141	Mauritania		18.4
142	Chad		18.0
143	Venezuela (Bolivarian Republic of)		18.0
144	Niger		17.6
145	Algeria		17.0
146	Guinea		16.8
147	Uzbekistan		16.7
148	Cabo Verde		16.3
149	Madagascar		16.1
150	Ethiopia		15.9
151	Côte d'Ivoire		14.8
152	Burkina Faso		14.4
153	Angola		14.2
154	Iraq		11.8





# INFORMATION AND COMMUNICATIONS TECHNOLOGY

Rank	Country	World average: 43.3	Value
1	Finland		74.3
2	Iceland		72.7
3	United States		72.4
4	Singapore		72.2
5	Estonia		71.1
6	United Kingdom		71.0
7	Luxembourg		70.6
8	Norway		70.5
9	Sweden		70.3
10	Denmark		70.3
11	Korea (Republic of)		69.2
12	Netherlands		68.5
13	Switzerland		67.8
14	United Arab Emirates		65.9
15	Israel		65.2
16	Austria		65.0
17	Japan		64.5
18	Cyprus		64.0
19	Poland		62.9
20	Ireland		62.8
21	Kuwait		62.7
22	France		62.6
23	Australia		62.2
24	New Zealand		61.4
25	Lithuania		61.3
26	Spain		60.7
27	Slovenia		60.6
28	Germany		60.4
29	Hong Kong, China (SAR)		60.3
30	Bahrain		59.6
31	Seychelles		59.3
32	Malta		59.1
33	China		59.0
34	Latvia		58.5
35	Saudi Arabia		58.2
36	Belgium		58.0
37	Croatia		57.0
38	Hungary		56.9
39	Czechia		56.8
40	Serbia		56.7
41	Portugal		55.7
42	Malaysia		55.5
43	Montenegro		55.3
44	Bulgaria		55.0
45	Slovakia		54.4
46	Chile		54.4
47	Belarus		54.0
48	Mauritius		53.6
49	Oman		53.0
50	Romania		52.6
51	Qatar		52.5
52	Italy		52.0
53	Moldova (Republic of)		51.7
54	Greece		51.2
55	Russian Federation		50.5
56	Brunei Darussalam		50.2
57	Egypt		50.0
58	North Macedonia		49.9
59	Barbados		49.9
60	Trinidad and Tobago		49.5
61	Costa Rica		49.4
62	Turkey		49.4
63	Armenia		49.0
64	Thailand		48.6
65	Georgia		48.2
66	Ukraine		48.2
67	Uruguay		48.1
68	Kazakhstan		46.4
69	Albania		46.2
70	Argentina		45.6
71	Brazil		45.0
72	Tunisia		44.9
73	Panama		44.5
74	Morocco		44.5
75	Mexico		44.1
76	Bosnia and Herzegovina		44.0
77	Colombia		42.1

Rank	Country	World average: 43.3	Value
78	India		42.0
79	Peru		41.8
80	Azerbaijan		41.5
81	Paraguay		41.2
82	South Africa		41.2
83	Dominican Republic		40.9
84	Viet Nam		40.9
85	Philippines		40.7
86	Indonesia		40.5
87	Cambodia		39.7
88	Mongolia		39.6
89	Iran (Islamic Republic of)		39.0
90	Ecuador		38.1
91	Kyrgyzstan		37.7
92	Jordan		37.6
93	El Salvador		37.6
94	Suriname		37.2
95	Ghana		36.8
96	Sri Lanka		36.5
97	Belize		36.1
98	Lebanon		36.0
99	Bolivia (Plurinational State of)		35.9
100	Bhutan		35.8
101	Uzbekistan		35.4
102	Jamaica		34.8
103	Guyana		33.4
104	Botswana		33.1
105	Cabo Verde		32.9
106	Algeria		32.8
107	Namibia		32.2
108	Timor-Leste		31.5
109	Nicaragua		31.5
110	Guatemala		31.1
111	Kenya		30.8
112	Rwanda		30.8
113	Zimbabwe		30.1
114	Pakistan		29.5
115	Senegal		29.4
116	Honduras		28.7
117	Bangladesh		28.3
118	Saint Lucia		28.2
119	Gambia		27.0
120	Myanmar		26.6
121	Venezuela (Bolivarian Republic of)		26.2
122	Angola		26.1
123	Tajikistan		26.0
124	Palestine, State of		25.5
125	Eswatini (Kingdom of)		25.3
126	Nigeria		25.3
127	Benin		25.2
128	Uganda		24.9
129	Togo		24.9
130	Lesotho		24.8
131	Guinea		24.6
132	Iraq		24.2
133	Mauritania		23.9
134	Malawi		23.6
135	Cameroon		23.3
136	Côte d'Ivoire		23.2
137	Nepal		23.2
138	Lao People's Democratic Republic		23.1
139	Burkina Faso		22.7
140	Zambia		22.6
141	Afghanistan		22.2
142	Yemen		22.1
143	Congo (Democratic Republic of the)		21.7
144	Mali		21.5
145	Tanzania (United Republic of)		21.4
146	Mozambique		21.2
147	Burundi		21.0
148	Sierra Leone		18.5
149	Madagascar		18.1
150	Niger		17.9
151	Sudan		17.7
152	Liberia		17.0
153	Chad		15.9
154	Ethiopia		15.9



Rank	Country	World average: 52.9	Value
1	Singapore		82.1
2	United Arab Emirates		79.8
3	Hong Kong, China (SAR)		78.2
4	Ireland		76.9
5	Denmark		74.5
6	United States		74.3
7	Korea (Republic of)		71.7
8	Malta		71.5
9	Switzerland		70.3
10	Norway		70.1
11	United Kingdom		70.1
12	Germany		69.8
13	Sweden		69.7
14	Belgium		68.4
15	Austria		68.4
16	Israel		68.3
17	France		68.2
18	Netherlands		67.9
19	Finland		67.9
20	Qatar		67.8
21	Estonia		67.6
22	Japan		67.6
23	New Zealand		67.5
24	Luxembourg		67.5
25	Australia		67.4
26	Cyprus		66.0
27	Slovenia		65.8
28	Lithuania		65.2
29	Malaysia		65.0
30	Hungary		64.7
31	Czechia		64.7
32	Thailand		64.1
33	Latvia		64.0
34	Seychelles		63.7
35	Kuwait		63.5
36	Iceland		63.2
37	China		63.1
38	Mauritius		62.2
39	Spain		62.2
40	Romania		62.0
41	Portugal		61.7
42	Panama		61.1
43	Bahrain		60.8
44	Slovakia		60.7
45	Poland		60.7
46	Viet Nam		60.1
47	Italy		60.0
48	Saudi Arabia		60.0
49	Croatia		59.3
50	Bulgaria		59.2
51	Chile		59.0
52	Indonesia		57.9
53	Montenegro		57.1
54	Peru		57.0
55	Mongolia		56.9
56	Egypt		56.7
57	Georgia		56.7
58	Mexico		55.8
59	North Macedonia		55.8
60	Serbia		55.4
61	India		55.3
62	Trinidad and Tobago		55.2
63	Brunei Darussalam		55.0
64	Oman		54.9
65	Russian Federation		54.5
66	Botswana		54.3
67	Turkey		53.6
68	Colombia		53.3
69	Cambodia		52.5
70	Moldova (Republic of)		52.4
71	Guyana		52.4
72	Kazakhstan		51.9
73	Uzbekistan		51.6
74	Philippines		51.1
75	Dominican Republic		50.9
76	Saint Lucia		50.8
77	Jordan		50.8

Rank	Country	World average: 52.9	Value
78	Jamaica		50.7
79	Bhutan		50.6
80	Zambia		50.6
81	Uruguay		50.6
82	Costa Rica		50.4
83	Greece		50.1
84	South Africa		49.9
85	Uganda		49.9
86	Guatemala		49.3
87	El Salvador		49.3
88	Cabo Verde		49.2
89	Bosnia and Herzegovina		49.2
90	Nepal		48.9
91	Tunisia		48.8
92	Lebanon		48.8
93	Sri Lanka		48.7
94	Barbados		48.7
95	Belize		48.7
96	Belarus		48.1
97	Morocco		48.0
98	Brazil		47.6
99	Albania		47.3
100	Armenia		47.2
101	Bangladesh		46.9
102	Kenya		46.8
103	Palestine, State of		46.6
104	Malawi		46.6
105	Paraguay		46.4
106	Ecuador		46.4
107	Tanzania (United Republic of)		46.2
108	Ethiopia		46.1
109	Ukraine		45.9
110	Pakistan		45.8
111	Kyrgyzstan		45.5
112	Rwanda		45.5
113	Côte d'Ivoire		45.2
114	Lesotho		45.2
115	Lao People's Democratic Republic		45.1
116	Azerbaijan		45.0
117	Timor-Leste		44.8
118	Nicaragua		44.7
119	Bolivia (Plurinational State of)		44.2
120	Mozambique		44.2
121	Namibia		43.8
122	Nigeria		43.8
123	Honduras		43.6
124	Togo		43.3
125	Iran (Islamic Republic of)		42.5
126	Argentina		42.5
127	Myanmar		42.4
128	Gambia		42.2
129	Senegal		41.9
130	Liberia		41.7
131	Ghana		41.6
132	Mali		40.4
133	Burkina Faso		39.6
134	Congo (Democratic Republic of the)		39.2
135	Benin		39.0
136	Algeria		38.9
137	Sudan		38.9
138	Cameroon		38.5
139	Madagascar		37.7
140	Mauritania		37.7
141	Zimbabwe		37.6
142	Guinea		37.6
143	Niger		37.4
144	Suriname		37.2
145	Tajikistan		36.9
146	Sierra Leone		35.6
147	Eswatini (Kingdom of)		35.6
148	Yemen		35.5
149	Iraq		33.4
150	Burundi		32.3
151	Afghanistan		32.0
152	Chad		31.4
153	Venezuela (Bolivarian Republic of)		30.2
154	Angola		27.4





# ENABLING ENVIRONMENT

Rank	Country	World average: 55.5	Value
1	Norway		88.4
2	Iceland		87.9
3	Sweden		85.6
4	Finland		85.0
5	Switzerland		84.4
6	Denmark		82.5
7	Luxembourg		82.3
8	Netherlands		81.2
9	New Zealand		81.0
10	Austria		80.7
11	Singapore		80.1
12	Ireland		79.7
13	Germany		78.9
14	Portugal		77.4
15	Uruguay		77.3
16	Belgium		77.1
17	United Kingdom		76.3
18	Estonia		76.2
19	France		75.1
20	Slovenia		74.8
21	Australia		74.4
22	Lithuania		74.3
23	Czechia		73.5
24	Spain		72.9
25	Malta		72.3
26	Japan		71.6
27	United Arab Emirates		69.3
28	Slovakia		69.2
29	Poland		68.5
30	Italy		68.5
31	Cyprus		68.2
32	Chile		67.8
33	Hungary		67.6
34	Croatia		66.3
35	Korea (Republic of)		66.0
36	Mauritius		65.9
37	Costa Rica		65.6
38	Cabo Verde		65.6
39	United States		65.5
40	Latvia		65.2
41	Greece		64.8
42	Brunei Darussalam		64.5
43	Romania		64.2
44	Barbados		63.4
45	Bhutan		62.7
46	Bulgaria		62.1
47	Montenegro		61.5
48	Georgia		61.2
49	Israel		61.2
50	Rwanda		60.2
51	Seychelles		60.2
52	Malaysia		60.2
53	Panama		59.7
54	North Macedonia		59.6
55	Qatar		59.4
56	Namibia		59.1
57	Argentina		58.9
58	Saint Lucia		58.8
59	Albania		58.6
60	Jamaica		58.5
61	Serbia		57.8
62	Kazakhstan		57.1
63	Thailand		57.0
64	Peru		56.7
65	China		56.6
66	Mongolia		56.3
67	Armenia		55.8
68	Paraguay		55.7
69	Botswana		55.2
70	Viet Nam		55.2
71	Brazil		54.6
72	Sri Lanka		54.6
73	Dominican Republic		54.5
74	Ukraine		54.4
75	Kuwait		53.7
76	South Africa		53.7
77	Moldova (Republic of)		53.4

Rank	Country	World average: 55.5	Value
78	Tunisia		53.4
79	Colombia		53.4
80	Trinidad and Tobago		53.3
81	Belarus		52.9
82	Ecuador		52.8
83	Saudi Arabia		52.4
84	Morocco		52.3
85	Indonesia		52.1
86	Ghana		52.0
87	Bosnia and Herzegovina		51.8
88	Egypt		51.2
89	Suriname		51.2
90	Mexico		51.1
91	Bahrain		51.1
92	Turkey		50.9
93	Russian Federation		50.8
94	Senegal		50.5
95	El Salvador		50.3
96	Guyana		50.0
97	Bolivia (Plurinational State of)		49.6
98	Jordan		49.0
99	Cambodia		48.8
100	Oman		48.7
101	Timor-Leste		48.4
102	Uganda		48.1
103	Tanzania (United Republic of)		48.0
104	Malawi		48.0
105	Azerbaijan		47.8
106	Hong Kong, China (SAR)		47.7
107	Philippines		47.6
108	Ethiopia		47.5
109	Nepal		47.1
110	Nicaragua		46.9
111	Lao People's Democratic Republic		46.7
112	Kenya		46.7
113	Zambia		46.7
114	Uzbekistan		46.6
115	Kyrgyzstan		45.9
116	India		45.9
117	Algeria		45.2
118	Belize		45.2
119	Madagascar		43.3
120	Angola		43.2
121	Côte d'Ivoire		43.2
122	Gambia		43.1
123	Honduras		42.8
124	Palestine, State of		42.6
125	Eswatini (Kingdom of)		42.2
126	Venezuela (Bolivarian Republic of)		42.0
127	Benin		42.0
128	Lesotho		41.9
129	Togo		41.9
130	Guatemala		41.7
131	Zimbabwe		41.5
132	Tajikistan		41.2
133	Burundi		41.1
134	Bangladesh		41.0
135	Myanmar		40.4
136	Sierra Leone		40.1
137	Mozambique		40.0
138	Cameroon		39.8
139	Lebanon		39.5
140	Liberia		39.4
141	Burkina Faso		38.7
142	Niger		38.3
143	Guinea		36.1
144	Pakistan		34.4
145	Mauritania		34.4
146	Iraq		34.2
147	Iran (Islamic Republic of)		34.1
148	Mali		34.0
149	Congo (Democratic Republic of the)		33.7
150	Nigeria		33.6
151	Sudan		32.2
152	Chad		31.8
153	Afghanistan		23.4
154	Yemen		23.0



# EXECUTIVE SUMMARY

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# INTRODUCTION

Profound contemporary global transformations—and their associated knowledge and technological revolutions—underline the central role of knowledge in achieving human development. Knowledge expands the opportunities available to individuals, empowering them to achieve socio-economic progress by developing their capabilities in a range of disciplines and sectors. It is broadly understood that no country can achieve its development goals without the support of suitable knowledge assets.

Nations around the world are racing to develop effective means and mechanisms to improve and leverage their human resources in a way that allows them to compete in a modern, globalized economy. This is especially relevant in the context of the Fourth Industrial Revolution, which emphasizes both knowledge economy and advanced technology. Therefore, countries must develop the knowledge and key skills amid an evolving environment that is driven by the intertwined effects of rapid change. While many consider only the economic effects of the Fourth Industrial Revolution, there is increasing global awareness of its profound effects on a range of areas from production, finance and business, to social, political, cultural and security systems.

Given the key relationship between knowledge and development, interest began to grow surrounding the means to measure and monitor related trends and conditions well before the concept of the Fourth Industrial Revolution arose. This is especially due to the complexity of the challenges related to achieving the sustainable development goals. The aim of such endeavours has been to chart the progress achieved toward development and humanitarian goals and identify related shortfalls. Knowledge indices are an important tool in this regard, as they allow for systematic and comprehensive assessments of the strengths and weaknesses of knowledge systems, and offer insights concerning the most appropriate means to achieve comprehensive human development.

The Global Knowledge Index (GKI) is one such instrument; by providing reliable data via its composite sectoral sub-indices, this methodological tool assists in measuring performance trends across the various elements of the knowledge system. It provides a comparison across regions and through times, highlights successful experiences, identifies the factors behind these successes, and helps direct efforts and resources to develop solutions to existing problems. As such, this tool promotes transparency by providing access to objective and accurate information, and facilitates information sharing on development policies and their outputs.

## Reviewing indices: An evolutionary necessity

Indices evolve based on a process of development that is supported by periodic reviews. Such reviews are necessary to keep pace with scientific developments and ensure current challenges and concerns are reflected. Metrics and indices therefore need to be regularly updated to ensure they are both effective and sustainable. The review may investigate the structure of the index, its variables and/or the concepts upon which it is based. They are also conducted for objective reasons; for example, in response to the discontinuation of particular variables, the emergence of new variables and the presence of contextual factors that require an update to the pillars or sub-pillars of the index.

*Development is dynamic; priorities and values shift. So should metrics. That is why the human development measurement toolkit has constantly evolved [...]. The challenges we face, and the possibilities before us, have always been more complex, much more multidimensional and interconnected than a single metric—or even a handful of metrics, no matter how good—could ever capture on its own. Complexity requires more lenses. New metrics help construct them.*

*Source: UNDP, 2020.*

Accordingly, in early 2021, a deep review was launched to reassess the structure of the GKI. This report represents the outcome of that review, including the most important changes and their justifications. It explains the methodological steps that were followed throughout the review and the various statistical treatments adopted to verify psychometric conditions.



## About the GKI 2017

The GKI, launched at the end of 2017, sought to raise awareness of the need to create a composite index that meets the necessary methodological conditions to contribute to international efforts tracking and monitoring knowledge, and the extent to which it supports comprehensive and sustainable human development. It was built by a multidisciplinary team of academic researchers, in consultation with a broader consulting team comprising independent experts and those affiliated with specialized international bodies. The initiative was launched at a time when reliable data was scarce, national and international assessments offered widely varying indicators, and composite indices that examined interactions between different development sectors were lacking.

The GKI is a composite index consisting of seven sub-indices that highlight the performance of six sectors (pre-university education; technical and vocational education and training (TVET); higher education; research, development and innovation (RDI); information and communications technology (ICT); and economy), and a composite index of enabling environment that measures the social, political and economic contexts of those sectors. The 2017 GKI was structured as follows:

- Pre-university education sub-index, comprising two pillars: knowledge capital and educational enabling environment.
- TVET sub-index, consisting of two pillars: formation and professional training, and features of the labour market.
- Higher education sub-index, consisting of two pillars: higher education inputs, and higher education outputs and quality.
- RDI sub-index, comprising three pillars: research and development, innovation in production, and societal innovation.
- ICT sub-index, consisting of two pillars: ICT inputs and ICT outputs.
- Economy sub-index, consisting of three pillars: knowledge competitiveness, economic openness, and financing and value added.
- Enabling environment sub-index, comprising three pillars: political and institutional, socio-economic, and health and environment.

*These sectors are not isolated; rather, they are interactive and integrated systems. [...] The complementary nature of the variables does not mean that some replace others [...]. This highlights the importance of the optimal distribution of the various elements affecting knowledge performance, which justifies assigning equal weights to the different sectors that constitute the Index. Knowledge performance is not the simple sum of the performance of each sector but rather reflects how the sectors contribute to each other to achieve the highest level of knowledge effectiveness. The performance of each sector is thus interdependent.*


*Source: UNDP and MBRF, 2017.*

## The 2021 GKI

### 1) Review procedure

The methodology for reviewing the GKI included the following:

- Forming an expanded consulting team, comprising academics, specialists and experts from international organizations, divided into sectoral committees according to their fields of specialization.
- Providing these specialized committees with explanatory documents concerning the conceptual and methodological construction of their respective sectoral sub-indices.
- Collecting all the suggestions of advisory board members, and then categorizing them by subject (general structure, pillars or variables) and availability. All variables were considered and assessed according to their: relevance to the sectors in question; comparability; suitability for the current context (i.e., the 2030 Agenda, the Fourth Industrial Revolution); and potential to be updated at a later date.



Controversial issues were discussed to reach consensus. These interactions facilitated agreement on the structure of the sub-indices and their variables. Despite the many alternatives that were proposed and discussed between advisory board members, data unavailability necessitated a long-term, pragmatic view when adopting relevant variables to ensure they were sustainable and covered the largest possible number of countries. The following chapters will cover in detail the discussions that took place in relation to each sub-index and present its new, agreed structure.

## 2) Revised GKI structure 2021

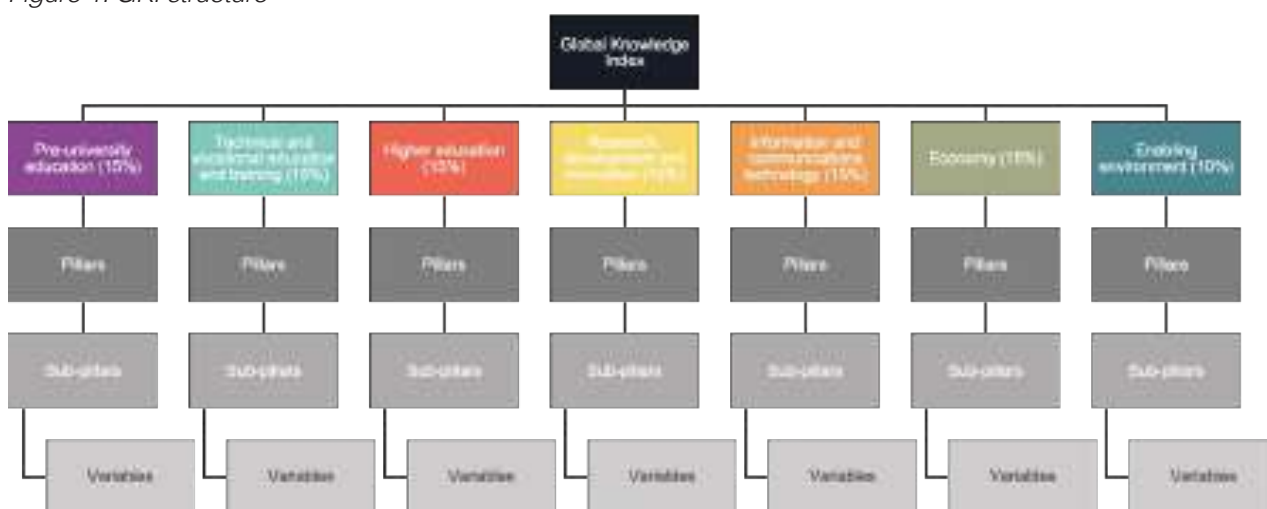
- Pre-university education sub-index, comprising two pillars: knowledge capital and educational enabling environment.
- TVET sub-index, covering two pillars: TVET components, and TVET labour market.
- Higher education sub-index, consisting of three pillars: inputs, learning environment, and outputs.
- RDI sub-index, including three pillars: inputs, outputs and impact.
- ICT sub-index, consisting of three pillars: infrastructure, access and usage.
- Economy sub-index, comprising three pillars: economic competitiveness, economic openness, and financing and domestic value added.
- Enabling environment, consisting of three pillars: governance, socio-economic, and health and environment.

# STATISTICAL METHODOLOGY

As previously mentioned, the Global Knowledge Index (GKI) consists of seven sub-indices—pre-university education; technical and vocational education and training; higher education; research, development and innovation (RDI); information and communications technology (ICT); economy; and enabling environment—each of which was constructed in accordance with standard international methodologies for the design of composite indicators.<sup>1</sup>

The structure of the Index features a hierarchy comprising sectoral indices (referred to as sub-indices), pillars, sub-pillars and variables. Each of the six sub-indices has a weight of 15 percent, except for enabling environment, which is accorded a weight of 10 percent (Figure 1).

Figure 1: GKI structure



## Selection of variables

The selection of variables included in the construction of each of the seven sub-indices was based on a clearly defined scientific methodology drawn from an extensive review of relevant local and international literature, as well as the experiences of, and concepts employed by, international organizations and agencies. It also relied on an intensive consultation process that engaged high-level advisory board members from different countries with a variety of different backgrounds and affiliations, all specialized in fields related to the sectors of the GKI. This process began with a mapping of the variables of the 2017 GKI that detailed the status of these variables (i.e. whether the variable is still reported or has been discontinued) but also assessed their methodologies and limitations. A complementary mapping exercise was undertaken to list variables capturing emerging trends that could potentially be included within the new structure of the index. Focus group meetings were also held to discuss the propositions and feedback from the advisory board, chaired by the core team members who prepared the report. Based on these discussions and focused workshops, final structures—including pillars, sub-pillars and variables—were produced.

A principal component analysis was used to confirm the consistency of the selected variables and the structure of their classification within the various sub-indices, further supporting the consistency of the broader conceptual context across the variables and sub-groups—for which the explained variance ratio in most cases exceeded 65 percent.<sup>2</sup>

The results of the in-depth correlation analysis and Cronbach's Alpha coefficient (exceeding 0.70 in most cases) confirmed the validity of the selection and classification of the variables. Furthermore, the correlation matrix for normalized variables was analysed to ensure that they followed the same direction as the composite index.



## Data collection

The 155 variables employed in the 2021 GKI were drawn from over 40 international sources and databases including those of the United Nations Educational, Scientific and Cultural Organization (UNESCO); the World Bank; the International Telecommunication Union (ITU); the World Economic Forum (WEF); the International Monetary Fund (IMF); the Organisation for Economic Co-operation and Development (OECD); the International Labour Organization (ILO) and other United Nations agencies and international organizations. The collected data was reviewed multiple times to ensure no errors had occurred during data entry; consequently, data was processed on the assumption that it was error-free. Also, all variables were taken in relative terms, and for those not linked to other size-dependent variables—such as population or GDP—results were recalculated after adjusting for the effect of the size. Variables included are in the form of hard data, composite indicators and survey questions/responses.

The most recent data for each variable within the period 2011–2021 was used.<sup>3</sup> As a prerequisite, data employed in the construction of the sub-indices met certain statistical criteria. This applied to all sub-indices and for all countries. In cases where data for a variable were not available for at least half of the countries, these variables were excluded from the structure.

The methods used to identify and treat outliers, severe skewness and severe kurtosis are outlined below.

## Data treatment

### Skewness and kurtosis

A variable was considered to have severe skewness if its absolute skewness coefficient was above 2.25, while an absolute kurtosis coefficient above 3.5 indicated that the variable had severe kurtosis.<sup>4</sup> Such variables required statistical treatment before being employed.

### Outliers

The value of a variable was considered an outlier if its instance fell outside the range of the specific data fence defined as follows:

$$\text{Lower bound} = \text{first quartile} - 1.5 \times \text{interquartile range}$$

$$\text{Upper bound} = \text{third quartile} + 1.5 \times \text{interquartile range}$$

By applying the rules for identifying outliers, severe skewness and/or severe kurtosis in the data of the variables, the team found 48 variables with outliers, skewness and/or severe kurtosis.

Variables with one to five outliers were Winsorized, whereby those values considered as outliers were assigned the second highest value (in the case of high values) or the second lowest value (in the case of low values) until the skewness and kurtosis were brought into acceptable ranges. In addition, variables with more than five outliers were treated using logarithmic or square root transformation. Table 1 shows the frequency distribution of these outlying variables according to the respective sub-index and the treatment used.

Table 1: Frequency distribution of GKI variables with outliers, skewness and/or kurtosis by sector and treatment

Sub-index	Treatment			Frequency
	Winsorization	Transformation		
		Logarithmic	Square root	
Pre-university education	5	-	-	5
Technical and vocational education and training	3	-	-	3
Higher education	5	-	-	5
Research, development and innovation	11	4	2	17
Information and communications technology	3	4	1	8
Economy	7	1	-	8
Enabling environment	2	-	-	2
Total	36	9	3	48

For example, in the pre-university education sub-index, within the variable 'net enrolment rate in primary education', outliers were identified and were treated using the Winsorization technique. Whereas in the information and communications technology sub-index, the two outlying variables, 'secure Internet servers per 1 million population' and 'international Internet bandwidth per user', were treated using square root and logarithmic transformations, respectively.

## Normalization

The rescaling or min-max method was used for normalization, where the values of variables were normalized into the [0,100] range, in which higher values indicated better results. The normalization criterion depends on whether the variable is good (has a positive relation with the overall index) or bad (has a negative relation with the overall index).

The good variables were normalized using the following formula:

$$\text{Normalized value} = \frac{\text{Country value} - \text{minimum sample value}}{\text{Maximum sample value} - \text{minimum sample value}} \times 100$$

In the case of bad variables (i.e. those with an inverse relation), the formula was adjusted as follows:

$$\text{Normalized value} = \frac{\text{Maximum sample value} - \text{country sample value}}{\text{Maximum sample value} - \text{minimum sample value}} \times 100$$

For survey data or composite indices, the original series' ranges of values were retained in the form of minimum and maximum values—for instance, in the case of the [1,7] range for the World Economic Forum Executive Opinion Survey variables.

## Index weighting

Weighting across the different components of the index (sub-indices, pillars and sub-pillars) was not unified; rather, it varied according to the nature of the components and their relative importance. Weightings identified for the seven constituent indices ranged from equal weighting and budget allocation to factor analysis. Equal weights were used in the absence of any clear evidence of a diversity of significance among variables, as well as in the absence of sound and complete information concerning the existence of causal relationships, or where a lack of consensus exists on a classical method for estimating weights.

The budget allocation process method was also used for weighting. A group of specialists and experienced experts were each given a budget consisting of 100 points to award to the variables. If the variable was believed



to have greater relative importance, it was allocated a greater number of points. Subsequently, the weights were calculated according to the average of the total points allocated to each variable.<sup>5</sup>

The weights were also assessed using factor analysis, which is based on aggregating the linked sub-indicators to form a single factor containing as much information as possible that is shared between the linked indicators. The weights produced by using both the budget allocation and factor analysis methods were consistent with each other and with the initial weight estimates, based on the intellectual and conceptual framework.

All sub-indices had equal weights across all hierarchies except for the research, development and innovation (RDI) sub-index, due to theoretical reasons outlined under the section on the RDI sub-index.

### Index calculation

The 2021 GKI was calculated for 154 countries, using the most recent and reliable available data to calculate the variables for each country.

Owing to the lack of availability of data covering all the components for each country, and in view of the need to maintain a sufficient level of accuracy, the composite index was calculated in a bottom-up approach by applying a series of successive aggregations. Consequently, pillars were calculated using at least half of their sub-pillars, whereas sub-pillars required at least one variable. The availability of at least two thirds of the pillars was required to calculate the sub-index (sectoral index). The overall GKI is calculated only if data for all seven sub-indices are available.

The arithmetic aggregation formula was used to calculate all composite indicators of the Index. The composite indicator (CI) is calculated by aggregating its sub-components (SC<sub>j</sub>) as follows:

$$CI = \sum_{j=1}^n w_j \times SC_j$$

CI is the proposed composite indicator to be computed (sub-index, pillar or sub-pillar);  $w_j$  is the relative weight of the sub-component SC (pillar, sub-pillar, or variable); and  $n$  is the number of sub-components aggregated to form the composite indicator.



### Introduction

Quality enhancement is a central issue in education policies around the world. Given the importance of human capital creation in achieving broader social development goals in a rapidly transforming world, it is vital that the outcomes of educational institutions remain closely aligned with the economic, social and cultural needs of countries. Hence, the performance of education systems must be continuously monitored and evaluated to ensure their development and capacity to provide quality education for all.

A growing body of literature exists concerning quality of education. Interest is no longer limited to ensuring all segments of society have equal access to education; today, the quality of education systems and the knowledge and skills they impart have also become major concerns. Global awareness regarding the importance of education quality was highlighted within the United Nations 2030 Agenda for Sustainable Development. Among the 17 goals of the Agenda is the goal to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”, reflecting the understanding that obtaining a quality education “enables upward socioeconomic mobility and is a key to escaping poverty”, and that bolder efforts are needed to achieve greater progress toward achieving universal education goals.<sup>6</sup>

In light of these global developments, it was necessary to focus attention on the adoption of systematic standards and tools that aid assessments of the quality of education systems and identify their strengths and weaknesses, therefore enabling the formulation of more effective educational policies based on reliable indicators.

*Follow-up and review based on robust monitoring, reporting and evaluation policies, systems and tools are essential for the achievement of SDG4-Education 2030. Monitoring quality in education requires a multidimensional approach covering system design, inputs, content, processes and outcomes. As the primary responsibility for monitoring lies at the country level, countries should build up effective monitoring and accountability mechanisms, adapted to national priorities, in consultation with civil society.*

*Source: UNESCO, 2016.*

In this context, the focus has shifted toward building indicators that are informed by international standards and specifications, and that support the monitoring of progress achieved by education strategies and programmes, allowing for comparisons over time in different locations or contexts. Such comparisons enable education planners and decision-makers to monitor changes in areas such as education quality and student performance. In particular, they draw attention to the effects of implemented reforms and identify emerging problems, thus highlighting individual education sub-systems that require improvement and further development.

### The 2017 pre-university education sub-index

The 2017 pre-university education sub-index (spanning from pre-school education to the end of secondary education) comprised two interactive pillars: knowledge capital and educational enabling environment, with each containing several sub-pillars. The knowledge capital pillar is divided into three sub-pillars, of which two are quantitative in nature, indicating the extent to which children and young people have opportunities to attend school and complete the required years of schooling at different levels. The third relates to educational outcomes or outputs and focuses more on qualitative aspects of the education and learning process. The educational enabling environment is divided into three sub-pillars which are important for achieving quality educational outputs, according to international literature. These are expenditure on education, early childhood education, and school environment.

## 2021 pre-university education sub-index review

The pre-university education sub-index of the GKI was structured to act as a methodological tool for measuring performance in the various stages of the pre-university education system. Consultations with numerous experts established the significance and efficacy of this structure, while statistical analysis has revealed encouraging measures regarding the integrity, consistency and stability of its components. However, to ensure greater accuracy and structural suitability, the current review sought to enhance the sub-index in light of recent developments in the education arena. This section presents the outcomes of the review process, as well as the most important amendments applied to the previous structure of the pre-university education sub-index (2017) and their rationale. It also presents the psychometric measures and most prominent results that influenced the new structure of the sub-index.

Discussions with the advisory board centred on the following:

- Emphasizing the need to link education indicators with the indicators contained within the sustainable development goals (SDGs).
- How to measure equity and inclusiveness.
- How to reconcile two primary concerns: accounting for key variables, and ensuring that a sufficient number of countries are included to calculate pillar and sub-pillar values.
- The need to include variables relating to the educational process, while recognizing the absence of reliable information on this dimension and the consequent barriers to objective measurement.
- The varied views regarding the significance of the pupil–teacher ratio variable; while some experts view this variable as an important factor in gauging the quality of the teaching and learning process, others view it in relative terms, citing studies that show weak correlation between the number of pupils in the classroom and their academic attainment.

### The revised structure and its justification

In light of the inherent difficulties of the review and amendment process—most notably the issue of data availability—the amendments focused on the following aspects:

At the pillar level, it was decided to maintain the two pillars under the same names: knowledge capital and educational enabling environment. The focus on measuring knowledge capital as one of the main outcomes of educational systems was emphasized, along with the need to include relevant contextual variables that directly impact the value and quality of educational outputs; namely, all inputs and processes that enable students to reach the desired goals. The sub-pillars were also retained and refined, and their variables reconsidered in light of changes in global data.

Therefore, the final structure of the sub-index comprises the following pillars:

#### *The knowledge capital pillar*

The knowledge capital pillar retained its existing sub-pillars: enrolment, completion and outcomes:

- The enrolment sub-pillar: employs ratios as a preliminary indicator of the extent to which countries are able to provide access to education institutions at all levels, from pre-school education to the end of secondary education. This sub-pillar includes three variables:
  - net enrolment rate in primary education;
  - net enrolment rate in lower secondary education; and
  - net enrolment rate in upper secondary education.

The variable ‘out-of-school children and adolescents of primary and lower secondary school age’ has been omitted owing to significant high inverse correlation with the variable, ‘net enrolment rate in primary and secondary education’.



- The completion sub-pillar: Two important aspects were taken into consideration when selecting the variables for this sub-pillar: a legislative aspect related to compulsory education, and a realistic aspect related to actual completion. The previous variables related to graduation rates—which the UNESCO Institute for Statistics no longer calculates—were replaced by two variables that indicate the extent of secondary school completion. The secondary stage was chosen because it is the last stage of pre-university education; hence reaching this stage necessarily means that the previous stages were completed. The variables in this sub-pillar are as follows:
  - number of years of compulsory primary and secondary education guaranteed in legal frameworks;
  - completion rate in upper secondary education; and
  - gross intake ratio to the last grade of lower secondary education.
- Within the outcomes sub-pillar, the ‘assessment of 8th grade achievement in mathematics and science’ variable was omitted, while the variable, ‘assessment of 15-year-old students in mathematics, science and reading’, was retained. One other variable was added that relates to student learning: ‘learning-adjusted years of schooling’.

*A global learning metric could help bring learning centerstage, making it more salient. Such a metric would use an internationally comparable scale to consistently track progress and identify gaps across contexts. It would enable comparisons across children, households, schools and locations. Beyond its technical dividends, a global metric would motivate action and generate accountability for learning. By showing what is possible, it could point to what countries should be aspiring to—and create pressure to meet those aspirations. By benchmarking learning gaps among disadvantaged groups, a global metric could also create pressures for social mobility within countries. Furthermore, comparable learning data could increase the effectiveness of global research, international partnerships, and global aid for learning. Such data could also help countries develop their capacity for analyzing results to drive policy.*

*Source: World Bank, 2018.*

### ***The educational enabling environment pillar***

It was agreed to retain the two sub-pillars of expenditure and early learning, and expand the scope of the third sub-pillar to become ‘resources’ and include other variables that relate more closely to the learning environment. Further, recognizing the increasing significance of equity and inclusiveness in international charters, and their close connection with the right to education, it was decided to include this dimension separately under a fourth sub-pillar. Below is a detailed description of the sub-pillars and their rationale:

- With regard to the expenditure sub-pillar, higher rates of enrolment in education entail increased expenditure on education, as this requires the construction of school buildings, the preparation of teachers, the provision of educational devices and aids, and other necessary services. As such, countries must spend on education to ensure its continuity and improve its internal and external efficiencies. Expenditure on education is often measured as a percentage of a country’s budget or GDP. Given that expenditure on education and educational institutions in general does not accurately indicate the amounts that reach the educational process—and particularly students—the variable, ‘current expenditure as a percentage of total expenditure in public institutions’, was replaced with two variables relating to student spending. Accordingly, the expenditure sub-pillar includes four variables relating to different integrated aspects of government spending, as follows:
  - government expenditure on primary education (% GDP);
  - government expenditure on secondary education (% GDP);
  - government funding per primary student (% GDP per capita); and
  - government funding per secondary student (% GDP per capita).

- Concerning the resources sub-pillar, the human capital entrusted with the task of teaching is a key factor that is no less important than expenditure on education. Without highly qualified and well-trained education cadres, education goals and curricula cannot be effectively translated into reality and will remain largely theoretical. While we are certain that a proper approach to measuring this factor requires a number of variables in relation to teachers' preparation, continuous training and professional self-development, given the scarcity of data, only two variables were added in relation to the availability of trained teachers:
  - pupil-trained teacher ratio in primary education (headcount basis); and
  - pupil-trained teacher ratio in secondary education (headcount basis).

It was suggested to add a number of variables relating to school management, including qualification and independence of school principals—such as ones that give insights on the 'percentage of principals who report on representation of teachers and department heads in the school management team', or 'percentage of principals with significant responsibility for the majority of school tasks', and 'percentage of principals who participated in at least one professional development activity in the 12 months preceding the survey', etc. However, despite their importance, these variables were not included due to the lack of reliable data or the low number of countries for which such data is available.

*The professionalisation of teachers implies four dimensions of training: academic (erudite knowledge), didactic (capacity to transform erudite knowledge into knowledge to be taught), pedagogical (offer situations that are motivating and conducive to learning) and personal (behaviour, ability to listen, empathy, etc.), to which the research dimension (innovation, changing reality) can be added. This professionalisation is constantly developing, continues throughout the teacher's career and should benefit from appropriate supervision.*

*Source: UNESCO IIEP, 2015.*

As for educational resources, the interactions that take place in the classroom, and the educational and assessment practices that are employed, are considered key factors in the success of the teaching and learning process. Examining pedagogical practices necessarily entails shedding light on the process of transferring knowledge, managing the classroom, motivating learners and catering both to individual differences and the different needs of learners. Hence, there was a need to include variables such as 'classroom hours allocated for extracurricular modules' and 'the existence of, or time allocated for, integrative modules within the school (STEAM courses, interdisciplinary courses, and project-based modules)'.<sup>7</sup>

However, given the limited availability of data, the main change was to include the use of technology in the educational process, in light of the spread of information and communications technology (ICT) and their diverse uses both in and outside the classroom environment to enhance education.<sup>7</sup> Studies have shown a correlation between the use of ICT in school systems and improved levels of reading, mathematics and science proficiency among students. There has been increasing interest in integrating technological media in the teaching and learning process, and it has become a basic requirement in educational system reform projects, especially in light of the spread of COVID-19 and the physical restrictions imposed on schools.

First, it was sought to adopt a set of variables relating to strategies for integrating educational technologies into curricula, training teachers on using such technologies, the equipment available in schools, and availability of digital learning materials. However, given the lack of data from reliable sources on these dimensions, only four variables about the availability of computers and Internet connections in schools were included. Thereafter, based on the high correlation revealed between the availability of computers and the availability of Internet connections, only the following two variables were included:

- schools with access to computers in primary education for pedagogical purposes (%); and
- schools with access to computers in secondary education for pedagogical purposes (%).



The early learning sub-pillar was adopted as an alternative name to “early childhood education”—as in the previous index—based on agreement among the consulting team that it more effectively highlights the concept of learning (rather than that of programmes) and its role in building children’s personalities and preparing them cognitively, emotionally and socially for learning in the subsequent stages of education. Since 2011, the World Bank Education Strategy 2020<sup>8</sup> has stressed the need to encourage early childhood learning and to ensure continuity both inside and outside the formal schooling system. UNESCO has also called for investments in early childhood development programs that include education and health, as early stimulation of intellectual development has positive long-term effects on education outcomes and future life pathways. “Research results demonstrate that early interventions for young children are essential not only for their own well-being: They also have sustainable, long-term effects on the development of human capital, social cohesion and economic success. [...] It is now well understood that intervening earlier requires fewer resources and less effort; at the same time, it is more effective”.<sup>9</sup>

This also reflects global trends and the Sustainable Development Goals. Hence, based on the above, the existing variables were reconsidered, replaced and enhanced by the addition of further variables. The agreed variables are as follows:

- gross enrolment ratio in early childhood education;
  - proportion of children aged 24–59 months who are developmentally on track in terms of health, learning and psychosocial well-being;
  - proportion of children under five years experiencing positive and stimulating home learning environments; and
  - pupil-trained teacher ratio in pre-primary education (headcount basis).
- For the equity and inclusiveness sub-pillar it was determined that, in line with the principle of the sustainable development agenda of ‘leaving no one behind’, equity and inclusiveness should be given special attention. Initially, they were considered for inclusion in a third pillar in the pre-university education sub-index. There was also an agreement regarding the disparities and inequalities that require attention in terms of quantity (enrolment and completion rates) and quality (attainment). A number of significant variables were suggested in relation to the differences between students in reading, mathematics and science scores by gender, location, immigration, disability, and guaranteed level of inclusion in primary and secondary education for students with disabilities.

However, in view of the scarcity of data and the difficulty of measuring aspects of equity in education beyond the issue of parity, this dimension was integrated into the educational enabling environment pillar. As for the variables that were considered, three main dimensions were taken into account: gender, location and wealth:

- completion rate in upper secondary education, gender parity;
- completion rate in upper secondary education, wealth parity; and
- completion rate of upper secondary education, location parity.

*It is very important that education systems reach all children regardless of gender, race, ability or background, not only through access to education, but through access to quality education.*

*Source: Arab Campaign for Education for All – ACEA, 2021. [in Arabic].*

It must be noted that, given the important role of large-scale, national and international indicators in tracking the development of the learning system, and related accountability and governance measures, the revision focused on defining variables that measure or approximate these issues. Reference was made to the World Bank’s Systems Approach to Achieve Learning for All,<sup>10</sup> and to SDG indicator 4.1.6: Administration of a nationally representative learning assessment (a) in Grade 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education. However, the countries for which this data is available were not sufficient to allow broad coverage.



The final amendments to the pre-university education sub-index emphasize a systemic approach that places the educational system within a set of internal and external factors that ultimately determine its quality and the quality of its outcomes. This is fully consistent with UNESCO's approach,<sup>11</sup> which identified four main components for education systems analysis and quality measurement:

- Contextual indicators: these provide information on contextual factors affecting learning, which are often difficult to measure because they relate to qualitative issues, surveys and classroom observations.
- Indicators of favourable inputs for education: these mainly measure the deployment and use of resources to facilitate learning. They indicate whether the planned financial, material and human resources are being delivered in the prescribed quantities at all levels of the system.
- Teaching and learning indicators: these measure how the activities of educational programmes are implemented, including the practical implementation of specific educational arrangements, such as application of standards, quality of teaching, time spent on a task, school climate, and educational supervision. Similar to contextual indicators, process indicators address qualitative issues and are measured through surveys, educational observations, inspection reports and self-evaluations.
- Outcome indicators: these measure the impact of education policies and the extent to which they achieve the desired goals. They are measured using the results of national examinations, international assessments and surveys.

While indicators are developed year to year, their importance is underlined as a key contributor to the process of developing effective educational policies aimed at achieving development goals in all dimensions. At the same time, a number of challenges are highlighted in relation to the ability to benefit from these indicators in raising educational performance and improving the quality of its outputs. These challenges include, most notably:

- Collecting comparable data, which requires developing systematic surveys and enhancing the use of international classifications to ensure comprehensiveness and the standardization of concepts and sources.
- The processing methods, including correction, auditing, building statistical models, and preparing national, regional and international estimates.
- The ability to interpret data and turn them into qualitative guidelines for reform and development purposes.
- Securing channels of cooperation that help achieve integration between the indicators offered by various education stakeholders, so as to enhance the opportunities to benefit from them and avoid both duplication and wasted efforts.

Figure 2: Structure of the pre-university education sub-index





### Introduction

Given the rapid developments in education and training, it is important to form a clear understanding of the various factors and variables that positively and negatively affect the nature and quality of these areas that contribute either directly or indirectly to the provision of skilled labour and qualified human capital. Given the strategic importance of countries' technical and vocational education and training (TVET) systems in building productive and cohesive communities, the use of indicators to track and monitor their strengths and weaknesses is vital, not least to provide data to inform decision makers concerned with education, training and employment policymaking. The provision of these types of data allows decision makers to compare their achievements with other countries, thus contributing to the enrichment of national experiences.

The Fourth Industrial Revolution, and the transition to green and digital economies, have created significant disparities between countries. Therefore, new sustainable approaches and methods are required to meet contemporary challenges and keep pace with relevant transformations.<sup>12</sup>

Various indices and indicators can play significant roles in this respect and the GKI must therefore adapt to developments by enhancing its methodology and expanding its sub-indices—particularly in the area of continuous education and training, which constitutes a key link between education systems and labour markets. The revised GKI also seeks to include new variables, where data is available in an accurate and internationally recognized scientific manner. These new variables depend mainly on values and goals such as quality, equal opportunities and equality that 2030 global education agendas seek to devote and disseminate.

One of the most important factors undermining the effectiveness of education and training programmes is the absence of rigorous, periodic statistics that enable proactive policymaking.

*To effectively promote youth employability, it is particularly important that ALMPs [active labour market policies] are designed and oriented to meet labour market needs. This requires a participatory approach and can only succeed if employers are actively involved. [...] Work experience can have a particularly positive impact on youth employability and can provide an initial link between young people and the labour market. However, the majority of companies in AMCs [Arab Mediterranean countries] are SMEs that have a very limited capacity to deliver training. [...] Educational and training systems in AMCs often lack information about current labour market needs. [...] While there are a multitude of initiatives to enhance this involvement, they function mainly as projects, and mechanisms for the systematic involvement of the private sector are not yet in place in most AMCs.*

*Source: European Training Foundation, 2015.*

The GKI considers TVET to be an essential sector that combines training and qualifications of the human capital at the professional level and one of the most critical sectors linked to the labour market. Meeting labour market requirements and integrating them into academic courses and curricula is a complex process that is subject to the fluctuations of the economy, competitiveness and international conditions. Professions come and go rapidly, making it difficult to respond quickly to changing requirements. Proactive policy adoption is therefore required based on a long-term vision, rather than economic fluctuations.

The TVET sector is also important in the context of steady demographic growth—particularly among children and youth—which directly affects public spending and the role of the state, especially in countries with limited financial resources. Rising numbers of young people who are not in education, employment or training (NEET) could create social crises, aggravating social marginalization and exclusion, and fostering a sense of injustice among groups that are meant to be at the heart of development efforts. The provision of education and employment has become increasingly difficult and complex as lifestyles change, giving the impression that one segment of society is less fortunate than another in terms of their education, health or social rights.<sup>13</sup>

Some hasty diagnoses attribute the problem to the inability of education and training systems to meet the requirements of the labour market. Such conclusions require careful, objective scrutiny. International indicators in this regard prove beyond doubt that the problem is greater and deeper than previously thought. For example, the European Training Foundation<sup>14</sup> concludes that many countries do not have sufficient systematic arrangements to determine the skills that are in demand in local, national or international labour markets. This is one of the factors that must be addressed urgently, as it undermines the ability of education and training programmes to identify and adapt to the knowledge, skills and attitudes that citizens need to enter and advance within rapidly changing labour markets.

A careful reading of the results of studies and reports of international organizations shows a lack of balance between education and training systems and the labour market, leading to negative impacts on the TVET sector, which is often identified as the source of the problem. However, a deeper examination of the inputs and outputs of this sector, which is ineffective in many countries, confirms that this situation is not necessarily attributed to the nature of the outputs of the TVET sector alone, but goes deeper, as highlighted by international studies that look more closely at the realities of the labour market.<sup>15</sup>

### **The 2017 TVET sub-index**

The TVET sub-index of the 2017 GKI featured two main pillars: 1) formation and professional training; and 2) features of the labour market.

- The formation and professional training pillar comprised two sub-pillars: continuous training and educational structure. While the continuous training sub-pillar measured the extent of staff training, local availability of specialized training services and percentage of firms offering formal training, the educational structure sub-pillar focused on expenditure, enrolment and pupil–teacher ratio.
- The second pillar of the TVET sub-index, features of the labour market, consisted of two sub-pillars. The first, qualifications of human capital, comprised variables on poor work ethic in the labour force, availability of skilled employees and technicians per thousand labour force. The second sub-pillar, structure of the labour market, comprised two variables: restrictive labour regulations and labour freedom.

These integrated variables draw a dynamic picture of the TVET system in a given country and provide a general framework for diagnosing its status, strengths and weaknesses compared to other countries.

### **2021 TVET sub-index review**

Based on the knowledge accumulated since the first edition of the GKI, which was refined and enriched through extensive consultations with subject-matter experts, a new draft of the TVET sub-index was proposed, taking into consideration the rapid developments in this sector in terms of its relationship with the labour market and the productive environment in general.

The previous version of the TVET sub-index was reviewed through lengthy discussions among a specialized group of independent consultants and experts from relevant international organizations. The focus of discussions was as follows:

- Adopting internationally recognized levels of learning at the primary, secondary and higher levels.
- The need to include variables to measure the qualification of human capital within the labour market and the efficacy of the labour market's response to the requirements and needs of employers.
- The need to make a distinction between professional qualifications in general and those relating to the three economic sectors—i.e. primary, secondary and tertiary, where the qualifications of the secondary (manufacturing) sector are often prioritized over those of the primary (agriculture) and tertiary (services) sectors.
- The requirement for variables that measure equity and inclusiveness, both to track the dynamics of their integration in training and support efforts to combat poverty among productive workforces.
- Given the essential role of the labour market in creating demand for qualified labour, the need to add a pillar to measure this critical dimension and assist in identifying the economic dynamics that create a competitive structure for education and professional training.
- The need to adopt variables to measure quality in TVET.
- The possibility of adding new variables to measure the digitization of the TVET sector or its openness to the sustainable development goals or entrepreneurship.



As such, the review of the TVET sub-index for 2021 accounted for important variables for which data was unavailable when the GKI was created in 2017. Nevertheless, the persistent lack—or poor quality—of data for some of these variables ultimately precluded them from the new sub-index. These included some related to training, such as ‘participation rate in non-formal job-related training’, or digital skills, such as ‘percentage of young people and adults who have sent emails with attached files’ or ‘percentage of young people and adults who have written a computer programme using a specialized programming language’. Others related to labour market requirements, such as ‘percentage of workers who need reskilling for at least one month’ or ‘percentage of employers who retrain existing employees in response to changing skills needs’; labour market structure and digitalization, such as ‘share of technical and vocational education and training jobs at risk of automation’; or equity, such as ‘skills employment gender gap’.

### **The revised structure of 2021 TVET sub-index**

The revised structure of the sub-index followed the same methodological foundations as the 2017 version, with some enhancement in relation to aspects that are considered important for building a knowledge society. There was an urgent need to produce a balanced vision of this sector based on the basic rights to education and training, as one of the pillars of the 2030 Sustainable Development Agenda. Therefore, quantitative variables such as enrolment and completion were linked to qualitative variables, as is the case for extent of staff training and quality of vocational training.

The structure of the economy, especially in terms of its relation to contemporary and knowledge transformations, has an essential role in this approach. Therefore, the new sub-index measures the extent to which national economies are able to diversify their offerings and modernize their structures to ensure both their positive interaction with education and training systems, and their positive contribution to the development of human capital. There are three main factors that affect the structure of the economy and the dynamics of social systems today: the environment of the economy, the structure of the labour market and qualifications. These factors are all interconnected and enable societies to respond to challenges, including most notably the integration of young people into their economies.<sup>16</sup>

The revised TVET sub-index 2021 also measures efficiency in training by adding the variable, ‘participation rate in formal and non-formal education training’. It is a variable that combines both competences and skills and treats both sexes equally, despite the gaps between them resulting from the rapid development of some economies.

The principle of equality is also established in the TVET sub-index 2021, which measures equality between the two sexes in terms of the availability of qualified labour. The principles of equity and social integration have also been included in the form of a new variable that emphasizes the role of inclusion in education and training, and its contribution to fighting poverty and social marginalization, especially among the productive workforce.

In addition, the review identified indicators to capture the dynamics between the structure of training and the labour market in a way that enables the evaluation of the education and training system based on its ability to respond positively to the determinants and constraints of the labour market, such as unemployment and qualification.

Data availability and source quality represented determining factors in the adoption of new variables. Hence, the 2021 version of TVET sub-index remains both realistic and credible.

Thus, the final structure of the TVET sub-index for 2021 comprises two pillars:

#### ***The TVET components pillar***

This pillar monitors the structures of TVET institutions, the qualifications they provide, and their ability to diversify their educational offerings and make them available to various segments of society—especially females. This relates primarily to factors including enrolment and graduation ratios at all levels, as well as the nature and size of the human resources working in the sector—especially trainers and teachers—and the ability to leverage continuous training programmes to achieve improvements in quality. This pillar is divided into three sub-pillars:

- The first sub-pillar is continuous training and skilling. It is measured through the following variables: percentage of firms offering formal training; labour force participation rate with short-cycle tertiary education; and participation rate of youth and adults in formal and non-formal education and training.
- The second sub-pillar focuses on TVET structure. It is measured through the following three variables: government expenditure on secondary, post-secondary and non-tertiary vocational education (%); share of students enrolled in secondary education enrolled in vocational programmes; and share of students in post-secondary non-tertiary education enrolled in vocational programmes.
- The third and final sub-pillar focuses on TVET quality and qualifications and is measured through the following variables: extent of staff training; quality of vocational training; mean nominal monthly earnings for high-skill TVET occupations relative to total average wage; and mean nominal monthly earnings for medium-skill TVET occupations relative to total average wage.

### The TVET labour market pillar

The labour market pillar monitors the realities of the employment system in relation to TVET as an integral part of the economy as a whole. It is measured through three sub-pillars, and offers a picture of conditions in the labour market and the extent to which the principles of efficiency, equity and inclusiveness are respected.

- The first sub-pillar, efficiency of the labour market, comprises four variables: percent of firms identifying an inadequately educated workforce as a major constraint; proportion of employees who are over or under-educated; proportion of skilled production workers; and unemployment rate among individuals with upper secondary, post-secondary non-tertiary, and short-cycle tertiary education.
- The second sub-pillar, post-TVET employment, is measured through the following variables: share of TVET occupations; and manufacturing employment as a proportion of total employment.
- The last sub-pillar is equity and inclusiveness. It is measured through three variables: gender parity among 15- to 24-year-olds enrolled in vocational education; and vulnerable employment as a percentage of total employment.

Figure 3: Structure of the TVET sub-index







## Introduction

Higher education plays a key role in driving knowledge and innovation by producing human capital with the qualifications and skills necessary to meet the needs of industries that drive the global knowledge economy. Hence, it was imperative that higher education be included as a core sub-index under the Global Knowledge Index. For the purpose of this Index, higher education will consider ISCED 5 to ISCED 8 programmes (short-cycle tertiary education, bachelor's or equivalent level, master's or equivalent level and doctoral or equivalent level) offered by public and private tertiary education institutions, as per the UNESCO International Standard Classification of Education (ISCED) 2011.<sup>17</sup>

Higher education is a major foundation of economic competitiveness and plays a vital role in achieving human development. The importance of this sector is demonstrated by its designation as one of the key focus areas of the UN 2030 Agenda for Sustainable Development. SDG 4 calls for the provision of inclusive and equitable quality education, including tertiary education, that is free of gender disparities, as a prerequisite for achieving development and full social participation.<sup>18</sup>

According to the World Bank,<sup>19</sup> higher education is essential to achieving growth, alleviating poverty and promoting prosperity. It is a key requirement for fostering employability in the industries that drive the global knowledge economy. As such, having a quality higher education system in place is a strategic necessity for broadening youth skillsets and achieving knowledge societies. This is, however, conditional on the provision of a conducive and productive labour market that can accommodate human capital with higher skills. It also requires balanced coordination between industrial and social institutions.

The higher education sector has demonstrated its ability to keep pace with development and adapt at all levels; but it now faces various challenges associated with the acceleration of globalization. It is particularly important that stakeholders consider these developments. Failure to do so may lead to a decline in the quality and effectiveness of the sector, and undermine a country's ability to conduct research and generate knowledge in various fields, thereby threatening national development and knowledge capital formation.

The role of higher education in human development, knowledge creation and innovation is widely acknowledged. This role extends beyond driving economic growth; it also serves to nurture societal values and a sense of citizenship, stimulate community involvement, and strengthen the foundations of democracy and justice. Higher education therefore influences quality of life and shapes the behaviour of individuals in society. Despite its importance, measuring the quality of higher education is a challenge. Given the importance of measures to ensure the quality of higher education, the OECD's 'Assessment of Higher Education Learning Outcomes'<sup>20</sup> highlights the lack of tools to compare the quality of education and learning in higher education at the international level. It points out that the few available studies focus on national-level comparisons. UNESCO observes that international university rankings use the research outputs of well-reputed institutions as a standard for measurement, representing a key limitation to the utility and relevance of such systems. Furthermore, these rankings do not evaluate the success of a higher education system in the context of the broader enabling environment in the reference country and therefore cannot be considered appropriate measures of development.<sup>21</sup>

Numerous attempts have been made to amend this deficiency, including through accreditation of higher education institutions and their programmes according to certain performance standards. However, they do not consider the status of higher education as a whole in any given country, as their scope has remained limited to specific programmes or institutions. In contrast to ranking or accreditation, the higher education sub-index seeks to examine the status of the sector across countries, analyse its performance, and identify areas for improvement and corrective intervention. An index can also be a useful reference tool for decision makers and stakeholders in evaluating the progress of education systems over time. Since 2017, the GKI's higher education sub-index has attempted to fill this gap by assessing the status of higher education at the country level.





## The 2017 higher education sub-index

The 2017 higher education sub-index comprised two main pillars: the higher education inputs pillar, and the higher education outputs and quality pillar. The inputs had three sub-pillars: expenditure, enrolment and human resources. The higher education outputs and quality pillar had four sub-pillars: two measured the outputs in terms of graduation rates and post-graduation employment rates, and a further two measured the quality of the higher education system in terms of quality of universities and competency of students. The sub-index contained 16 variables, with seven variables for the inputs pillar and nine for the outputs and quality pillar.

Two criteria were adopted to determine the weighting of the 2017 higher education sub-index to 1) give equal weights to different variables within each sub-pillar and 2) accord greater weight to the output and quality pillar – as studies of higher education indicators have recommended.<sup>22</sup>

## 2021 higher education sub-index review

The review of the higher education sub-index began with a critical examination of the 2017 version, while acknowledging the limited ability to assess the different dimensions or provide an exhaustive list of indicators and variables—for a variety of reasons. This is especially true in the case of composite indices where limitations are imposed by the number of variables, the agreed structure for different hierarchies in the composite index, or the availability of data.

### Revisions to the 2017 higher education sub-index

1. The higher education sub-index now considers all four different levels of tertiary education, namely ISCED 5, ISCED 6, ISCED 7 and ISCED 8 (listing them: i.e. short higher education programmes, a bachelor's degree or equivalent, a master's degree or equivalent, and a doctoral degree or equivalent).
2. A third pillar on the learning environment in higher education institutions was added alongside the inputs and the outputs pillars.
3. The variable on university ranking was omitted, as this is identified in the literature as a problematic measure that does not adequately assess the quality of higher education institutions and therefore should not be considered in a development context.
4. Measures related to the equity and inclusiveness of higher education were added, to identify whether a given country makes higher education accessible to all students regardless of their backgrounds.
5. The sub-pillar on university quality was changed to university impact and the 'competency of students' sub-pillar was removed.

### Limitations

Since the inception of the GKI in 2017, the higher education sub-index has faced a number of challenges and limitations, some of which persist. The main challenge relates to poor data coverage and availability, especially with regard to indicators related to the quality of higher education. Some data employed in the 2017 version no longer exist, which posed another challenge. Higher education is different from other levels of education, in that substantial funding that comes from students themselves (either directly, via personal or family contributions, or indirectly via loan programmes). For countries where private higher education institutions are dominant, government expenditure does not capture investment in post-secondary education. Unfortunately, data on household contributions to higher education was only available for few countries.

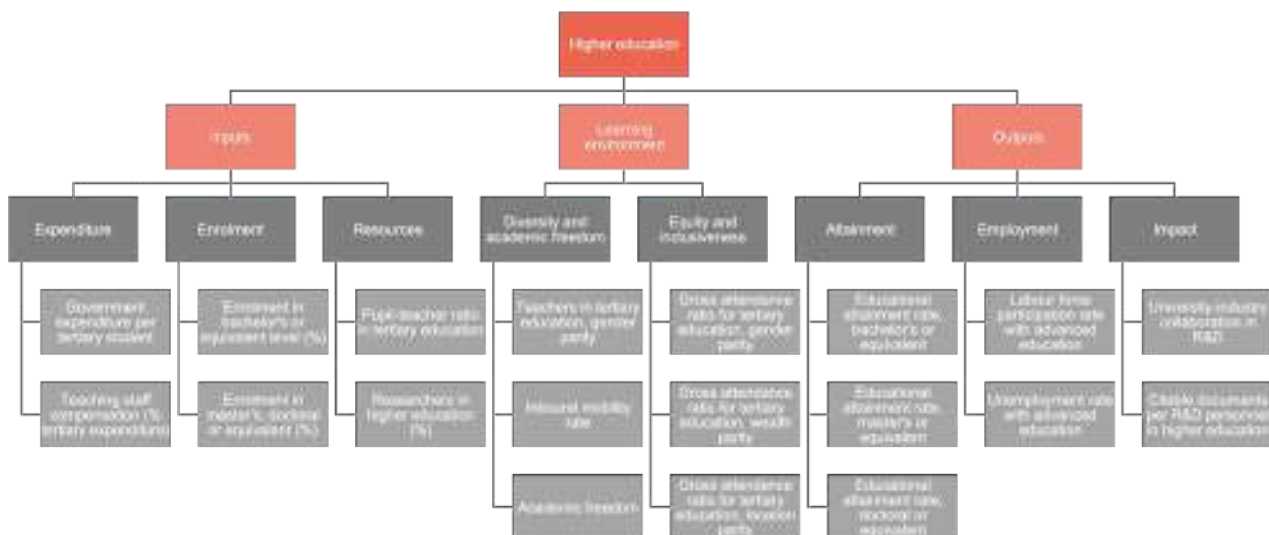
Furthermore, the COVID-19 pandemic has affected the sector's mission as it relates to teaching, research and service.<sup>23</sup> It was suggested that a variable be added on the learning capabilities of higher education systems in different countries. This was supported by the fact that higher education institutions have raced to develop solutions to ensure the continuity in response to the disruption to campus- and classroom-based learning during the pandemic. Thus, higher education services have migrated from traditional to virtual, blended or other forms of delivery. This makes the development of new methods of course delivery—including online teaching models and virtual systems—a vital capability for universities. Variables on online higher education and open universities were also suggested, the rationale being to examine whether higher education systems offer further opportunities for increased knowledge building among larger segments of societies. Therefore, 'distance education' was proposed as a sub-pillar, with variables covering open universities and online or virtual learning, and the availability, enrolment and graduation rates related to these programmes. However, poor data quality and availability have undermined this important enhancement to the sub-index.



## The revised structure and its justification

While the structure of the 2017 higher education sub-index suited the data available at the time, it has been revised in light of the global changes that have occurred since and the availability of new variables. As such, the new higher education sub-index was able to bridge several caveats. It was decided that measuring the sub-index through its inputs and outputs, while straightforward, would not fully capture critical dimensions related to the context of higher education; this is a common limitation related to building composite indices, as the composition does not entirely reflect what is being measured. However, this limitation was partly mitigated by the data employed in the current version, and through assessments of the openness of the sector and its attention to equity issues. The current higher education sub-index therefore considers internal and contextual characteristics of higher education systems through a pillar that studies the learning environment in higher education institutions. Consequently, the 2021 higher education sub-index has three sub-pillars: inputs, learning environment and outputs. Under these pillars, three sub-pillars assess inputs (expenditure, enrolment and resources); two sub-pillars assess the learning environment (diversity and academic freedom, and equity and inclusiveness); and three sub-pillars assess outputs (attainment, employment and impact).

Figure 4: Structure of the higher education sub-index



### The higher education inputs pillar

The inputs of higher education are those factors that enable systems to achieve their objectives. They come from different sources including fiscal and human. With regard to the expenditure sub-pillar, the variable related to government expenditure per tertiary student was preserved and a variable on teaching staff compensation was added. Three variables (on initial household funding per tertiary student—as there is a noticeable increase in families' share in funding their children's higher education—private higher education funding and university teachers' mean monthly earnings) were also considered but dropped, as data on these variables are not widely available.

For the second sub-pillar on enrolment, two variables were considered relating to enrolment in bachelor's or equivalent level (%) and the enrolment in master's, doctoral or equivalent (%).

Some variables were considered for inclusion in the resources sub-pillar, relating to the number of think tanks affiliated to higher education institutions; open universities; and virtual universities. However, again, sufficient data were not available to support these variables. Therefore, the sub-pillar currently only comprises pupil-teacher ratio in tertiary education and a variable on researchers in higher education retained from the previous version of the index. While this variable could also be considered an output of the system, it is nonetheless a resource available to higher education institutions and is considered an input the index.

### *The learning environment in higher education institutions pillar*

The aim of the learning environment pillar is to provide an indication of the learning and teaching climate that students and instructors experience in higher education institutions. The learning environment pillar is a new addition to the index. Initially, many variables were suggested, including: online teaching; COVID-19 management; female-to-male ratio of teachers in higher education; parity indices; international student mobility rates; and others. Subsequent discussions identified a concise perspective of what learning environment means at higher education institutions: it is an environment that respects and celebrates diversity; has equity concerns as a core focus; and is open and transparent, and maintains academic freedom. These three main features made up the sub-pillars of the learning environment. Therefore, three themes were suggested: equity and inclusiveness, diversity and academic freedom—with diversity and academic freedom grouped in one sub-pillar and equity and inclusiveness grouped in another.

For the equity and inclusiveness sub-pillar, three variables were adopted: gross attendance ratio for tertiary education, gender parity; gross attendance ratio for tertiary education, wealth parity; and gross attendance ratio for tertiary education, location parity. Taken together, these three variables relate to the composition of students in higher education institutions by their gender, location and wealth and provide a good indicator for equity in the sector.

In the second sub-pillar, the first theme on diversity was measured through two variables: the inbound mobility rate and the teachers in tertiary education, gender parity. The second theme on academic freedom reflects issues of freedom and openness and is measured through the Academic Freedom Index. A higher education sector is responsive to issues of diversity and freedom if it considers a balanced representation of male and female teachers, opens its doors to both sexes from abroad, and maintains an atmosphere of freedom of expression, freedom in teaching and research, institutional autonomy, academic exchange and campus integrity.

### *The higher education outputs pillar*

The outputs pillar aims to provide an assessment of the outcomes and impact of the system and its contribution to the economic and social development of its graduates. The outputs pillar consists of three sub-pillars: attainment, employment and impact.

The attainment sub-pillar comprises three variables: educational attainment rate, bachelor's or equivalent; educational attainment rate, master's or equivalent; and educational attainment rate, doctoral or equivalent.

The employment sub-pillar was the subject of extensive discussion, the key aspect of which was the understanding that employment is less directly related to higher education than to economic and other market factors. Another point of discussion concerned whether a variable on the percentage of female higher education graduates in the labour force should be added. However, this variable was ultimately dropped, as the inclusion of adjusted gender parity variables and male-to-female teacher ratio in the learning environment seemed sufficient to indicate equity issues as part of the higher education sub-index. The employment sub-pillar ultimately comprised two variables: the labour force participation rate with advanced education; and unemployment rate with advanced education.

The third sub-pillar in the outputs pillar relates to the impact of universities. Initially, multiple variables were proposed, including soft power impact. However, this was not selected, as data were only available for a limited number of countries. The same conclusion was reached for university sustainability impact and COVID-19 research productivity. Two variables from the World Bank System Approach for Better Education Results (SABER) were also assessed and discarded—again, because data were available only for very few countries. The ranking of universities—represented by an average across the three largest ranking systems—was broadly disqualified by the review team for a number of reasons, including the fact that such rankings do not indicate impact. Ultimately, two variables were selected. The first is university–industry collaboration in R&D, which indicates economic and business impact; the second is citable documents per R&D personnel in higher education, which indicates research and knowledge creation impact.



# RESEARCH, DEVELOPMENT & INNOVATION

## Introduction

Research and development (R&D) “comprise creative and systematic work undertaken in order to increase the stock of knowledge—including knowledge of humankind, culture and society—and to devise new applications of available knowledge”.<sup>24</sup> Innovation, on the other hand, is viewed as creative activity leading to the development of new products or processes that differ significantly from the product previously delivered to consumers, or the process previously used by the company or the industry.<sup>25,26</sup> Based on these definitions and rationale, scientific research, development and innovation (RDI) represent a central aspect of knowledge generation, dissemination and application processes in support of development.

Furthermore, innovation products and processes introduce new or significantly improved goods and services to be used in product markets. They therefore represent an important factor supporting the acceleration of economic growth and the achievement of sustainable development in a country. Given the recent advancements in knowledge markets, and the surge in intelligent digital technologies associated with the Fourth Industrial Revolution, scientific research and innovation have become a cornerstone of the transformation to knowledge societies and economies in 21st century.

Ever since the conception of the GKI in 2017, research, development and innovation (RDI) has been consolidated in one key sub-index. This unanimous choice is justified by the GKI's dual orientation, estimating the transformation of countries towards knowledge societies on one hand—through the role of R&D in creative work undertaken to increase the stock of knowledge, and the use of this stock of knowledge to devise new applications—and considering the growing role of ‘innovation’ in developing knowledge economies, on the other.

Although innovation is not only produced within the R&D process—and is not merely considered as an output of R&D—merging innovation with R&D in order to form a composite RDI sub-index is justified by four factors. (i) Innovation can be the outcome of the complete cycle of research and experimental development that begins with the exploration of ideas and natural phenomena, and ends with prototyping, production models and commercialization. This choice is also based on the ‘4Ps’ process that begins with publishing a paper, then producing a patent, followed by a prototype model for testing to finally reach a final product that can be commercialized. (ii) Innovation in business enterprises and civil society requires a minimum level of research and development capabilities. (iii) Successful innovation generally requires ‘knowledge workers’ equipped with R&D and knowledge skills, and to a certain extent advanced cognitive capability. Finally, (iv) innovation generally requires an R&D culture and understanding.

Based on the above rationale, the RDI sub-index was developed with the inception of the GKI in 2017.

## The 2017 RDI sub-index

Following the decision to associate innovation with scientific research as one composite sub-index of the GKI, the conceptual model of the 2017 RDI sub-index was developed according to the following considerations.

First, in spite of the common global recognition of inputs and outputs representing the scientific research and development (R&D) production function, methods for measuring innovation vary in their concepts, implementation and types of indicators used based on a multidimensional model of estimation.<sup>27,28</sup>

Second, the production function used for collecting statistics about R&D is composed of: inputs needed to support the R&D process; and outputs contributing to increasing the stock of knowledge and generating the desired socio-economic impact. Inputs are broadly divided into expenditure on R&D, size of the research workforce, and the size of high-technology net imports. Outputs include research publication, citation counts, ranking of scientific journals, quality of research institutions, patent statistics and research cooperation.

Third, given its sizeable impact on markets for goods and services, as well as the performance of the business sector and civil society, innovation is conceptually represented by a multidimensional model. Studies on innovation and approaches for estimating its impact are grouped under three alternate categories or dimensions including: i) sources for producing innovation; ii) innovation domains; and iii) classes of innovation outputs.<sup>29</sup> The first category assumes that innovation is developed (or produced), as part of R&D activities in research institutions.

In principle, the complete research and development cycle ends generally with new commercialized products or new production processes (considered as innovation outputs). This first innovation-producing model is generally associated with advanced or modern R&D infrastructures such as science and research parks, and technology valleys.<sup>30</sup> Another source of producing innovation is the business sector (or commodity producing enterprises). The output of this innovation production category is generally represented by new or significantly improved goods, services, managerial models or marketing methods. The estimation of innovation inputs and outputs, according to this model, is generally carried out using community surveys.<sup>31,32</sup>

Fourth, innovation can also be produced outside research centres and the production sphere of the economy. This is generally associated with societies characterized by creative, high-skilled and educated labour. This innovation model is known as 'societal innovation'.<sup>33</sup> As a source of innovation, this model demands a technologically advanced environment that can cope with the knowledge era and the Fourth Industrial Revolution, a highly skilled population, and a favourable enabling economic and social environment.<sup>34,35</sup>

Based on the above rationale and analytical points, the structural design of the 2017 RDI sub-index was composed of three pillars; 'research and development (R&D)'; 'innovation in production (or business innovation)'; and 'societal innovation'. Each of these pillars is broken down into inputs and outputs sub-pillars.

## **2021 RDI sub-index review**

After four years of applying RDI as a main constituting component of the 2017 GKI, it was deemed necessary and useful to revise its rationale and structure—including selected pillars, sub-pillars and variables. Furthermore, extensive discussion and assessment of its usefulness and weaknesses as an analytical tool have stressed the need to consider its evaluation and revision in order to enhance its capacity as a dynamic comparative policy analysis tool. It was deemed equally important to assess the status of variables used to estimate RDI. As will be shown below, while some variables previously considered in the 2017 structure are no longer produced, others have acquired a new formulation and estimation process. Correlation among variables of the same sub-pillar or across sub-pillars also needed re-estimation. Finally, and most importantly, the RDI multidimensional conceptual model has evolved during this four-year period through sensible changes, new considerations and additional dimensions. All these changes and considerations have affected the structure and variables included in the RDI sub-index.

A major drawback of the 2017 design was that the variables under the pillar 'research and development' did not account for the innovation output generated or produced in research institutions, which generally occurs with the completion of the R&D cycle that ends with prototypes, industrial models and commercialized products. This separation, however, was deemed difficult given the availability and coverage of worldwide RDI statistics. Furthermore, the second pillar on business innovation may include research activities to prepare the ground for innovative outputs, which can either be achieved in a separate R&D department or within a different department. This represented a major factor that affected the authors' choice to deal with RDI as an integrated activity in the modified version.

### **Selection of weights**

Another issue related to the original RDI structure was the allocation of relative weights for pillars and sub-pillars. During the initial phases of index conceptualization, multiple statistical techniques were applied to determine weights associated with pillars and sub-pillars based on empirical considerations. Given the conflicting results, the logic, rationale and relative role of each pillar were used to determine the allocation of weights.

Although general practice suggests the use of equal weights, it was decided to allocate 50 percent to both business enterprises and societal innovation sub-pillars, and 50 percent to the R&D institutions sub-pillar in both the inputs and outputs pillars of the modified structure (Figure 6).

This decision was based on a number of supporting criteria and considerations: i) R&D is considered the main source for generating new theoretical and practical knowledge (through basic research, applied research and experimental development). Despite the considerable impact of innovation on accelerating economic growth,





productivity and the transition to knowledge economies, the main bulk of knowledge creation and application pertains to R&D. ii) R&D is generally needed as an input to business innovation (in business enterprises with or without R&D units). iii) Societal innovation requires knowledge workers with R&D skills and culture. Finally, iv) innovation can be generated in research institutions, as previously explained.

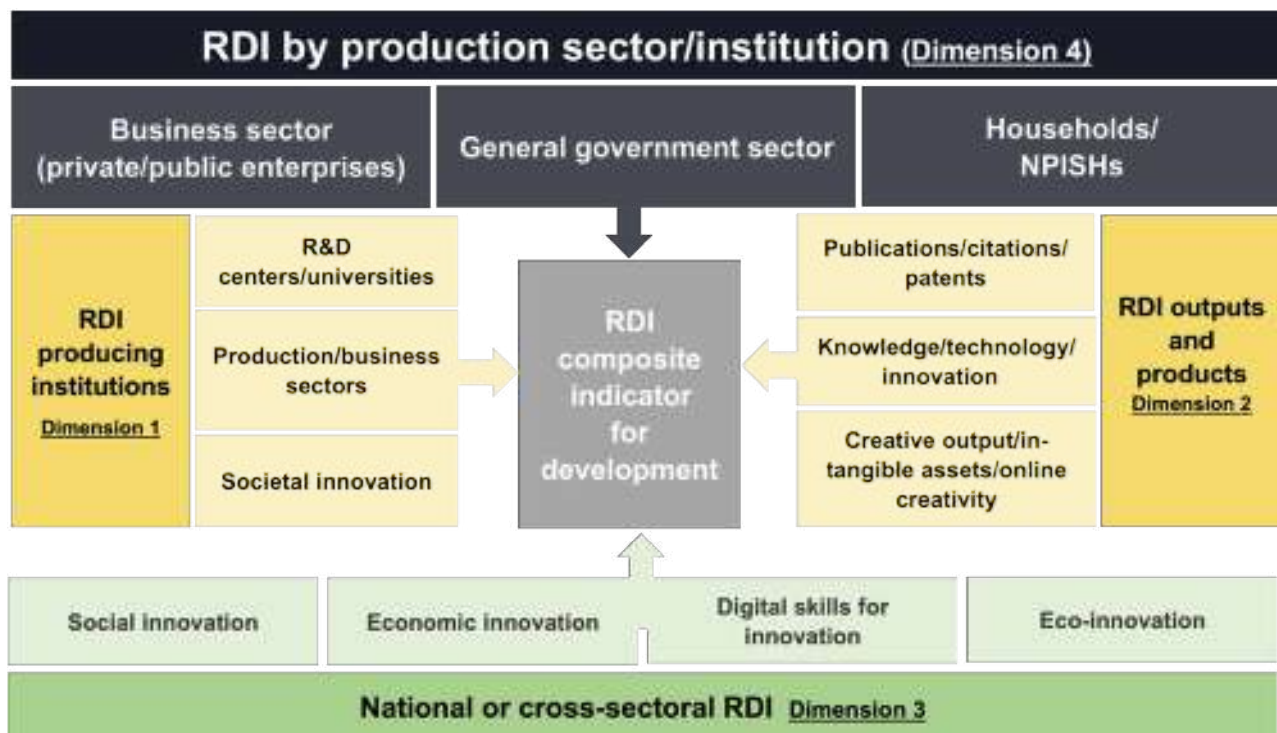
### The four-dimensional RDI conceptual model

Given its observed impact on the transition of countries to knowledge societies and economies, and its increasing role in keeping pace with the Fourth Industrial Revolution and digital transformation, the conceptual model of the RDI sub-index has witnessed sensible changes and acquired new features. RDI has become an integral part of most national sustainable development strategies. These recent developments have required changes in the original design and structure of RDI sub-index developed in 2017. As shown in Figure 5, approaches to estimate different RDI variables and evaluate their impact on knowledge transformation in a country are represented by four dimensions. These dimensions are: i) sources of producing RDI; ii) alternative RDI output categories; iii) cross-sectoral or national specific RDI; and iv) RDI pertaining to a specific sector in the production sphere of the national economy (based on the International Standard Industrial Classification [ISIC] scheme).<sup>36</sup>

With respect to the first dimension of the model in Figure 5, RDI can be generated (or produced), as part of the activities of R&D institutions. These institutions include universities, research centres and other knowledge-producing units. RDI can also be produced in private and public industrial business sectors, and in society as a whole.<sup>37</sup>

Innovation in production activities or the business sector (as part of RDI) is analysed in detail in the *Oslo Manual*.<sup>38</sup> Experience has shown that innovation generated by R&D institutions and business enterprises represents the largest proportion of RDI outputs. RDI in general, and innovation in particular, are also produced outside R&D centres and the production sphere of the economy. This generally happens in societies characterized by a high percentage of creative, highly skilled and educated labour.

Figure 5: The four-dimensional conceptual model of RDI





The second dimension of the RDI conceptual framework shown in Figure 5 relates to the nature and diversified features of its expected outputs and impacts. Here, we can identify three categories of outputs. The first is concerned with publication counts, citation statistics and patent records; the second category is related to knowledge and technology outputs as an outcome of RDI activities; the third includes creative and cultural outputs, investment in intangible assets, and online creativity. It is worth noting here that the second dimension reflects, to a great extent, the modern vision and output components of RDI.<sup>39,40,41</sup>

As shown in Figure 5, RDI is classified similarly according to its domain of application, special purpose or technical orientation. This third dimension is defined as 'national or cross-sectoral RDI'.<sup>42</sup> It groups specific types of innovation, such as social and economic innovation, eco-innovation and innovative digital skills. Social innovation is defined by the OECD as a creative activity directed to address social challenges that cannot be handled by market economies.<sup>43</sup> Given this rationale, social innovation seeks to improve the living standards of citizens, as well as their welfare measures. It is worth noting that 'social innovation' differs from 'societal innovation' associated with the sources of producing RDI addressed previously. On the other hand, innovation in the 'economic domain' aims at creating "new or significantly improved marketed goods and services"<sup>44</sup> to enhance the productivity and economic growth prospects of a country. As such, it is considered the corner stone for accelerating the economic development process.

The last category of this dimension (eco-innovation) addresses innovation in support of sustainable development. It offers promising prospects for the emergence of innovation-friendly green markets. Its main purpose is to reduce the cost of environmental protection, increase energy efficiency and facilitate the necessary shift to a green economy.

Finally, the last RDI dimension addresses development and innovation in selected economic sector or production activity based on the ISIC classification scheme.<sup>45</sup> Despite the variety of breakdowns of economic activity, the most used sectoral division in RDI-based research identifies private and public industrial activities, general government sectors, the households' sector and non-profit institutions serving households (NPISHs).

### Revisions to the 2017 RDI sub-index

The revision procedure that has led to the modified RDI sub-index was guided by an RDI advisory board members. It was carried out in four phases:

1. Discussion, evaluation and critical review of concepts, general orientation, development approach, structural features and possible modifications of the 2017 RDI sub-index by the advisory board members, based on a detailed conceptual review paper.
2. Based on the outcome of phase 1, and given the statistical constraints on the number of pillars, sub-pillars and variables, the discussion led to the final structure presented in the next section.
3. Based on the approved structure, a comprehensive set of variables was introduced and evaluated based on their relevance, reliability and impact on the objective and orientation of the RDI sub-index, as well as their contribution to the GKI. The outcome of this phase was a reduced set of variables to be included in the RDI structure.
4. The reduced number of variables pertaining to the sub-pillars of RDI were determined after excluding irrelevant, less important variables and those having limited country coverage or that were no longer produced. Other variables are not considered because of their selection in other sectors of the GKI, or given their high correlation with other variables.

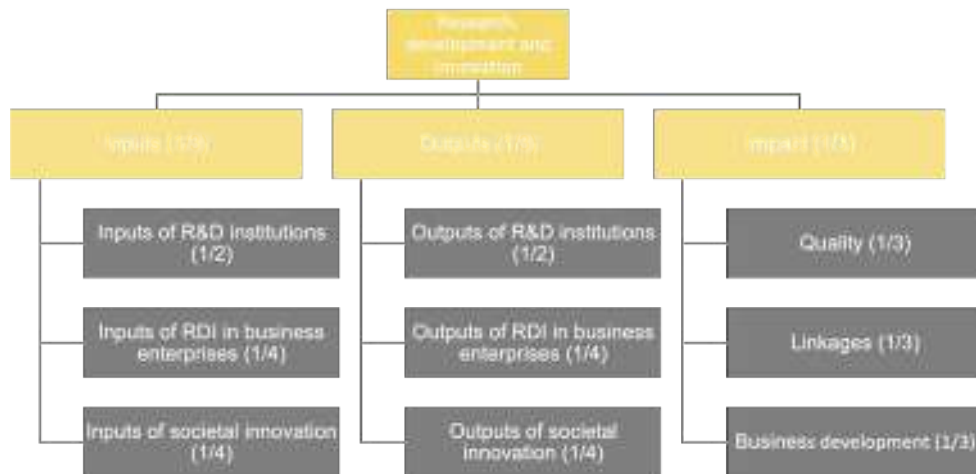
### The revised structure of the RDI sub-index and its justification

The pillars and sub-pillars of the modified RDI sub-index are shown in Figure 6. The sub-index is broken down into three pillars, two for estimating inputs and outputs of RDI, and a third for determining the impact of RDI. Based on this rationale, the design treats RDI as a unified or integrated sub-sector, with a production function (composed of inputs and outputs) and a separate pillar for its impact. Compared with the previous RDI sub-index, this new structural division of pillars enhances the analytical capacity. In addition to computing inputs supporting the production of RDI and outputs, it provides analytical information about its quality, linkages with other sectors, and contribution to business development. These two vital changes—treating RDI as an integrated function and adding a separate pillar for the evaluation of its impact—contribute to making the revised RDI sub-index a better comparative policy analysis tool for countries. It is worth noting that the breakdown of RDI sub-pillars aligns with



the first dimension of the new RDI conceptual model of Figure 5 (including R&D research institutions, RDI in business enterprises, and societal innovation) as shown in Figure 6), whereas the variables under each of them follows a combination of dimensions one, two and three of the RDI conceptual model (as will be discussed in the following section).

Figure 6: Modified RDI structure: pillars, sub-pillars and weights



Although the revised 2021 RDI sub-index, pillars and sub-pillars reflected, to a great extent, the RDI four-dimensional conceptual model previously described—as well as its desired features, orientation and purposes as defined by the members of the advisory board—the process of variable selection witnessed four major difficulties. The first difficulty concerned the conflicting views about the significance, relevance and analytical scope of some of the selected variables, taking into consideration the broad definitions of innovation types, different approaches to their estimation, and their interaction with R&D activities. The second difficulty resulted from the duplication of part of the selected variables in other sectors of the GKI—in particular the economy and higher education sub-indices. However, theoretical and statistical analyses solved these two difficulties. The third difficulty concerned the reliability, country coverage and statistical problems associated with an increasing percentage of RDI variables, and several variables were omitted from the structure for these reasons. Finally, the last problem concerned the preference to rely on hard data or survey results in developing the set of variables associated with the sub-pillars where several variables were excluded because they were integrated into other sub-indices of the GKI, are no longer produced, or have high correlation with other variables. The general structural constraints defined by the statistical methodology have also contributed to reducing the degree of freedom for an extensive and exhaustive selection of variables. Figure 7 summarizes the final structure of the modified RDI sub-index along with its associated variables.

### The RDI inputs pillar

The 'inputs' pillar includes three sub-pillars: 'inputs of R&D institutions'; 'inputs of RDI in business enterprises'; and 'inputs of societal innovation'. The constituent variables of the 'inputs of R&D institutions' sub-pillar are similar to the 2017 'R&D inputs' sub-pillar that concentrates on 'gross expenditure on R&D (% GDP)' and 'gross expenditure on R&D per researcher (computed as full time equivalent [FTE]);' and the 'share of researchers per thousand labour force'. Furthermore, the 'percentage of tertiary graduates from science, technology, engineering and mathematics (STEM) programmes' is included here, given its relevance to R&D processes.

In the 'inputs of RDI in business enterprises' sub-pillar, two types of gross expenditure are considered. The first estimates the total amount of spending allocated to RDI in business enterprises (GERD performed by business enterprises [%]), whereas the second type of spending concentrates on business sector own financing (GERD financed by business enterprises [%]). Based on this definition, the first spending variable reflects the interest of

a country in enhancing R&D in the business sector. The second variable estimates the internal policy of enterprises to finance R&D needs. The 'percentage of researchers in business enterprises' represents RDI inputs that determine research capacity and resources in an enterprise. Finally, the 'percentage of firms that spend on R&D' in a given country is added here to show the dissemination of a research culture in business sector.

'Inputs of societal innovation', as a third sub-pillar, is composed of three variables. The first variable reflects the importance of having knowledgeable and skilled labour to achieve societal innovation. High-skilled labour is generally required in the knowledge-intensive industries that characterize developed economies. In order to produce innovative or creative goods and services, civil societies need to acquire intellectual property rights. This represents the second input of societal innovation. Finally, the 'state of cluster development' is another measure that reflects the capacity of a country to have well established cluster industrial and services units that are geographically distributed in support of innovation.

### *The RDI outputs pillar*

The sub-pillar 'outputs of R&D institutions' is similar to the R&D outputs sub-pillar of the 2017 RDI sub-index. It concentrates mainly on publications, citations and resident patent applications.

The 'outputs of RDI in business enterprises' sub-pillar is based on four variables. Two relate to the number of receipts the business sector collects against the utilization by other national institutions of their intellectual property rights and industrial design applications. The increase in this type of income means that the business enterprises of a country are more productive and innovative. A third variable measures the number of patents under the Patent Cooperation Treaty (PCT)—administered by the World Intellectual Property Organization (WIPO) to provide patent protection in a number of countries simultaneously—which reflects the level of advanced innovation products. Finally, the 'percentage of firms producing new goods and services' is a direct measure of the innovative capacity of a business sector in a country.

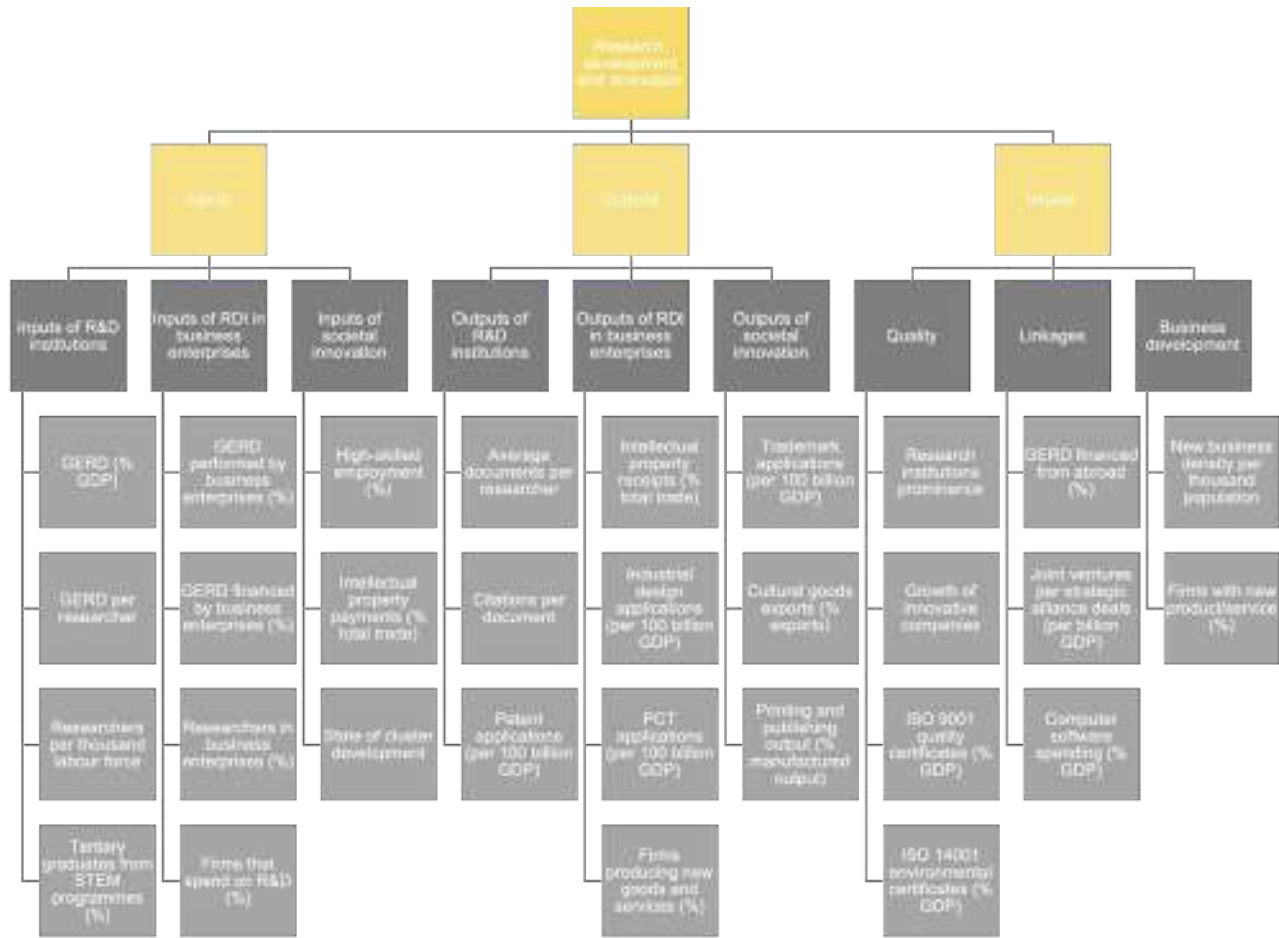
Based on the conceptual four-dimensional model of RDI, the third sub-pillar is concerned with 'outputs of societal innovation'. This latter is generally broken down into the acquisition of intangible assets, outputs of creative and culture products, and online creativity. Investment in intangible assets is represented in the output of societal innovation sub-pillar by 'trademark applications per GDP'. Creative and cultural products are measured within the structure of the sub-index by two variables: 'cultural goods exports (% exports)' and 'printing and publishing output (% of manufactured output)'.

### *The RDI impact pillar*

This third pillar is a new addition that goes beyond the previous RDI sub-index applied from 2017 to 2020. In addition to the variables explaining inputs and outputs of RDI, this pillar captures some elements of RDI impact—as far as the international scientific and socio-economic database permits. This pillar comprises three sub-pillars with variables pertaining to the quality of RDI, RDI linkages and how RDI affects the business sector development process—business development. The 'quality' of RDI is measured using both survey questions and hard data. Two survey questions determine the 'prominence of research institutions' and 'growth of innovative companies' of a country. A third variable estimates the management quality of institutions (ISO 9001) (% GDP), and a fourth variable determines eco-innovation performance measured by 'ISO 14001 environmental certificates (% GDP)'. Gross expenditure on R&D (GERD) financed by the outside world is allocated to the 'linkages' sub-pillar in order to measure the cooperation between domestic and foreign RDI institutions. Furthermore, 'joint ventures per strategic alliance deals (% GDP)' is another measure of linkages. Finally, the increase in 'computer software spending (% GDP)' is interpreted as a way of ensuring linkages between RDI and information technology (IT). A third sub-pillar included under the impact pillar is 'business development'. Since the development ideas of new business enterprises are considered as innovation outcomes, a measure of 'new business density per thousand population' can be viewed as part of the innovation impact on business development. Finally, the variable 'percent of firms with new products or services' that are considered new or significant improvements to the main economic market is viewed as a measure leading to the development of business enterprises.



Figure 7: Structure of the RDI sub-index





## Introduction

As the digital economy grows to constitute an increasingly significant portion of the broader global economy, industries in all sectors are striving to meet the requirements of the Fourth Industrial Revolution,<sup>46</sup> and its demands on information and communications technology (ICT) and other knowledge sectors. For ICT to reach its full potential, knowledge creation should not be restricted to a cluster of countries or regions; rather, it should be localized and shared for the well-being of all societies. Therefore, to gain an insight into how the future will unfold, we must acknowledge the interactions embedded within a number of mutually reinforcing trends in ICT.

ICT has fundamentally changed the way people live, affecting both our daily activities and the way we do business, necessitating a paradigm shift in how ICT infrastructure and policies are shaped. The adoption of such new technologies is dependent on the willingness of governments, businesses and citizens to drive technology/digital-led transformations in their countries, both in terms of investing in a robust, reliable and sustainable ICT infrastructure—represented by networks, software, hardware and platforms—or in terms of its usage by individuals, governments and businesses, and its impact on development. Furthermore, regional and international regulatory frameworks play a key role in enabling cross-border data flows and trade digitalization, as countries revisit the scope of their existing frameworks to ensure equitable distribution of economic development gains.<sup>47</sup>

The use of digital technologies has led to the development of new products and services, and the re-engineering of production systems in order to improve quality and reduce costs.

*ICTs are specifically mentioned as a means of implementation under SDG 17, highlighting the cross-cutting transformative potential of ICTs. Indeed, ICTs are crucial in achieving all of the SDGs, since ICTs are catalysts that accelerate all three pillars of sustainable development – economic growth, social inclusion and environmental sustainability – as well as providing an innovative and effective means of implementation in today's interconnected world. Paragraph 15 of the 2030 Agenda for Sustainable Development highlights that the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies...*

*Source: ITU, n.d.*

This has brought about a fundamental change in traditional business models, which now seek to leverage big data and global communication networks to increase market share. However, the impact of technology extends beyond expanding profits and cutting costs to realizing inclusive growth by enhancing access to services and creating employment opportunities. Thus, for governments and businesses to remain relevant and competitive, and to maximize the benefits from deploying new technologies, they must align the development of both their human resources and infrastructure with the demands of the digital transformation.

In this context, the need for relevant and timely indicators that measure the state of ICT in a given country is all-important. Hence, the ICT sub-index serves as a benchmarking tool, adding value to existing indices by examining ICT through the prism of sustainable development.

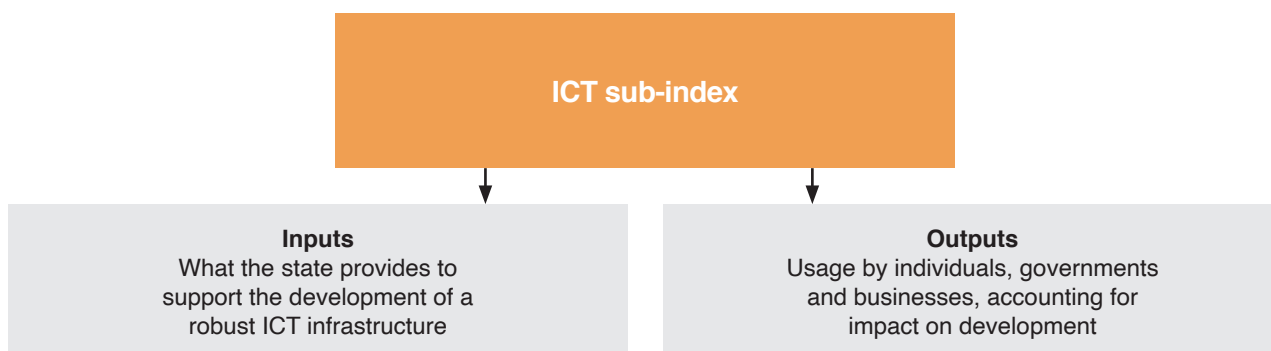
## The 2017 ICT sub-index

Technological revolutions have provided unprecedented opportunities for knowledge ecosystems and accelerated the creation, accumulation and dissemination of knowledge both within and across countries. The progress of knowledge-intensive production has therefore become linked to the provision of advanced technologies.



Consequently, as technology constantly evolves and the ICT sector witnesses significant advancements, it is paramount to have indicators and tools to measure the progress of countries against the development of this sector underlines the importance of developing an ICT measure; hence, this sub-index aims to exploring the capacities of countries to leverage the possibilities presented by technological advancements to drive their economic growth and prosperity.

The previous structure comprised two pillars—ICT inputs and ICT outputs—and six sub-pillars covering 20 variables from international sources such as the International Telecommunication Union (ITU), the World Bank, the World Economic Forum and the United Nations Department of Economic and Social Affairs (UN DESA), among others.



The input pillar encompassed two sub-pillars: infrastructure and sector competitiveness. The infrastructure sub-pillar measured the degree to which a country supplies citizens with the compulsory resources to access basic services; while the sector competitiveness sub-pillar reflected the affordability of fast, reliable and secure ICT services, in addition to laws relating to ICTs.

The output pillar was designed to measure the availability of technologies and the role of the government and organizations in committing to the integration and adoption of ICT for social and economic welfare and development. The output pillar was divided into four sub-pillars: subscriptions; usage by individuals; usage by government and institutions; and impact on development. The subscriptions sub-pillar measured the penetration of ICT services, whereas the two usage sub-pillars reflected how connected a society is, and the efficiency and quality of public services. The impact on development sub-pillar measured the effect of ICT on society in terms of innovation, doing business and participation.

## 2021 ICT sub-index review

The methodology of the ICT sub-index was refined through a rigorous revision of the existing literature related to the measurement and evaluation of the performance of the ICT sector, complemented by a series of consultations with distinguished subject-matter experts. As such, in the framework of the Global Knowledge Index (GKI), the ICT sub-index takes into account variables relating to ICT infrastructure, and access to, and usage of, technologies to: (i) create knowledge; (ii) localize knowledge; and (iii) disseminate knowledge for sustainable development. There is therefore a strong correlation between the ICT sub-index and the other sub-indices constituting the GKI because ICT has become the *de facto* underlying sector of a knowledge society. Examining ICT from this perspective helped in developing the pillars, sub-pillars and variables of the index.

## Revisions to the 2017 ICT sub-index

The revised edition of the index accounted for several key alterations:

- Replacing subjective variables by quantitative and objective variables where available. For instance, opinion surveys that are driven by personal beliefs and experiences have been replaced by scalable and robust variables.



- Omitting variables that are not regularly updated. For example, the ICT Price Basket variable, which was discontinued by the ITU, has been replaced by two variables reflecting the price of fixed- and mobile-broadband baskets relative to GNI per capita.
- Considering new variables that were not collected and reported when the first edition of the index was produced, such as Internet activities by individuals and trade in digitally deliverable services.
- Introducing emerging trends in the ICT field. The revised version comprises a new sub-pillar, 'skills and employment', reflecting the importance of digital skills and ICT employment in the new digital era.

### The revised structure of the 2021 ICT sub-Index

The ICT sub-index was revised to capture wider notions; as such, the pillars have been revisited in line with progress in ICT measurement.<sup>48</sup> The ICT sub-index now comprises three pillars: infrastructure, access and usage; the three of them being mutually reinforcing.

#### *The infrastructure pillar*

The infrastructure pillar reflects the importance of infrastructure as a prerequisite for the realization of the gains of technologies, and as an enabler for digital transformation. The deployment of mobile network coverage, and investments in telecommunication networks, tangible and intangible assets, are critical for the development of the sector in any country. Not only should governments invest in their fixed assets, they should also guarantee that quality services are provided at affordable prices, whereby these services are accessible by anyone anywhere. The latter requires efforts by the government to design inclusive and modern regulatory frameworks that ensure the growth and competitiveness of the Internet and telephony sector. Consequently, the competitiveness of the sector, along with a robust ICT infrastructure, supports the country in realizing the potentials offered by innovations and advancements in the Internet of Things (IoT).

Accordingly, the infrastructure pillar is divided into three sub-pillars, coverage, quality and affordability. The coverage sub-pillar includes three variables: 3G/4G mobile network coverage (% population); secure Internet services per 1 million population; and investment in telecommunication services (% GDP).

In their broad definition, the variables under the coverage sub-pillar, directly or with the use of proxies, measure the fixed assets investments in the telecommunication sector necessary to ensure that the whole population is covered by the equipment and the secure networks required to connect to the Internet. Subsequently, a secure and strong ICT infrastructure will allow countries to strengthen the means for individuals, businesses and governments to benefit from basic services, and to enhance knowledge exchange between them; notwithstanding the challenges to e-government and the realization of the digital transformation posed by the deployment of frontier technologies—such as artificial intelligence, machine learning, blockchain and biotechnology—within an inadequate ICT infrastructure.<sup>49</sup>

The quality sub-pillar measures the quality of fixed- and mobile-broadband subscriptions provided in terms of speed using three variables: mobile upload and download speeds; fixed-broadband upload and download speeds; and fixed-broadband subscriptions by speed per hundred people.

It is worth noting that while mobile-broadband technology is advancing at a fast pace, it is not yet an alternative for fixed-broadband, given that businesses to date are highly dependent on fibre-optic communication to conduct business. As such, equal importance is allocated to both fixed- and mobile-broadband in measuring the penetration and quality of telecommunication services in a country.

As the pandemic has changed both the work and educational environments, they are now characterized by remote working and distance learning, the majority of Internet activities could be classified as data-hungry and would entail high-speed Internet services. Thus, this sub-pillar serves as a good measure for the quality of the services provided and the ability of the ICT sector to support the development of sturdy business and learning environments.

While the availability of quality services is essential, ensuring that the services are provided at affordable prices is also indispensable. Hence, a third sub-pillar, affordability, was introduced to measure the relative prices of ICT services; it encompasses three variables: fixed-broadband basket (% GNI per capita); mobile-broadband basket (% GNI per capita); and Internet and telephony competition.



These variables reflect the maturity of the regulatory environment of a country and its capacity to introduce competition to the sector, thereby lowering prices to affordable levels and consequently achieving universal connectivity. Further, affordable access to broadband and ICT infrastructure and services is crucial to the growth and innovation of the ICT sector as it permits business continuity and improves the welfare of society by enhancing the flow of knowledge and strengthening social cohesion.<sup>50</sup>

*In general there is a negative correlation between price levels and penetration rates, for the ICT services monitored. Yet the relationship is not always a straightforward one. Thus, even as prices in LDCs [least developed countries] declined for the mobile and fixed broadband baskets, subscription numbers remained low, a possible indication that penetration will only increase once prices drop to a level where they are affordable for the average earner.*

*Source: ITU, 2021.*

### ***The access pillar***

The development of an advanced and integrated ICT infrastructure alone is not sufficient for the development of a dynamic and inclusive ICT sector. Access and usage of ICTs by citizens, businesses and governments to drive innovation, maximize the growth potential of technologies and realize development goals, remains at the core of the digital agenda. While businesses are striving to have an online presence in an attempt to reduce their costs and increase their market share, it is imperative for individuals and consumers, on the other side of the spectrum, to have access to these services, which is only possible by enhancing Internet accessibility. This, in turn, reduces social disparities and inequalities. Accordingly, the access pillar was introduced to measure the penetration of ICT in the country and human capacities in the ICT field. It is divided into two sub-pillars: subscriptions; and skills and employment.

The sub-pillar 'subscriptions', measuring the penetration of ICT services among citizens, includes three variables: active-mobile broadband subscriptions per 100 inhabitants; international Internet bandwidth per user; and households with Internet access at home (%).

The variables included in the subscriptions sub-pillar reflect the level of penetration, which plays a key role in determining the volume and scope of knowledge creation, localization and diffusion. As more people are connected to the Internet, knowledge creation increases exponentially and people, regardless of where they are located, are connected to the ideas and knowledge generated online.

A new sub-pillar 'skills and employment' was developed to reflect the digital skills of citizens and employment in ICT. It comprises three variables: individuals with standard ICT skills (%); tertiary graduates from ICT programmes (%); and ICT employment (%).

This 'skills and employment' sub-pillar assesses the capacity of human capital to integrate the new technologies and to contribute to the growth of the ICT sector. As the demand for digital skills is increasing with the rise in digital-oriented jobs, and the adoption of technologies in the workplace and by governments, citizens should acquire a set of digital skills to harness these technologies for economic and social development. Furthermore, as global competition is now concentrated over ICT-enabled goods and services, creating a massive number of jobs in the field, the need for self-motivated and talented ICT specialists that possess programming and analytical skills is paramount.

### *Innovating skills for a digital economy*

*To realize opportunities presented by digitalization, governments need to understand how jobs—and the skill sets demanded by these jobs—are changing. Digital skills have moved from 'optional' to 'critical' and need to be complemented with transversal 'soft skills' such as the ability to communicate effectively in both online and offline mediums. In developing countries, digital skills are also in high demand and greatly improve prospects for decent employment. They are linked to higher earning potential, and experts have predicted a growing number of jobs for people with advanced digital skills. Not only are there new jobs available, some of them are actually going unfilled, making the provision of advanced digital skills part of a solution to unemployment.*

*Source: UNESCO, 2018.*

### *The usage pillar*

The technological, societal and scientific impacts of ICT remain the utmost factors in determining the contribution of this sector to the development of a country. While the infrastructure and access pillars set the digital foundations for a strong ICT sector, the usage of technological services to promote development and create new opportunities is fundamental in measuring the advancement of this sector in an economy. An increase in the use of ICT services promotes the rapid exchange of knowledge—as more people are connected through social networks—and enables the effective development of solutions to pressing challenges via Internet-enabled innovation, creativity and entrepreneurship.<sup>51</sup> Additionally, the availability of online government services and the transition towards digital government is imperative in promoting transparency, accountability and governance in public administrations.

To illustrate the exchange of knowledge and the impact driven by ICT, the usage pillar was developed, including two sub-pillars: services and outcomes.

The 'services' pillar measures the provision of adequate ICT services, and includes four variables: government online services; fixed-broadband Internet traffic per subscription; mobile-broadband Internet traffic per subscription; and Internet users (%).

These variables reflect the intensity of Internet use through the Internet traffic variables, mobile- and fixed-broadband, and the development and availability of online government services in the country. "Commercial traffic through large data centres for business applications represents a significant portion of the data generated in digital form."<sup>52</sup> The proportion of individuals using the Internet remains a relevant and realistic measure to assess the usage of ICT services, as it provides insights on the portion of individuals interacting among each other, with businesses and governments.

The second sub-pillar, outcomes, witnessed considerable changes to reflect the efficacy of the sector and its dynamic effects on other aspects of the economy such as trade, innovation, governance and doing business. It covers four variables: ICT PCT patent applications (per 100 billion GDP); e-participation; Internet activities by individuals (%); and trade in digitally deliverable services (% total trade).

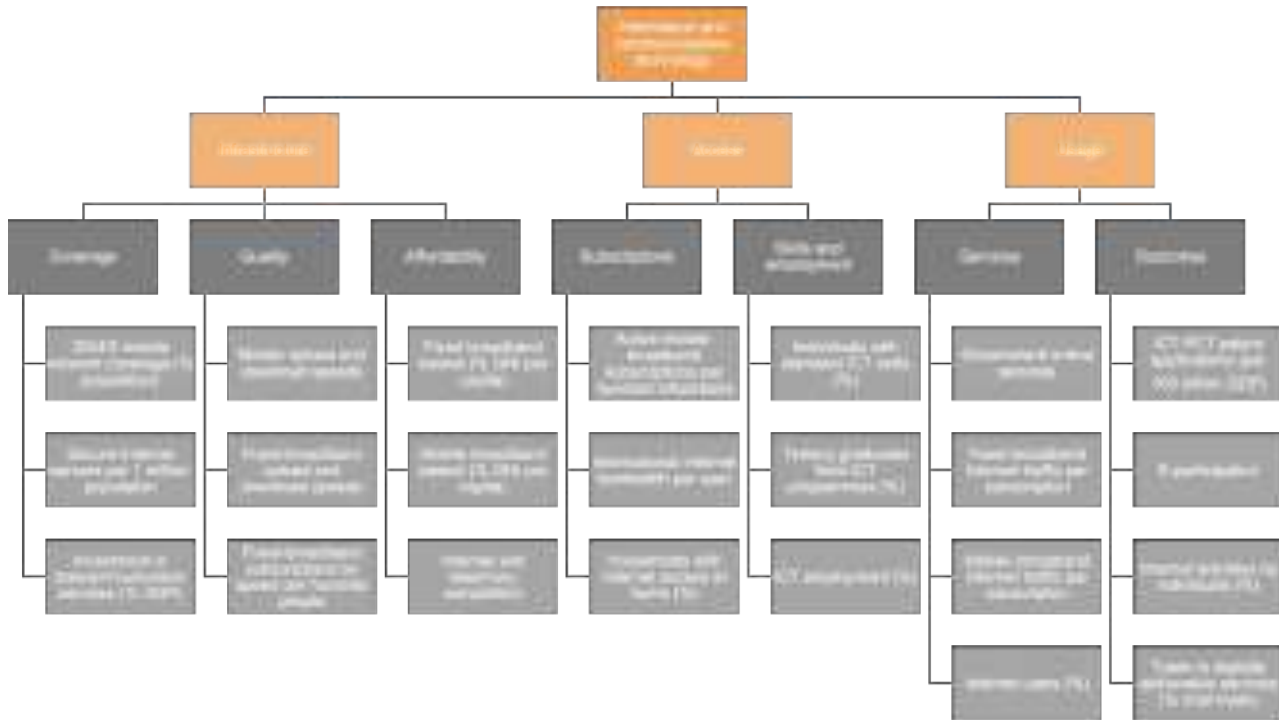
These variables capture the outcomes of ICT as seen in innovation through ICT inventions registered through the international patent system, 'Patent Cooperation Treaty' (PCT), and in trade, whereby ICT-enabled digitally deliverable services, financial services, use of intellectual property, telecoms and computer and information services, among others, are traded across countries. They also show how governments are using online tools to promote citizen engagement and facilitate provision of knowledge by public administrations to citizens. The Internet activities by individuals (%) variable presents perceptions and behaviours on the usage of the Internet for private purposes, Internet banking, purchasing goods and services, and online courses, among others. Hence, this sub-pillar is a good measure of the absorption of modern technologies and their usage for business-to-consumer (B2C), business-to-business (B2B) and government-to-citizen (G2C) transactions.

Finally, the gender digital divide is reflected in the seventh GKI sub-index 'enabling environment', as it impacts all sectors presented in the Global Knowledge Index and is considered an important variable in measuring gender equity. The variable, female-to-male Internet users' ratio, measures the usage of Internet and knowledge-enhancing



applications and services by females relative to that of males, which is in turn a good measure of female empowerment, as the use of ICTs enables women greater independence and autonomy, providing them with economic and social opportunities.<sup>53</sup> Furthermore, it is worth noting that due to data unavailability and insufficient data coverage, the digital divide variable was extended to cover the gender aspect only, as disaggregated data related to infrastructure, access and usage by location, wealth or other socio-economic factors are limited.

Figure 8: Structure of the information and communications technology sub-index





## Introduction

The establishment of knowledge economies—characterized by their diversity of production, productivity, labour and human capital—has become the main determinant of the ability of countries to adapt to global transformations and developments. Within the Global Knowledge Index (GKI), the components of the knowledge economy related to economic competitiveness, economic openness, and financing and domestic value added, represent important indicators of the ability and resilience of economies to face global transformations and developments. This has been illustrated by the COVID-19 pandemic, which has shown that countries with competitive knowledge-based economies are best able to adapt to, and recover from, such crises.

The knowledge economy is linked to all productive sectors. For example, the ICT sector and related digital activities within the commodity and service sectors, including logistical communication chains, are all direct indicators of the role of the knowledge economy in achieving sustainable development and balanced economic growth. It has also been suggested that knowledge economies require that the numbers of workers in sectors related to knowledge, technologies and digitization must exceed those working in traditional sectors.<sup>54</sup>

*The World Bank considers education, training, information infrastructure, economic incentives, institutional systems and innovation to be the main pillars for achieving a knowledge economy. These pillars ensure the free transfer of knowledge and stimulate investment, creativity and innovation within the economy.*

*Source: World Bank, 2013.*

Since the launch of the GKI in 2017, the economy sub-index has been shown to be one of the most interactive of the six indices. This is reflected in the interdependence between the components of the economy sub-index and the variables employed for other sectors that feed into the economy. The structure of the economy sub-index reflects the specificity of the sector and the balance between its three pillars: knowledge competitiveness; economic openness; and financing and value added.

## The 2017 economy sub-index

A dedicated structure for the economy sub-index was created within the 2017 GKI to ensure sufficient connection and alignment with the components of the other sectors—including pre-university education, TVET, higher education, RDI, ICT and enabling environment; the latter of which constitutes an organic link between the six sectors that make up the Index.

The structure also considered the need for variables that reflect the role, components and status of the global economy in determining the progress of nations in their acquisition, production, transfer and localization of knowledge. Within this general framework, it was agreed that the economy sub-index would consist of three pillars that link the economy with other sectors, and with the broader concept of the knowledge economy in the Index. Each of the three pillars comprised two sub-pillars with individual variables that reflected their potential and role in the economy. The six sub-pillars of the 2017 economy sub-index were: economic infrastructure and competition; competitiveness drivers; creative economy; trade; financing and taxes; and domestic value added. These six sub-pillars comprised 22 variables indicating the role of the economy in knowledge, on the one hand, and its role in other sectors, on the other.

## 2021 economy sub-index review

Through an objective, scientific and practical review of the components of the economy sub-index, it was determined that its sub-pillars and variables required further development. Global changes and developments in the economic landscape necessitated the qualitative development of the components of the sub-index. This was achieved based on desk studies, including a review of the economic literature and its applications worldwide.





Thereafter, international experts in economics were consulted, resulting in a thorough, qualitative review of the sub-index and its components, including its main pillars, sub-pillars and variables.

### Revisions to the 2017 economy sub-index

Discussions with the team of international consultants and experts focused on the following:

- How the economy sub-index can reflect the real role of the pillars in enriching knowledge.
- Using objective numerical indicators while reducing the number of variables based on samples and opinion polls to the greatest extent possible.
- Reconsidering the names of some of the pillars and sub-pillars to better reflect their true meaning.
- Introducing variables that directly relate to the knowledge of human resources and their role in transferring, localizing and building knowledge in countries.
- Ensuring variables cover as many countries as possible, allowing for more objective measurements, comparisons and rankings of countries.
- The exclusion of variables owing to the lack or unavailability of sufficient data. For example, some of the data employed in the 2017 GKI is no longer produced, or does not cover enough countries to meet the requirements of the Index.

### The revised structure of the 2021 economy sub-index

Based on the above, and in light of various contemporary global developments and crises, the revised structure of the economy sub-index sought to reflect the intertwined organic nature of the knowledge economy, taking into consideration two key aspects. First, the overlap between the economy and other knowledge sectors included in the GKI that represent essential components of a knowledge economy. Second, the concept of the knowledge economy in the contemporary world required clarification, as it complements other sectors; for example, the infrastructure needed to attract investment—which requires knowledge, funding, production and access to markets. In addition, economic openness, financing and value added play important roles in the localization, adoption and transfer of knowledge both locally and globally. Indeed, the definition of knowledge economy has been much debated among researchers since the 1960s.<sup>55</sup>

*Although there is no agreed definition of the concept of the knowledge economy, [...] it is useful to say that human cultures throughout history have relied heavily on knowledge to survive and improve their standards of living.*

*Source: Piotrowski, 2015.*

The global experts who reviewed the GKI in general, and the economy sub-index in particular, also concluded that there was a need to limit, where possible, variables that did not depend purely on quantitative data, in order to reduce potential bias—for example, variables that rely on opinion polls and may be affected by the personal judgment of respondents and the surrounding circumstances. However, some limitations, such as the availability of data at the country level or lack of a suitable objective alternative, meant that it was impossible to completely replace all non-quantitative variables.

Accordingly, the main pillars and sub-pillars of the economy sub-index were reorganized as follows. The main pillars of the economy sub-index remained the same; however, the knowledge competitiveness pillar was renamed to economic competitiveness, in line with global designations. The economic openness, and financing and value added pillars remained the same. This was confirmed through all stages of the review, including research, literature review and direct communication with a core group of international experts working in the fields of knowledge economy and human capital at international institutions, universities, and international research and development centres.



It was agreed that the sub-pillars should also be developed in accordance with the reviews and consultations. Equal relative weights were used for the main pillars and sub-pillars in order to avoid bias and ensure relative balance in the distribution of variables among the former. The conviction that variables within each pillar were of equal importance was another reason for the equal relative weights. At the level of the sub-pillars, it was agreed that each main pillar should contain two sub-pillars—similar to the format in the 2017 version—but also that those sub-pillars should be developed and updated in accordance with the abovementioned reviews and available data.

### *The economic competitiveness pillar*

The economic competitiveness pillar consists of two sub-pillars: infrastructure investment and business agility.

- The infrastructure investment sub-pillar represents one of the most important factors for the competitiveness of economies and their ability to attract investments, which together form the backbone of the economy. Investment in infrastructure facilitates access to resources, which in turn accelerates the pace of innovation and knowledge production. According to the Organisation for Economic Co-operation and Development (OECD), infrastructure investment includes all variables and indicators relating to the infrastructure of the economy, including roads, buildings, transportation and even financial legislation and the availability of capital.<sup>56</sup> This sub-pillar comprises four variables that represent the concept of investment infrastructure in its broad sense, as follows: gross fixed capital formation (% GDP); Logistics Performance Index; transport productive capacities index; and building quality control index.

Gross fixed capital formation as a percentage of GDP is generally used to express the flow of investments into infrastructure. Such investments are essential for accelerating economic growth and enhancing future production capacities. The sub-pillar also contains the logistics performance index, transport productive capacities index and building quality control index variables. These variables directly reflect the ability of infrastructure to meet the requirements of, and strengthen, foreign and domestic investment. This is an important determinant for activating and advancing the economy in terms of the production, localization and transfer of knowledge.

- Economics literature today clearly indicates the importance of agility in economic decision-making at the micro and macro levels, among individuals and institutions.<sup>57</sup> Therefore, as part of the development and modernization of the economy sub-index, business agility was introduced as a sub-pillar within the economic competitiveness pillar to reflect data that measures the economy's agility in relation to complex and unprecedented changes and transformations—whether global, regional or local. This data is based on: (1) the ability to dynamically respond to developments, changes and shocks; (2) the strength and flexibility of the integrative links between actors in the economy, especially horizontally between the public and private sectors, and vertically between institutions and units within one sector, whether government or private; and (3) the availability of digital infrastructure that facilitates projections and monitors the impact of external transformations on various sectors of the economy and on economic actors—be they government, private sector or individuals—and their ability to transform quickly and flexibly in order to adapt to or mitigate adverse effects. Therefore, the business agility sub-pillar includes four variables as follows: ease of starting a business; insolvency recovery rate (cents per dollar); entrepreneurial employee activity rate; and extent of corporate transparency index.

*In today's world, agile organizations combine efficiency of scale, speed, flexibility, and resilience to compete and win.*

*Source: McKinsey, 2021.*

These variables constitute the basic measures for calculating the economy's agility, its ability to renew itself, engage with positive global transformations, and work with sufficient flexibility to interact in the global economy, not only in terms of local expansion and serving local sectors, but also in attracting, maintaining and sustaining foreign investments in a safe, effective and rapid manner. It is noted here that all the variables reflected the main determinants of agility, especially with regard to: speed and flexibility in the execution of



work; response to shocks and crises; labour; productivity; institutional transparency; the ability to highlight the agility of institutions in all circumstances; and in effective cooperation and transparent communication with stakeholders.<sup>58</sup>

### *The economic openness pillar*

Two sub-pillars were employed within this pillar: trade and diversification, and financial openness

- While developing the structure of the economy sub-index, the components of the trade and diversification sub-pillar were reconsidered to reflect the level of knowledge associated with trade exchange between countries on the one hand, and because diverse markets offer an opportunity to increase knowledge at the level of micro- and macro- economics. This sub-pillar contains the following variables: trade (% GDP); high-technology trade (% total trade); product concentration index; and market concentration index.

The technology-related variables are perhaps the most expressive of the reality of knowledge exchange through trade between countries. Global intra-state trade increases the level of productive knowledge exchange between countries, and even between consumers and institutions. The same applies for trade in advanced technology. However, concentration of markets and products results in limited knowledge exchange and constitutes a lost knowledge opportunity for consumers, institutions and countries in general. Hence, the trade and diversification sub-pillar reflects the role of international trade and the openness of countries in enhancing the level of knowledge shared among them, depending on the level of trade exchange and the diversity of production and markets.<sup>59</sup>

*Both geographical location and international trade [...] affect the flow of knowledge between countries.*

*Source: Sjöholm, 1996.*

However, some changes were applied to the variables of the trade and diversification sub-pillar owing to data availability and updates, or their association with quantitative or non-quantitative methodologies. The variable trade (% GDP) has been retained. The variable for the prevalence of non-tariff barriers has been removed because it is based on opinion surveys.

Some appropriate quantitative variables have been introduced, as indicated above, in order to give greater momentum to the role of trade exchange, and the diversity of markets and products.

All of these variables are significant for transferring productive knowledge between countries, and even transferring and adopting modern technology between different countries of the world. This reinforces the argument presented that economic openness is the gateway to knowledge exchange between countries, and that foreign trade, freedom of trade and diversity in markets and products constitute the best means to produce, transfer and localize knowledge among countries.

- Within the concept of economic openness, financial openness is an essential component that determines the ability of countries to obtain and circulate knowledge. The sub-index was updated to include a sub-pillar related to financial enablement titled 'financial openness'. This sub-pillar replaces the creative economy sub-pillar; the variables of which were redistributed among other pillars and sub-pillars of the economy sub-index. In this context, the sub-pillar on financial openness contains the following variables: Chinn-Ito Financial Openness Index; foreign direct investment, net inflows (% GDP); and debt dynamics.

The Chinn-Ito Financial Openness Index measures the level of openness of countries' markets to capital flows. It captures the level of international exchange in financing investments and financial operations, both of which are necessary for stimulating, encouraging and supporting the launch of businesses, and facilitating investments in the service and commodity sectors. Facilitating the transfer of capital, in accordance with controls on transparency and financial commitment, necessarily means supporting the transfer of knowledge between countries. The more open a country is in these respects, the higher its ability to generate, localize and transfer knowledge.

On the other hand, net foreign direct investment flows, which are mainly related to investments in real productive sectors, themselves imply the transfer and localization of knowledge. The debt dynamics variable measures the extent of change in public indebtedness, after weighting it by the credit rating of countries. Credit ratings affect the ability of countries to borrow for the purposes of capital spending, which is one of the indicators of the development capabilities of the state, i.e. its ability to manage public budgets, as well as directing debt towards development and capital projects, thereby contributing to increasing knowledge, borrowing can be used to support current spending, which may affect the ability of countries to pay and fulfil their obligations to the international community, i.e. creditors. Hence, credit rating has become one of the most important determinants of the ability of countries to obtain financing. This ability to secure financing is a result of the desire to obtain knowledge; without adequate funding, access to knowledge—through international exchange, or even domestic spending—becomes unrealizable.

### *The financing and domestic value added pillar*

Based on the agreement of the experts involved in the review, the sub-pillars on financing and taxes, and domestic value added, were retained from the 2017 edition.

- The financing and taxes sub-pillar has been redeveloped to better reflect the positive impact of financing on the dissemination and localization of knowledge in countries, as well as to clarify the effects of tax on the generation and dissemination of knowledge. Legalizing the easy transfer of goods and services between countries is considered one of the most important factors in knowledge exchange and transfer. This sub-pillar includes four variables: domestic credit to private sector (% GDP); MSME financing gap (% GDP); total tax and contribution rate (% profit); and bank non-performing loans (%).

The variables of domestic credit to private sector, and total tax and contribution rate, were maintained. Two new variables were introduced: bank non-performing loans to total gross loans, and MSMEs financing gap (% GDP). This gap is negative; the wider the gap, the more restricted access to knowledge becomes. The importance of this lies in the fact that MSMEs dominate today's global economy and represent more than 40 percent of GDP in emerging economies.<sup>60</sup> The financing gap for these companies and institutions is a major disincentive to the localization, transfer and even adoption of knowledge in the economy.

*Small and medium-sized companies play an important role in most economies [...] They are important contributors to job creation [...] They represents about 90 percent of the volume of business and 50 percent of employment globally [...] The World Bank estimates that about 600 million new jobs will be needed in the year 2030. Therefore, small and medium-sized companies will be of high importance for world governments.*

*Source: World Bank, 2021.*

Hence, it is important to determine the role of the banking system in supporting MSMEs and the financing capabilities of these institutions in various countries of the world. This is a major determinant of the level of knowledge in many countries.

The variable for bank non-performing loans to total gross loans has been introduced, because default rates identify the extent to which companies are able to work and expand in the future, which ultimately affects levels of knowledge. Such knowledge could be lost due to defaulting institutions, or slowed down by the failure of some businesses in certain periods. This means that the banking system has an important role to play in the continuation of knowledge exchange. Hence, a sound banking system is required for financing expansion, new projects, new innovations and large, medium, small and even micro enterprises.

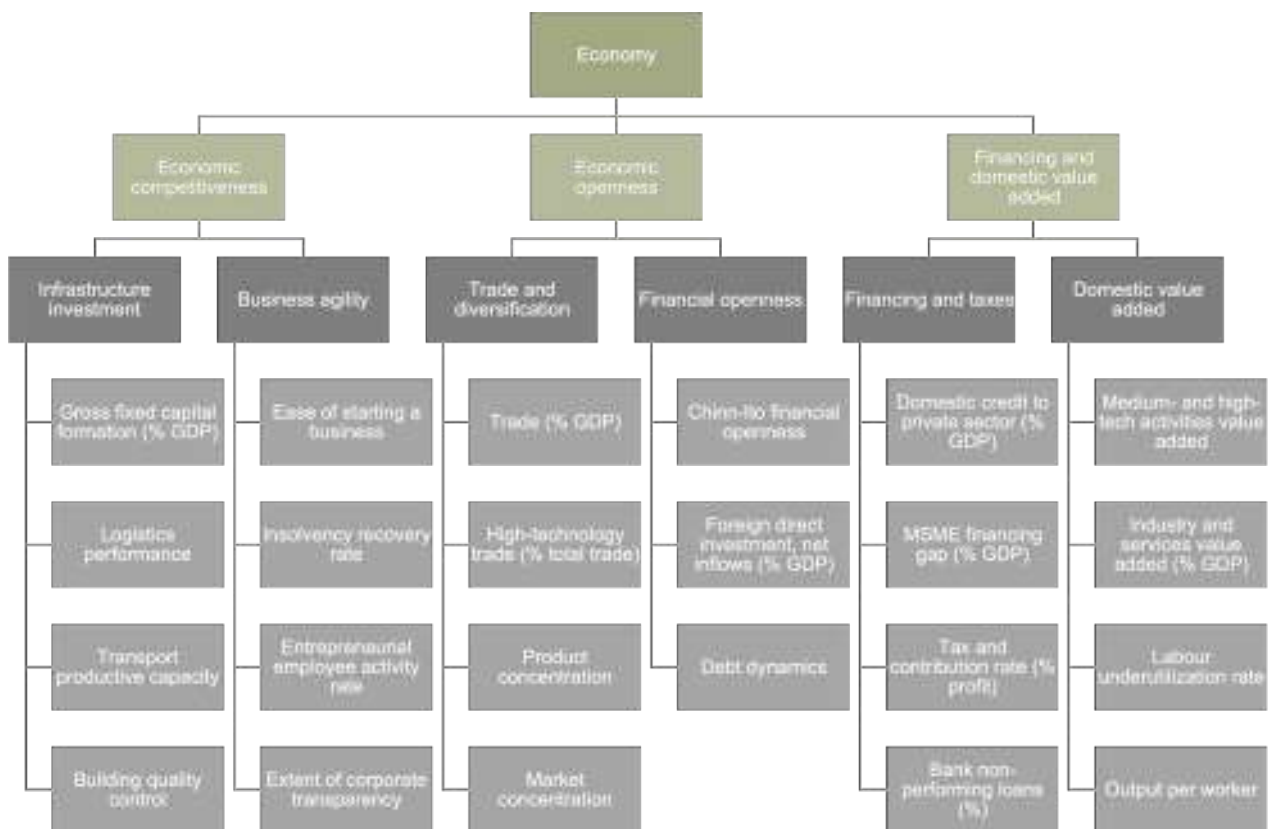
Finally, the variable expressing the tax burden was maintained. This shows the extent to which large companies and institutions are able to use their surplus profits, after taxes, to spend on various fields of knowledge, including through horizontal and vertical expansion. A high tax burden will discourage companies from spending more on different fields of knowledge, and from expanding horizontally or vertically, both domestically and abroad.



- The term, domestic value added, within the concept of economy, refers to the potential resources of countries in producing knowledge. It necessarily implies the extent to which local human and material resources are used in the production processes of both goods and services. This sub-pillar has been maintained in the new version of the sub-index, with the following variables: share of medium and high-tech activities in total manufacturing value added; industry and services value added (% GDP); composite rate of labour underutilization; and output per worker.

The concept and role of domestic value added explicitly indicate the need to examine technology and the role of human resources. This is achieved through the four variables mentioned above. In an age of increasing technological advancement and digitization, the transfer, localization and production of knowledge becomes dependent on the level of involvement of technology sectors in various manufacturing processes. This determinant is not limited to manufacturing, but is also of great importance to service sectors. The COVID-19 pandemic has shown the importance of these sectors, and especially logistics and supply chains, in combating the virus on the one hand, and in supporting the continued functioning of economies on the other. Furthermore, labour is the basis for generating domestic value added in countries. Human capital is essential for the production, transfer and localization of knowledge. Hence, the last two variables in this pillar cover both the extent of utilization of human capital and worker productivity. Failure to utilize human capital has a negative impact on the production, transfer and localization of knowledge. A positive change in the rate of worker productivity means a positive and significant change in the progress of knowledge economies.

Figure 9: Structure of the economy sub-index





## ENABLING ENVIRONMENT

### Introduction

The enabling environment represents the necessary conditions for the incubation and support of the production, development and utilization of knowledge to achieve sustainable development. It is a key determinant for the development of knowledge indicators as it is related to all sectors—institutional, social, economic and political enabling factors are considered as the main pillars for knowledge empowerment. This environment comprises many elements, such as development, education and qualification policies and plans; economic and political reform projects; and legislative frameworks that help support the processes of nurturing new generations, establishing the rule of law and strengthening human rights systems to ensure human safety, welfare and equality. Health services, quality of life and the environment are also general elements that play a key role in achieving and sustaining human development.

Therefore, the six sectoral sub-indices that make up the GKI are open and dynamic systems that constantly interact with each other on the one hand, and with their surroundings within the general context on the other. They were linked to a number of contextual variables that have been proven to influence the functioning of sectors and their outputs, based on a holistic view of development and its components, placing them in the context of an integrated synthetic system that is dynamically active and interactive, without being closed or confined to one factor or component.

Enhancing the performance of the education system and improving the quality of its outputs require a supportive environment; a health care system that ensures the physical and mental well-being through basic health services; and the preservation and protection of the environment from all forms of pollution and degradation. It also requires an enlightened culture in which broad segments of society are highly educated and social justice prevails; and a stable political climate, in which rights and duties are respected, the rule of law is established, and freedoms are exercised responsibly. Perhaps the most telling evidence of the importance of these factors is the deterioration of education in all its stages in countries that suffer instability due to conflict.

The enabling environment also plays a pivotal role in supporting the higher education sector. Establishing an effective higher education system requires a number of supportive contextual factors, including—most notably—political stability, the absence of violence/terrorism, quality legislations and government effectiveness, in addition to prominent socio-economic variables such as social inclusion and income level. All of these variables determine the general educational context, which inevitably affects the fortunes of individuals enrolling in higher education.

The RDI sector requires an appropriate political and legal environment, including political stability, rule of law, suitable legislation for the knowledge age, and the government's efficiency and effectiveness in making investment and organizational decisions that support scientific research and innovation for development. The success of countries in RDI is linked to economic performance, the achievement of the sustainable development goals, and the preservation of the natural environment. Public health variables also support a suitable environment for RDI.

The same applies for the ICT sector, which is also affected by the enabling environment—especially the legislative and political environment, as political stability provides an encouraging environment for investment and attracts international companies to participate in the provision of communications services, and both Internet and mobile applications. Having clear laws and regulations for investment helps companies grow and expand. Prompt justice, rule of law and litigation processes also help attract capital to this central sector. The level of education and, literacy, and the availability of trained manpower are essential factors for the growth of this sector and its active contribution to the knowledge system.

The socio-economic aspects of the enabling environment, especially in terms of gender equity, represent an essential determinant that supports economic indicators, particularly in relation to the local





added value and the knowledge competitiveness of countries. The institutional and political environments constitute the main pillars for knowledge formation in the economy; added value, internal and external competitiveness, and economic openness are all closely linked to the institutional framework of the country—especially in relation to the type and quality of procedures, effectiveness of the litigation system, efficiency of the government, and political stability. In addition, socio-economic enablement is important, especially with regard to women's contribution to local added value. On the other hand, public health, the level of health services, and the quality of life and the natural environment are among the general enablers upon which the economy depends to establish a competitive environment and attract sustainable investments.

### **The 2017 enabling environment sub-index**

The enabling factors across sectors were aggregated into an independent sub-index called 'enabling environment'. Despite awareness of the many contextual factors within the various sectors, special focus has been placed on three main pillars, namely: political and institutional; socio-economic; and health and environment.

- The political and institutional pillar is divided into two sub-pillars: political and institutional. The political sub-pillar comprises two variables: political stability and the absence of violence and terrorism; and government effectiveness. The institutional sub-pillar comprises three variables: judicial independence; regulatory quality; and World Press Freedom Index.
- The socio-economic pillar is divided into two sub-pillars: gender parity and empowerment. The gender parity sub-pillar is measured through three variables: women-to-men ratio in parliament; labour force participation rate; and educational attainment (at least completed upper secondary school). The empowerment sub-pillar is measured using five variables: adult literacy rate; mean years of schooling; GDP per capita; unemployment rate; and share of youth not in employment, education or training.
- The health and environment pillar is divided into two sub-pillars: health and environment. The health sub-pillar comprises two variables: life expectancy at birth; and under-five mortality rate. The environment sub-pillar consists of three variables: total CO<sub>2</sub> emissions (CO<sub>2</sub> per capita); energy intensity of the residential sector; and renewable energy consumption.

### **2021 enabling environment sub-index review**

The enabling environment sub-index did not undergo drastic changes, and reflected dimensions which cut across and influence all six sectoral sub-indices. The three-pillar structure was maintained, with some modifications to names and variables to reflect current realities.

#### **The revised structure of the 2021 enabling environment sub-index**

##### *The governance pillar*

Governance is an issue that transcends all sectors and determines their performance. It is an essential requirement for establishing an incubating environment for development, especially in terms of participation, accountability, political stability, absence of violence, government effectiveness, quality of legislation and regulations, rule of law and control of corruption.

The effectiveness of the political environment is an important indicator due to its role in unlocking potentials, setting priorities, working to promote justice and equal opportunities, and controlling corruption. These are the dimensions emphasized by the World Bank in its efforts to monitor and measure governance at the global level by collecting and documenting data on aggregate and individual governance indicators. These indicators are categorized into six areas: control of corruption; political stability and absence of violence/terrorism; rule of law; voice and accountability; government effectiveness; and regulatory quality.<sup>61</sup>



Based on the above, the governance pillar was divided into two sub-pillars:

- Political environment, which is measured through two variables: peace and political stability; and voice and accountability.
- Quality of institutions, which is measured through three variables: rule of law; control of corruption; and government effectiveness.

These variables interact within the governance system, with voice and accountability serving as one of the pillars of wise leadership. Greater freedom of expression, enhanced accountability mechanisms, and follow-up, monitoring and evaluation, support peace and stability in society. All of this is only possible through radical reforms of institutional structures, improved performance of state institutions and agencies, and increased government effectiveness. These factors also contribute to strengthening the rule of law, and ensuring transparency and control of corruption of all kinds (financial, administrative, political, moral, etc.). Corruption hinders the achievement of the SDGs, as “the SDGs are comprehensive and their susceptibility to be undermined by corruption is unsurprising: it is entirely conceivable that ‘a better and more sustainable future for all’ often runs counter to the interests of a few and can be derailed through many forms of corruption”.<sup>62</sup>

### *The socio-economic environment pillar*

As explained above, the concept of enablement is today seen as a continuous societal process that complements and supports modernization and development. Through its tools and mechanisms, it enables sectors and empowers entire societies to integrate and participate in development processes, thus contributing to achieving sustainable development. Therefore, empowerment is one of the strategies adopted by international organizations to overcome the problems of poverty, exclusion, marginalization and injustice.

In this sense, the socio-economic environment falls within the context of concepts adopted by the United Nations, such as human development and sustainable development, or those related to equity, inclusion, integration, etc. The agreed definition focuses on enabling individuals and groups to acquire increased control over their lives, and the variables and factors affecting them, as well as raising their income and standard of living. It also helps individuals to build their capabilities and skills, become full partners in society, and access mechanisms that regulate their influence in society.<sup>63</sup>

Since social, economic and knowledge dimensions necessitate the ability to influence and participate in change, this pillar comprises three sub-pillars:

- Gender equity, which comprises three variables: female-to-male ratio in parliament; female-to-male labour force participation; female-to-male ratio in Internet usage.
- Social inclusion, which also includes three variables: social protection coverage (% of population); adult literacy rate; and share of youth not in employment, education or training.
- The standard of living sub-pillar is measured using two variables: poverty headcount ratio at national poverty lines (% of population); and GDP per capita.

Using these sub-pillars to monitor the social and economic environment reinforces the principle of full citizenship, and links knowledge and development with the adoption of the principles of equality and parity, and countering marginalization, exclusion and discrimination—especially among the most vulnerable groups in the society, such as women, the poor, and youth without education or employment. Therefore, it is generally noted that countries with high levels of human development are those that seek to enable all segments of the population to acquire the skills that allow them to realize their potential and increase their opportunities for work and political participation by promoting smart programmes and strategies. These must provide integrated and comprehensive social services guaranteeing equal opportunities, and participation in society and the economy. They must also meet the needs of the poor and vulnerable, and remove barriers to achieving inclusion and participation.<sup>64</sup> Without these enabling measures, no country will be able to improve living conditions and levels of social welfare.

### *The health and environment pillar*

The environment and health are among the most prominent current issues in the global agenda that require swift, appropriate solutions that protect the safety of humans and all living creatures, and their right to enjoy a normal life in a healthy environment. This requires the adoption of integrated policies that adhere to fair and equitable standards and are capable of achieving development by combining scientific and technological development with the preservation of physical and mental health, and protection of the natural environment.



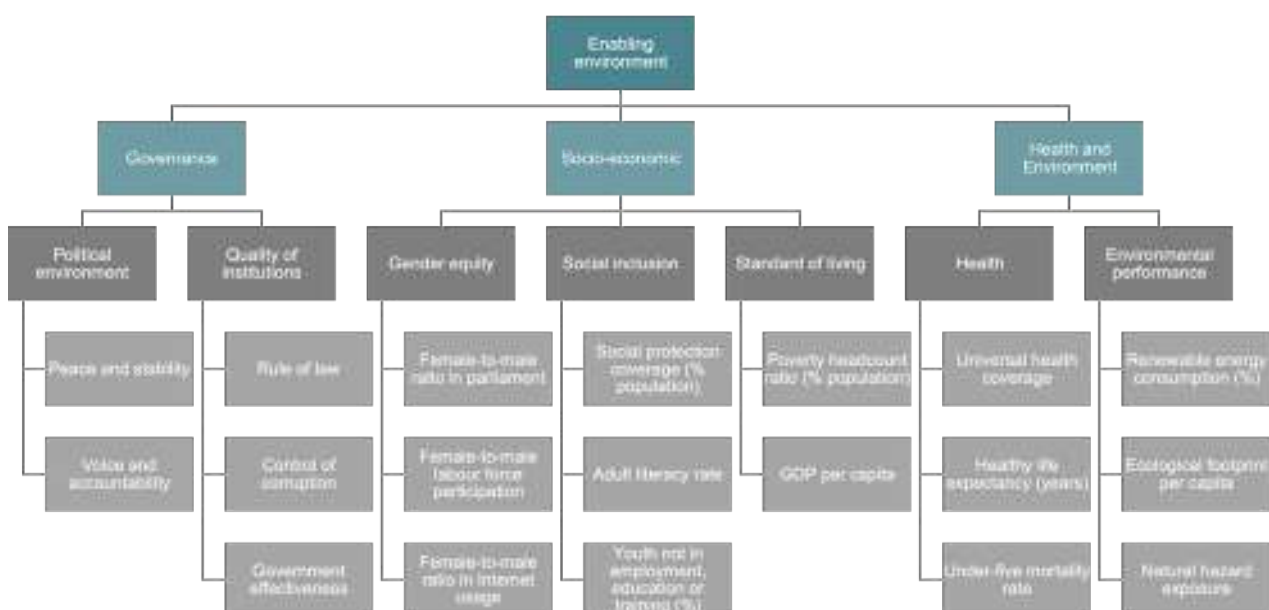
Given the significant inherent challenges in achieving these goals, it is clear that responsibility for their realization does not lie solely with professionals and specialists in these fields; rather, it is a shared, collective responsibility. Dealing with health issues is not the responsibility of medical professionals alone, just as dealing with environmental challenges is not the task of environmentalists alone. Hence, any policy that is good for the environment is also good for health. The WHO Committee on Health and Environment has stated that human health depends primarily on the ability of society to manage the interaction between human activities and its biological environment in a manner that protects and promotes health without compromising the integrity of the ecosystems that form the basis for the physical and biological environment. This requires the provision of a stable climate and the availability of environmental resources (soil, drinking water and clean air) in a sustainable manner, as well as the proper functioning of the natural systems that receive the waste produced by human societies.<sup>65</sup>

Hence, health and the environment were combined in a third independent pillar. This choice was necessitated by the correlative relationship between them, which has been underlined by global health studies,<sup>66</sup> as well as human development reports that link environmental degradation with the resultant change in living conditions. Therefore, greater attention was paid to the expected effects on, and threats to, human health, security and life.<sup>67</sup> This pillar is divided into two sub-pillars:

- The health sub-pillar comprises three variables: universal health coverage; healthy life expectancy; and under-five mortality rate.
- The environmental performance sub-pillar comprises three variables: renewable energy consumption (%); ecological footprint per capita; and natural hazards exposure.

These sub-pillars and their variables are characterized by the interactive relations between them and can be included within a broader concept of human well-being, which is a basic goal of sustainable development. Human well-being can only be achieved through comprehensive healthcare for all biological, mental, psychological and social aspects of life; and effective policies to eradicate poverty, and reduce the frequency of environmental threats and others related to life and society. Perhaps the greatest evidence of the importance of this interactive relationship and its direct impact on economic growth and human development is the paralysis of vital sectors throughout the COVID-19 pandemic, which led to the most severe recession the world has witnessed since World War II. The severity of the effects of these factors varied from country to country, depending on their health, economic and social infrastructure, and the resilience of existing health systems and their ability to respond to the requirements of the crisis. It was not possible to contain the crisis and its repercussions on various aspects of economic, social, health and environmental life without adopting coordinated and comprehensive measures targeting collective health. These required global financial and technical solidarity to help the poorest and most affected countries, providing the basis for the resumption of efforts to achieve safe and equitable development and prosperity for all.

Figure 10: Structure of the enabling environment sub-index





# ENDNOTES

- <sup>1</sup> Organisation for Economic Co-operation and Development (OECD), 2008.
- <sup>2</sup> For more information about Principal Component Analysis, see Hair et al., 2015.
- <sup>3</sup> Only very few exceptions were made.
- <sup>4</sup> The condition was relatively relaxed because the qualifying sample size is 154 countries (conditioned by data availability from credible international sources).
- <sup>5</sup> For more information about the Budget Allocation Process method, see OECD, 2008.
- <sup>6</sup> United Nations, 2015.
- <sup>7</sup> United Nations Educational, Scientific and Cultural Organization Institute for Statistics (UNESCO UIS), 2009.
- <sup>8</sup> World Bank, 2011.
- <sup>9</sup> UNESCO IIEP, 2015.
- <sup>10</sup> World Bank, 2014.
- <sup>11</sup> UNESCO, 2005.
- <sup>12</sup> Sadik and Koleva, 2021 [in French].
- <sup>13</sup> Sadik, 2018 [in French].
- <sup>14</sup> European Training Foundation, 2015.
- <sup>15</sup> Ibid.
- <sup>16</sup> See Biavaschi et al., 2012.
- <sup>17</sup> UNESCO UIS, 2011.
- <sup>18</sup> See United Nations Department of Economic and Social Affairs, 2015.
- <sup>19</sup> World Bank, 2021a.
- <sup>20</sup> See OECD, 2014.
- <sup>21</sup> UNESCO, 2013.
- <sup>22</sup> University of Melbourne, 2018.
- <sup>23</sup> Al-Samarrai et al., 2021.
- <sup>24</sup> OECD, 2015.
- <sup>25</sup> Ibid.
- <sup>26</sup> OECD and Eurostat, 2018.
- <sup>27</sup> OECD, 2015.
- <sup>28</sup> UNESCO UIS, 2017.
- <sup>29</sup> Khorshid and Ismail, 2019.
- <sup>30</sup> Khorshid, 2015.
- <sup>31</sup> Hollanders and Es-Sadki, 2014.
- <sup>32</sup> Rezk et al., 2015.
- <sup>33</sup> See Cornell University, INSEAD and World Intellectual Property Organization, 2021.
- <sup>34</sup> United Nations Development Programme (UNDP) and Mohammed bin Rashid Al Maktoum Foundation (MBRF), 2016.

- <sup>35</sup> UNDP and MBRF, 2017.
- <sup>36</sup> United Nations Department of Economic and Social Affairs, 2008.
- <sup>37</sup> Khorshid, 2015.
- <sup>38</sup> OECD and Eurostat, 2018.
- <sup>39</sup> Ibid.
- <sup>40</sup> Khorshid, 2015.
- <sup>41</sup> Arab Thought Foundation, 2018 [in Arabic].
- <sup>42</sup> See Hollanders and Janz, 2013.
- <sup>43</sup> OECD, 2011.
- <sup>44</sup> Khorshid et al., 2020.
- <sup>45</sup> United Nations Department of Economic and Social Affairs, 2008.
- <sup>46</sup> See Schwab, 2015.
- <sup>47</sup> United Nations Conference on Trade and Development, 2021.
- <sup>48</sup> See United Nations Economic and Social Council, 2015.
- <sup>49</sup> United Nations Department of Economic and Social Affairs, 2020.
- <sup>50</sup> International Telecommunication Union (ITU), 2021.
- <sup>51</sup> OECD, 2016.
- <sup>52</sup> Benson et al., 2010.
- <sup>53</sup> ITU, 2015.
- <sup>54</sup> Abdel Moneim and Gaaloul, 2019.
- <sup>55</sup> Piotrowski, 2015.
- <sup>56</sup> OECD, 2021.
- <sup>57</sup> See Su, 2011.
- <sup>58</sup> McKinsey, 2021.
- <sup>59</sup> Gould, 2018.
- <sup>60</sup> World Bank, 2021b.
- <sup>61</sup> See World Bank, 2021c.
- <sup>62</sup> United Nations Office on Drugs and Crime (UNODC), 2021.
- <sup>63</sup> Desmons, 2018 [in French].
- <sup>64</sup> UNODC, 2021.
- <sup>65</sup> World Health Organization (WHO), 1994.
- <sup>66</sup> See WHO, 2008.
- <sup>67</sup> See European Environment Agency, 2020.

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# COUNTRY PROFILES



## A

Afghanistan  
Albania  
Algeria  
Angola  
Argentina  
Armenia  
Australia  
Austria  
Azerbaijan

## B

Bahrain  
Bangladesh  
Barbados  
Belarus  
Belgium  
Belize  
Benin  
Bhutan  
Bolivia (Plurinational State of)  
Bosnia and Herzegovina  
Botswana  
Brazil  
Brunei Darussalam  
Bulgaria  
Burkina Faso  
Burundi

## C

Cabo Verde  
Cambodia  
Cameroon  
Chad  
Chile  
China  
Colombia  
Congo (Democratic Republic of the)  
Costa Rica  
Croatia  
Cyprus  
Czechia  
Côte d'Ivoire

## D

Denmark  
Dominican Republic

## E

Ecuador  
Egypt  
El Salvador  
Estonia  
Eswatini (Kingdom of)  
Ethiopia

## F

Finland  
France

## G

Gambia  
Georgia  
Germany  
Ghana  
Greece  
Guatemala  
Guinea  
Guyana

## H

Honduras  
Hong Kong, China (SAR)  
Hungary

## I

Iceland  
India  
Indonesia  
Iran (Islamic Republic of)  
Iraq  
Ireland  
Israel  
Italy

## J

Jamaica  
Japan  
Jordan

## K

Kazakhstan  
Kenya  
Korea (Republic of)  
Kuwait  
Kyrgyzstan

## L

Lao People's Democratic Republic  
Latvia  
Lebanon  
Lesotho  
Liberia  
Lithuania  
Luxembourg

## M

Madagascar  
Malawi  
Malaysia  
Mali  
Malta  
Mauritania  
Mauritius  
Mexico  
Moldova (Republic of)  
Mongolia  
Montenegro  
Morocco  
Mozambique  
Myanmar

## N

Namibia  
Nepal  
Netherlands  
New Zealand  
Nicaragua  
Niger  
Nigeria  
North Macedonia  
Norway

## O

Oman

## P

Pakistan  
Palestine, State of  
Panama  
Paraguay  
Peru  
Philippines  
Poland  
Portugal

## Q

Qatar

## R

Romania  
Russian Federation  
Rwanda

## S

Saint Lucia  
Saudi Arabia  
Senegal  
Serbia  
Seychelles  
Sierra Leone  
Singapore  
Slovakia  
Slovenia  
South Africa  
Spain  
Sri Lanka  
Sudan  
Suriname  
Sweden  
Switzerland

## T

Tajikistan  
Tanzania (United Republic of)  
Thailand  
Timor-Leste  
Togo  
Trinidad and Tobago  
Tunisia  
Turkey

## U

Uganda  
Ukraine  
United Arab Emirates  
United Kingdom  
United States  
Uruguay  
Uzbekistan

## V

Venezuela (Bolivarian Republic of)  
Viet Nam

## Y

Yemen

## Z

Zambia  
Zimbabwe



**GKI RANK** 151/154

**GKI SCORE** 28.4

**WORLD AVERAGE** 48.4

# AFGHANISTAN

## COUNTRY PERFORMANCE SUMMARY

Afghanistan is a weak performer in terms of its knowledge infrastructure. It ranks 151st out of 154 countries in the Global Knowledge Index 2021 and 24th out of the 27 countries with low human development.

### KEY INDICATORS

**GDP US\$ billions** 77,038  
**Population** 38,928,341  
**HDI** 0.511

### AREAS OF STRENGTH

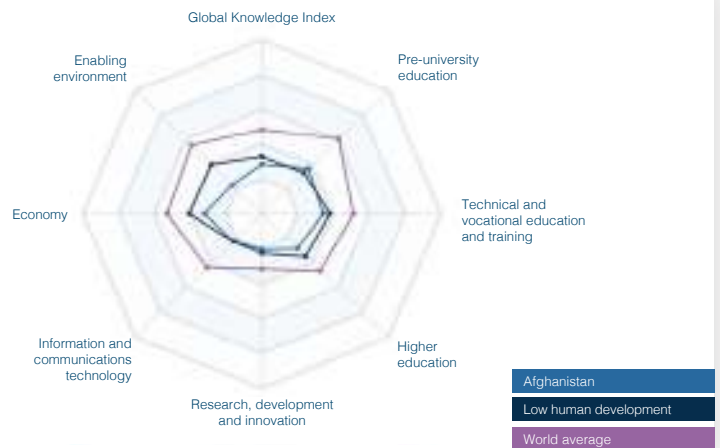
- + Ecological footprint per capita
- + Printing and publishing output (% manufactured output)
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Investment in telecommunication services (% GDP)
- + Ratio of high-skill TVET occupations earnings to average wage

### AREAS OF IMPROVEMENT

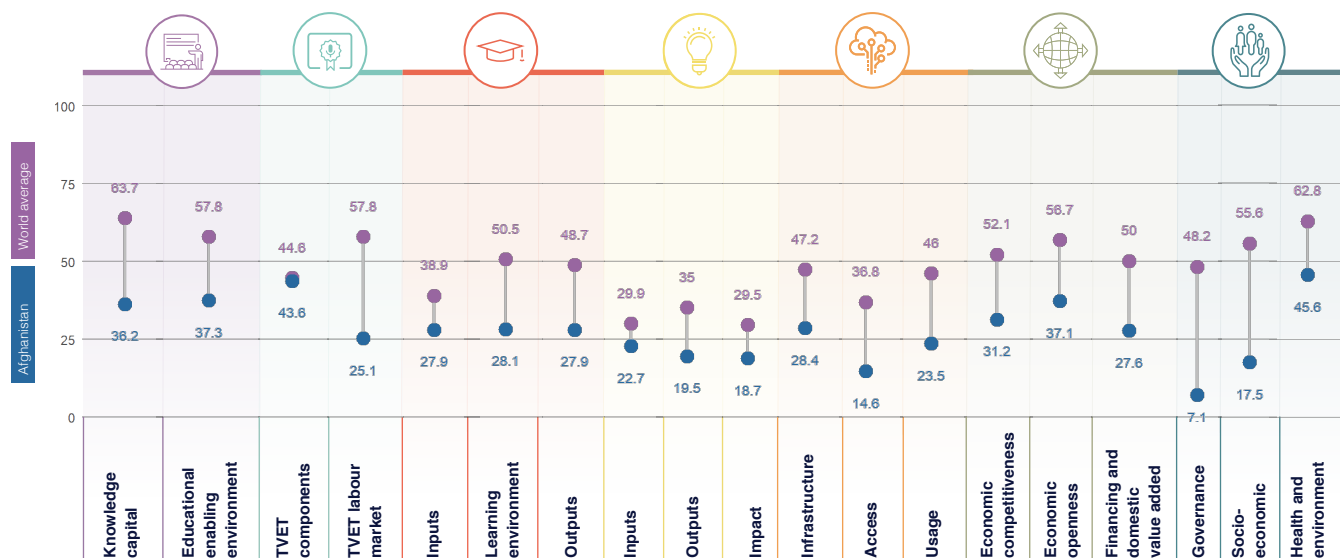
- Firms constrained with inadequately educated workforce (%)
- Inbound mobility rate
- Fixed-broadband subscriptions by speed per hundred people
- Extent of corporate transparency
- Domestic credit to private sector (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	137	36.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	145	34.3
HIGHER EDUCATION	147	28
RESEARCH, DEVELOPMENT AND INNOVATION	129	20.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	141	22.2
ECONOMY	151	32
ENABLING ENVIRONMENT	153	23.4



## GKI PILLARS







# AFGHANISTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolutedge capital	138	36.8
Enrollment	138	25.2
Net enrolment rate in primary education	106	79
Net enrolment rate in lower secondary education	106	79
Net enrolment rate in upper secondary education	115	55.2
Completion	127	45.5
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	100	25.1
Success rate rate in the last grade of lower secondary education	111	42.5
Completion	121	29.2
Assessment of 15-year-old students in math, science and reading	106	106
Learning-adjusted years of schooling	124	25.5
<b>Educational enabling environment</b>		
Expenditure	81	21.4
Government expenditure on primary education (% GDP)	85	42.9
Government expenditure on secondary education (% GDP)	105	14
Government funding per primary student (% GDP per capita)	89	26.1
Government funding per secondary student (% GDP per capita)	100	14.5
Resources	122	11.8
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	83	8
Schools with access to computers in secondary education (%)	85	17.5
Early learning	63	21.2
Class attendance rate in early childhood education	106	106
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	29	21.2
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	107	21.2
Completion rate in upper secondary education, gender parity	123	44.2
Completion rate in upper secondary education, wealth parity	74	35.5
Completion rate in upper secondary education, location parity	85	46.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	106	52.5
Firms offering formal training (%)	62	38.6
Labour force with short-cycle tertiary education (%)	54	65.2
Participation rate in formal and non-formal education and training	106	106
TVET resources	111	11.2
Government expenditure on vocational education (%)	62	12.5
Share of students enrolled in secondary vocational programmes	132	1.1
Share of students enrolled in postsecondary vocational programmes	82	63.1
TVET quality and infrastructure	91	52.5
Extent of staff training	106	106
Quality of vocational training	106	106
Ratio of high-skill TVET occupations earnings to average wage	22	51.5
Ratio of medium-skill TVET occupations earnings to average wage	9	65.2
<b>TVET labour market</b>		
Efficiency of the labour market	147	21.4
Firms considered well-integrated with workforce (%)	125	8
Employment educational mismatch (%)	100	21.2
Proportion of skilled production workers	115	16.2
Unemployment rate with vocational education	87	67.2
High TVET unemployment	120	21.2
Share of TVET occupations	124	32
Manufacturing employment (%)	100	25.2
Quality and infrastructure	127	12.2
Enrollment in vocational education, gender parity	117	22.5
Useable employment rate	148	15.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	81	19.2
Government expenditure per tertiary student	108	4.5
Teaching staff compensation (% tertiary expenditure)	47	26.1
Enrollment	108	21.2
Enrollment in bachelor's or equivalent level (%)	108	6.8
Enrollment in masters, doctoral or equivalent (%)	125	0.4
Resources	81	19.2
Ratio teacher ratio in tertiary education	66	65.2
Researcher in higher education (%)	106	106
<b>Learning environment</b>		
Directly paid academic freedom	108	23.2
Teachers in tertiary education, gender parity	112	15.2
Labour mobility rate	121	9
Academic freedom	88	88
Quality and infrastructure	72	22.2
Class attendance rate in tertiary education, gender parity	88	48.2
Class attendance rate in tertiary education, wealth parity	45	32.2
Class attendance rate in tertiary education, location parity	22	16.1
<b>Outputs</b>		
Attainment	102	2.4
Educational attainment rate, bachelor's or equivalent	94	5.8
Educational attainment rate, master's or equivalent	81	1
Educational attainment rate, doctoral or equivalent	106	106
Employment	122	22.2
Labour force participation rate with advanced education	115	47.2
Unemployment rate with advanced education	111	52
Innovation	106	106
University tertiary enrollment in R&D	106	106
CRIDE indicators per 100 personnel in higher education	106	106
<b>Government's contribution to innovation and economic growth</b>		
Finance	27	22.2
Human capital formation	81	100
GDP (% GDP)	106	106
GERD per researcher	106	106
Researchers per thousand labour force	106	106
Tertiary graduates from STEM programmes (%)	111	25.2
Government's contribution to innovation	81	100
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	28	42.2
Quality of innovation environment	102	22.2
High-skill employment (%)	77	2.4
Intellectual property payments (% total trade)	100	5.8
State of cluster development	106	106
<b>Support</b>		
Government's contribution to innovation	102	22.2
Average documents per researcher	106	106
Citations per document	106	6.8
Patent applications (per 100 billion GDP)	106	106
Government's contribution to innovation	81	100
Intellectual property receipts (% total trade)	118	0.1
Research and development expenditure (per 100 billion GDP)	106	106
PCT applications (per 100 billion GDP)	106	106
Firms producing new goods and services (%)	27	62.1



# AFGHANISTAN

	Rank	Value
<b>Consumer electronics</b>	111	35.3
Treatment applications per 100 million GDP	109	108
Cultural goods exports (% exports)	100	3.1
Printing and publishing output (% manufactured output)	6	60.7
<b>Energy</b>	107	10.7
<b>Finance</b>	105	7
Access to investors' protection	104	104
Depth of innovative companies	104	104
ISO 9001 quality certificates (% GDP)	101	0.1
ISO 14001 environmental certificates (% GDP)	100	0
<b>Infrastructure</b>	100	10
CERD freedom from abuse (%)	100	100
Cost of contracts per strategic contract deals (% GDP)	104	104
Computer software spending (% GDP)	106	106
<b>Government services</b>	99	10.1
New business density per thousand population	110	0.8
Firms with one or more advisers (%)	89	33.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	141	22.2
<b>Infrastructure</b>	132	26.4
<b>Coverage</b>	100	22.1
30MHz mobile network coverage (% population)	143	23.0
Secure Internet servers per 1 million population	129	0.5
Investment in telecommunication services (% GDP)	20	62.0
<b>Quality</b>	100	0
Mobile speed and download speeds	108	4
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (y speed) per hundred people	107	0
<b>Availability</b>	101	16.3
Fixed broadband bandwidth (% Gbps per capita)	124	60.0
Mobile broadband basket (% Gbps per capita)	143	21.1
Internet and telephony competition	100	65.2
<b>Access</b>	111	16.8
<b>Subscriptions</b>	101	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	141	7.3
International Internet bandwidth per user	128	24
Households with Internet access at home (%)	145	5.8
<b>Skills and employment</b>	100	16.0
Individuals with standard ICT skills (%)	106	108
Tertiary graduates from ICT programmes (%)	81	35.1
ICT employment (%)	128	0.7
<b>Usage</b>	120	25.0
<b>Services</b>	106	10
Government online services	123	41.2
Fixed broadband Internet traffic per subscriber	94	1.8
Mobile broadband Internet traffic per subscriber	85	6.8
Internet users (%)	100	3.0
<b>Commerce</b>	100	10.1
ICT FDI parent applications (per 100 million GDP)	106	106
E-participation	111	46.4
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	123	21.0
<b>ECONOMY</b>	181	20
<b>Economic complexity indexes</b>	100	21.2
<b>REGISTRATION</b>	100	10.1
Overhead capital formation (% GDP)	106	106
Logistics performance	145	23.9
Transport productive capacity	87	22.7
Building quality control	100	20

	Rank	Value
<b>Business agility</b>	111	41.2
Cost of starting a business	40	80
Recovery recovery time	111	24
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	118	6
<b>Corporate openness</b>	112	27.1
<b>Trade and investment</b>	141	41.2
Trade (% GDP)	106	106
High-technology trade (% total trade)	140	6
Market concentration	100	82.0
Market concentration	124	30.4
<b>Product openness</b>	141	25.0
Contract financial openness	106	106
Foreign direct investment, net inflows (% GDP)	141	25.0
Cost dynamics	106	106
<b>Financing and domestic value added</b>	100	27.0
<b>Financing and costs</b>	141	20
Domestic credit to private sector (% GDP)	102	6
MSME financing gap (% GDP)	84	62.0
Tax and contribution rate (% profit)	107	30.0
Bank nonperforming loans (%)	86	60.4
<b>Unmet needs index</b>	100	11.2
Medium- and high-tech activities value added	101	6.3
Industry and services value added (% GDP)	100	42.2
Labour underutilization rate	147	13.0
Output per worker	127	2.8
<b>ENABLING ENVIRONMENT</b>	182	23.4
<b>Governance</b>	181	7.1
<b>Political environment</b>	140	0.0
Peace and stability	104	0.0
View and accountability	128	18.0
Quality of institutions	101	4.0
Rule of law	100	0.4
Control of corruption	100	0.3
Government effectiveness	101	0.4
<b>Socio-economic</b>	100	17.0
<b>Gender equity</b>	144	29.0
Female-to-male ratio in parliament	87	37
Female-to-male labour force participation	144	23.0
Female-to-male ratio in internal wage	106	106
<b>Gender equality</b>	101	10.0
Social protection coverage (% population)	105	4.8
Adult literacy rate	102	18.0
Youth not in employment, education or training (%)	100	7.7
<b>Standard of living</b>	101	10.1
Poverty headcount ratio (% population)	121	20.1
GDP per capita	142	1.1
<b>Health and environment</b>	100	45.0
<b>Health</b>	101	30.0
Universal health coverage	145	37
Healthy life expectancy (years)	144	22.0
Under-five mortality rate	100	40.4
<b>Environmental performance</b>	89	61.0
Renewable energy consumption (%)	82	22.2
Household footprint per capita	0	89.0
Natural hazard exposure	137	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 81/154

**GKI SCORE** 47.6

**WORLD AVERAGE** 48.4

# ALBANIA

## KEY INDICATORS

**GDP** US\$ billions ..... **37729**  
**Population** ..... **2,877,800**  
**HDI** ..... **0.795**

## COUNTRY PERFORMANCE SUMMARY

Albania is a moderate performer in terms of its knowledge infrastructure. It ranks 81st out of 154 countries in the Global Knowledge Index 2021 and 20th out of the 39 countries with high human development.

### AREAS OF STRENGTH

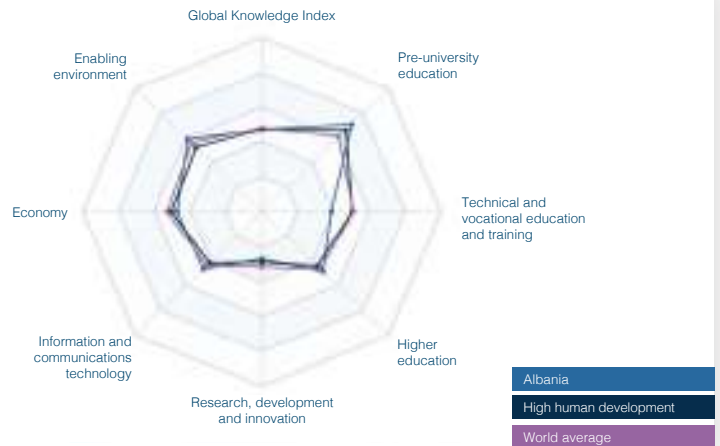
- + Government funding per primary student (% of GDP per capita)
- + Printing and publishing output (% manufactured output)
- + Foreign direct investment, net inflows (% GDP)
- + Enrolment in master's, doctoral or equivalent (%)
- + Teaching staff compensation (% tertiary expenditure)

### AREAS OF IMPROVEMENT

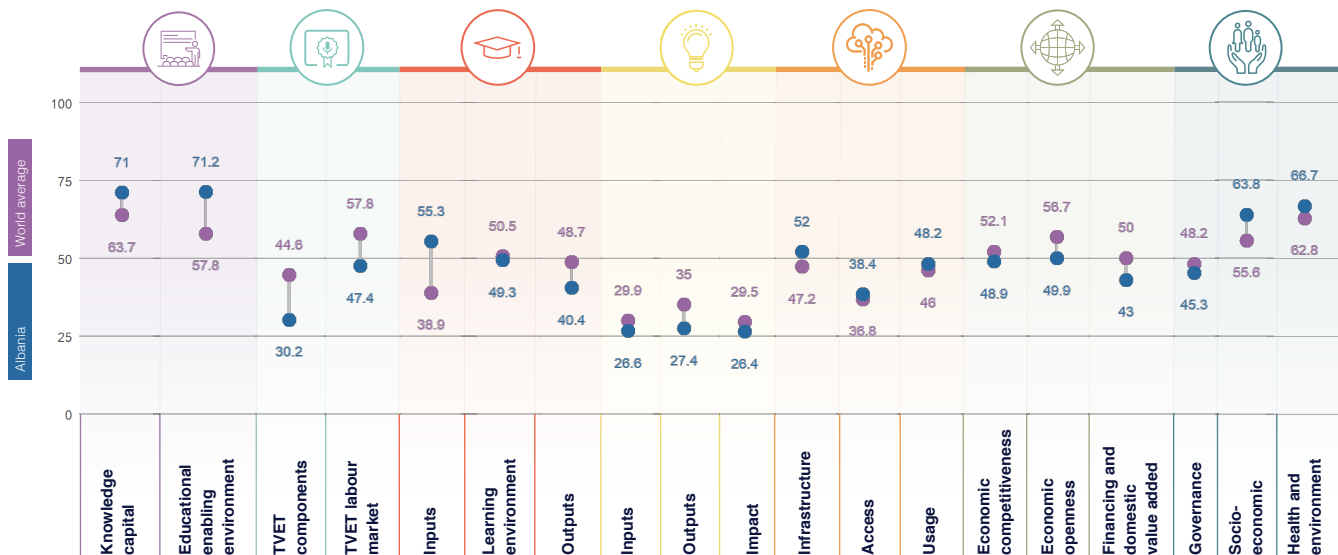
- Enrolment in vocational education, gender parity
- State of cluster development
- High-technology trade (% total trade)
- Research institutions prominence
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	56	71.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	132	38.8
HIGHER EDUCATION	62	48.3
RESEARCH, DEVELOPMENT AND INNOVATION	101	26.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	69	46.2
ECONOMY	99	47.3
ENABLING ENVIRONMENT	59	58.6



## GKI PILLARS







# ALBANIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	78	71.1
Enrollment	73	81.3
Net enrolment rate in primary education	84	88.3
Net enrolment rate in lower secondary education	87	85.1
Net enrolment rate in upper secondary education	70	78.4
Completion	68	75.3
Years of compulsory education in primary and secondary	67	65.0
Completion rate in upper secondary education	43	83.7
Success rate rate in the last grade of lower secondary education	27	75.4
Completion	33	43.3
Assessment of 15-year-old students in math, science and reading	54	30
Learning-adjusted years of schooling	66	83.0
<b>Educational enabling environment</b>	<b>38</b>	<b>71.3</b>
Expenditure	33	40.7
Government expenditure on primary education (% GDP)	26	47
Government expenditure on secondary education (% GDP)	30	13.4
Government funding per primary student (% GDP per capita)	5	82.7
Government funding per secondary student (% GDP per capita)	108	3.8
Resources	81	80.3
Pupil-based teacher ratio in primary education	32	87.5
Pupil-based teacher ratio in secondary education	38	78.4
Schools with access to computers in primary education (%)	62	54.3
Schools with access to computers in secondary education (%)	1	100
Early learning	9	83.3
Class attendance rate in early childhood education	114	114
Proportion of children who are developmentally on track	114	114
Proportion of children with stimulating home learning environments	24	71.7
Pupil-based teacher ratio in preprimary education	37	87.5
Quality and infrastructure	81	81.2
Completion rate in upper secondary education, gender parity	28	86.4
Completion rate in upper secondary education, wealth parity	45	83
Completion rate in upper secondary education, location parity	41	85.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>102</b>	<b>81.3</b>
Companies training apprentices	109	54.3
Firms offering formal training (%)	29	87.3
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	46	122.3
TVET resources	108	112.3
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	85	122.3
Share of students enrolling in postsecondary vocational programmes	114	114
TVET quality and infrastructure	81	40.3
Extent of staff training	81	88.3
Quality of vocational training	54	54.7
Ratio of high-skill TVET occupations earnings to average wage	70	21.3
Ratio of medium-skill TVET occupations earnings to average wage	84	35.3
<b>TVET labour market</b>	<b>117</b>	<b>47.4</b>
Efficiency of the labour market	71	66.4
Firms considered with inappropriately educated workforce (%)	79	34
Employment educational mismatch (%)	59	85.7
Proportion of skilled production workers	38	88.1
Unemployment rate with vocational education	71	77
Real TVET unemployment	81	81.1
Share of TVET occupations	107	41.2
Manufacturing employment (%)	85	37
Quality and infrastructure	110	32.3
Enrollment in vocational education, gender parity	113	27.3
Useable employment rate	111	45.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>18</b>	<b>88.3</b>
Expenditure	41	14.3
Government expenditure per tertiary student	33	7.6
Teaching staff compensation (% tertiary expenditure)	73	42.1
Enrollment	28	88.1
Enrollment in bachelor's or equivalent level (%)	64	27.3
Enrollment in masters, doctoral or equivalent (%)	13	32.4
Resources	28	87.1
Pupil-teacher ratio in tertiary education	43	81.1
Researchers in higher education (%)	114	114
<b>Learning environment</b>	<b>82</b>	<b>48.3</b>
<b>Quality and academic freedom</b>	<b>71</b>	<b>33.3</b>
Teachers in tertiary education, gender parity	42	67.0
Labour mobility rate	65	61
Academic freedom	38	88
Quality and infrastructure	35	45
Class attendance rate in tertiary education, gender parity	68	88.4
Class attendance rate in tertiary education, wealth parity	28	48.4
Class attendance rate in tertiary education, location parity	28	32.3
<b>Outputs</b>	<b>111</b>	<b>40.4</b>
<b>Attainment</b>	<b>58</b>	<b>37.7</b>
Educational attainment rate, bachelor's or equivalent	65	52.2
Educational attainment rate, master's or equivalent	25	44.7
Educational attainment rate, doctoral or equivalent	57	4.3
<b>Employment</b>	<b>110</b>	<b>33.2</b>
Labour force participation rate with advanced education	108	54.3
Unemployment rate with advanced education	118	65.4
<b>Impact</b>	<b>79</b>	<b>35.2</b>
University tertiary enrollment in R&D	82	38.2
OECD indicators per 100 personnel in higher education	114	114
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>51</b>	<b>32.4</b>
Access to credit resources	81	37.1
GDPD (% GDP)	114	114
GERD per researcher	114	114
Researchers per thousand labour force	114	114
Tertiary graduates from STEM programmes (%)	75	37.1
<b>Quality of innovation environment</b>	<b>81</b>	<b>3</b>
GERD performed by business enterprises (%)	114	114
GERD financed by business enterprises (%)	114	114
Researchers in business enterprises (%)	114	114
Firms that spend on R&D (%)	111	3
<b>Quality of business environment</b>	<b>81</b>	<b>30</b>
High-skilled employment (%)	39	35.2
Intellectual property payments (% total trade)	57	21.3
State of startup development	107	33.4
<b>Outputs</b>	<b>108</b>	<b>27.4</b>
<b>Access to credit resources</b>	<b>118</b>	<b>33.2</b>
Average documents per researcher	114	114
Citations per document	80	18.3
Patent applications (per 100 billion GDP)	100	31.5
<b>Quality of business environment</b>	<b>81</b>	<b>30</b>
Intellectual property receipts (% total trade)	30	22.3
Research and development expenditure (per 100 billion GDP)	87	8
PCT applications (per 100 billion GDP)	119	35.0
Firms producing new goods and services (%)	43	54



# ALBANIA

	Rank	Value
<b>Business environment</b>	55	65.0
Treatment applications (per 100 million GDP)	65	23.0
Cultural goods exports (% exports)	107	0.6
Printing and publishing output (% manufactured output)	9	63.0
<b>Energy</b>	95	25.3
<b>Energy</b>	95	25.3
Renewable investment's proportion	115	0
Depth of innovative companies	81	45.1
ISO 9001 quality certificates (% GDP)	30	39.0
ISO 14001 environmental certificates (% GDP)	22	35.0
<b>Finance</b>	100	5.1
CERD forecast from abroad (%)	116	116
Joint ventures per strategic industry deals (% GDP)	89	5.2
Computer software spending (% GDP)	85	8
<b>Government services</b>	100	100.0
New business density per thousand population	73	2.5
Firms with new products/services (%)	44	31.3
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	84	66.2
<b>Infrastructure</b>	86	50
<b>Coverage</b>	89	41.1
3G/4G mobile network coverage (% population)	30	60.0
Secure Internet servers per 1 million population	72	5.4
Investment in telecommunication services (% GDP)	100	22.9
<b>Quality</b>	97	32.0
Mobile internet and download speeds	114	114
Fixed broadband upload and download speeds	114	114
Fixed broadband subscriptions (y-speed) per hundred people	64	32.5
<b>Availability</b>	17	22.3
Fixed broadband basket (% GNI per capita)	63	63.6
Mobile broadband basket (% GNI per capita)	63	66.4
Internet and telephony competition	1	100
<b>Access</b>	72	36.4
<b>Subscribers</b>	93	12.0
Active mobile-broadband subscriptions per fixed-line inhabitants	60	30.1
International Internet bandwidth per user	49	44.2
Households with Internet access at home (%)	63	63.4
<b>Skills and employment</b>	53	25.1
Individuals with standard ICT skills (%)	58	30.0
Tertiary graduates from ICT programmes (%)	39	39.2
ICT employment (%)	73	12.1
<b>Usage</b>	72	46.2
<b>Services</b>	100	41.2
Government online services	81	64.1
Fixed broadband internet traffic per subscription	64	15.0
Mobile broadband internet traffic per subscription	73	50.5
Internet users (%)	73	30.7
<b>Commerce</b>	50	17.2
ICT FDI positive applications (per 100 million GDP)	114	114
E-participation	35	64.0
Internet activities by individuals (%)	43	50.9
Trade in digitally deliverable services (% total trade)	123	10.0
<b>ECONOMY</b>	84	47.3
<b>Economic competitiveness</b>	85	46.3
<b>Infrastructure investment</b>	100	0.1
Overhead capital formation (% GDP)	64	60.1
Logistics performance	69	41.0
Transport productive capacity	64	25.2
Building quality control	22	60.7

	Rank	Value
<b>Business agility</b>	90	46.1
Ease of starting a business	49	61.6
Recovery recovery rate	49	48.4
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	118	6
<b>Corporate openness</b>	37	46.0
<b>Trade and investment</b>	120	20.2
Trade (% GDP)	81	23.0
High-technology trade (% total trade)	100	21.3
Market concentration	87	76
Market concentration	125	36.0
<b>Product openness</b>	90	41.0
China's financial openness	90	41.7
Foreign direct investment, net inflows (% GDP)	15	67.1
Cost dynamics	110	40
<b>Financing and domestic value added</b>	112	40
<b>Financing and costs</b>	77	21.2
Domestic credit to private sector (% GDP)	81	14
MSME financing gap (% GDP)	30	62.5
Tax and contribution rate (% profit)	75	70.0
Bank nonperforming loans (%)	66	63.0
<b>Unmet needs index</b>	100	27.1
Medium- and high-tech activities value added	120	5.1
Industry and services value added (% GDP)	134	41.0
Labour underutilization rate	110	21.7
Output per worker	80	12.3
<b>ENABLING ENVIRONMENT</b>	59	46.4
<b>Governance</b>	75	45.3
<b>Political environment</b>	63	50.4
Peace and stability	66	46.5
View and accountability	84	61.2
Quality of institutions	87	46.2
Rule of law	88	42.0
Control of corruption	104	31.7
Government effectiveness	81	48.1
<b>Socio-economic</b>	49	63.8
<b>Gender equity</b>	39	54.5
Female-to-male ratio in parliament	45	50.5
Female-to-male labour force participation	61	56
Female-to-male ratio in internal wage	57	57.0
<b>Gender equality</b>	61	71.0
Social protection coverage (% population)	116	116
Adult literacy rate	32	67.0
Youth not in employment, education or training (%)	110	46
<b>Standard of living</b>	55	46
Poverty headcount ratio (% population)	31	60.0
GDP per capita	78	11.0
<b>Health and environment</b>	43	66.7
<b>Health</b>	66	54.5
Universal health coverage	111	50
Healthy life expectancy (years)	34	63.2
Under-five mortality rate	81	60.0
<b>Environmental performance</b>	67	60
Renewable energy consumption (%)	21	29.7
Household footprint per capita	65	66.2
Natural hazard exposure	132	31

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 111/154

**GKI SCORE** 40.3

**WORLD AVERAGE** 48.4

# ALGERIA

## COUNTRY PERFORMANCE SUMMARY

Algeria is a modest performer in terms of its knowledge infrastructure. It ranks 111th out of 154 countries in the Global Knowledge Index 2021 and 38th out of the 39 countries with high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **468.403**  
**Population** ..... **43,851,043**  
**HDI** ..... **0.748**

### AREAS OF STRENGTH

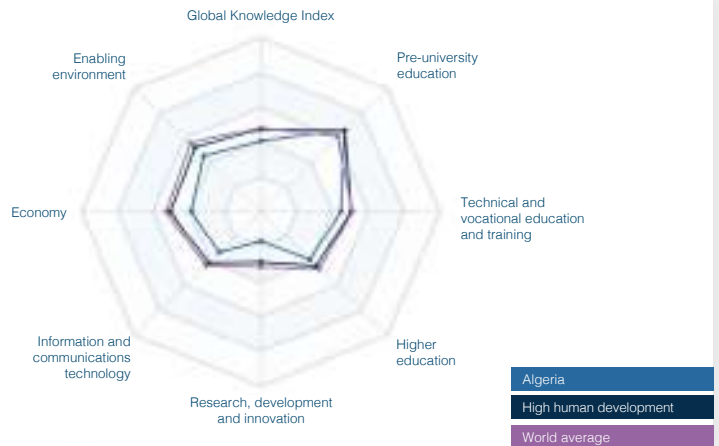
- + Researchers in higher education (%)
- + Poverty headcount ratio (% population)
- + Gross fixed capital formation (% GDP)
- + Gross attendance ratio for tertiary education, wealth parity
- + Net enrolment rate in primary education

### AREAS OF IMPROVEMENT

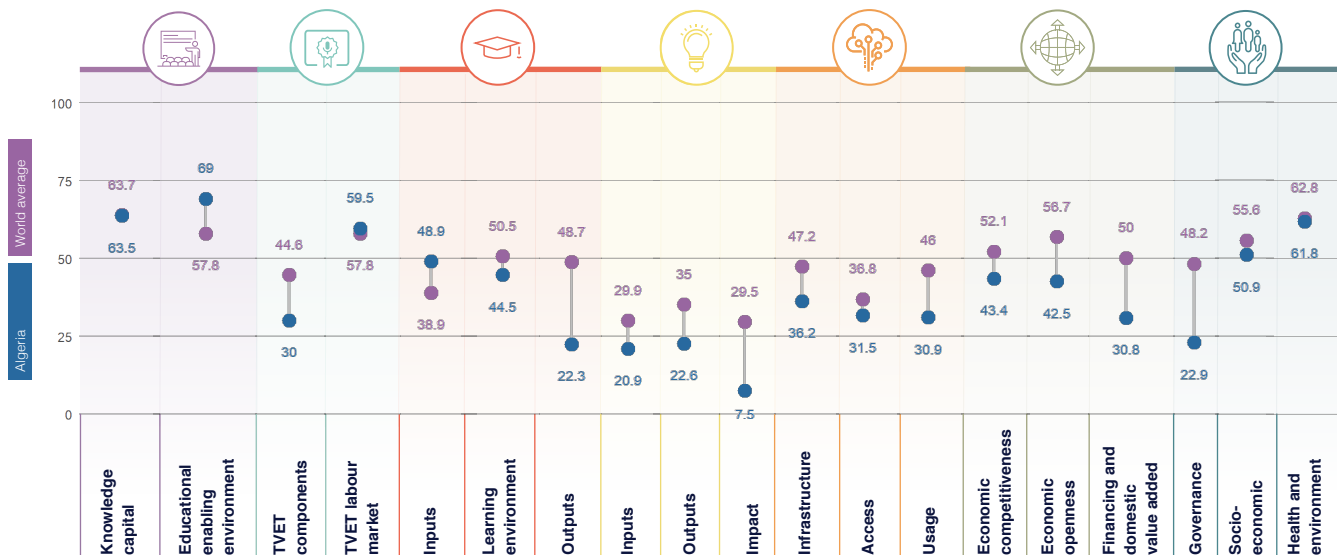
- Computer software spending (% GDP)
- Cultural goods exports (% exports)
- Fixed-broadband upload and download speeds
- GERD financed from abroad (%)
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	78	66.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	108	44.7
HIGHER EDUCATION	111	38.6
RESEARCH, DEVELOPMENT AND INNOVATION	145	17
INFORMATION AND COMMUNICATIONS TECHNOLOGY	106	32.8
ECONOMY	136	38.9
ENABLING ENVIRONMENT	117	45.2



## GKI PILLARS







# ALGERIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	43.8
Enrollment	4	82.5
Net enrolment rate in primary education	95	90.5
Net enrolment rate in lower secondary education	99	99
Net enrolment rate in upper secondary education	99	99
Completion	100	92.3
Years of compulsory education in primary and secondary	12	76.9
Completion rate in upper secondary education	80	43.3
Success rate rate in the last grade of lower secondary education	89	86.7
Completion	114	23.7
Assessment of 15-year-old students in math, science and reading	75	11.3
Learning-adjusted years of schooling	52	46.1
<b>Educational enabling environment</b>	47	89
Expenditure	99	99
Government expenditure on primary education (% GDP)	99	99
Government expenditure on secondary education (% GDP)	99	99
Government funding per primary student (% GDP per capita)	99	99
Government funding per secondary student (% GDP per capita)	99	99
Resources	59	84.9
Pupil-based teacher ratio in primary education	45	82.0
Pupil-based teacher ratio in secondary education	99	99
Schools with access to computers in primary education (%)	99	99
Schools with access to computers in secondary education (%)	89	87.2
Early learning	47	82.0
Class attendance rate in early childhood education	81	89
Proportion of children who are developmentally on track	32	84.6
Proportion of children with stimulating home learning environments	39	76
Pupil-based teacher ratio in preprimary education	99	99
Quality and infrastructure	87	83.9
Completion rate in upper secondary education, gender parity	129	80
Completion rate in upper secondary education, wealth parity	70	33.3
Completion rate in upper secondary education, location parity	62	88.8
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	122	37
Commence training and training	99	99
Firms offering formal training (%)	99	99
Labour force with short-cycle tertiary education (%)	99	99
Participation rate in formal and non-formal education and training	99	99
TVET resources	107	91.0
Government expenditure on vocational education (%)	99	99
Share of students enrolled in secondary vocational programmes	84	13.2
Share of students enrolling in postsecondary vocational programmes	99	99
TVET quality and infrastructure	89	84.7
Extent of staff training	89	84.9
Quality of vocational training	82	46.5
Ratio of high-skil TVET occupations earnings to average wage	99	99
Ratio of medium-skill TVET occupations earnings to average wage	99	99
<b>TVET labour market</b>	78	86.8
Efficiency of the labour market	99	99
Firms considered well-integrated with labour (%)	99	99
Employment educational mismatch (%)	99	99
Proportion of skilled production workers	99	99
Unemployment rate with vocational education	99	99
Real TVET unemployment	89	84.1
Share of TVET occupations	84	80.4
Manufacturing employment (%)	73	25.6
Quality and infrastructure	89	84.7
Enrollment in vocational education, gender parity	99	99
Useable employment rate	75	30.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	38	48.8
Expenditure	99	99
Government expenditure per tertiary student	99	99
Teaching staff compensation (% tertiary expenditure)	99	99
Enrollment	59	23.0
Enrollment in bachelor's or equivalent level (%)	88	23.5
Enrollment in masters, doctoral or equivalent (%)	99	99
Resources	39	34.0
Pupil-teacher ratio in tertiary education	90	85.9
Research in higher education (%)	5	89.7
<b>Learning environment</b>	88	44.5
Timely and academic freedom	117	37.1
Teachers in tertiary education, gender parity	41	39.0
Labour mobility rate	90	2
Academic freedom	126	28.3
Quality and infrastructure	39	87.0
Class attendance rate in tertiary education, gender parity	77	87.8
Class attendance rate in tertiary education, wealth parity	81	83.0
Class attendance rate in tertiary education, location parity	12	88.9
<b>Outputs</b>	149	22.3
Efficiency	99	99
Educational attainment rate, bachelor's or equivalent	99	99
Educational attainment rate, master's or equivalent	99	99
Educational attainment rate, doctoral or equivalent	99	99
Employment	99	99
Labour force participation rate with advanced education	99	99
Unemployment rate with advanced education	99	99
Impact	108	22.3
University tertiary enrollment in FTE	89	37.1
OECD students per FTE personnel in higher education	89	7.5
<b>INNOVATION, RESEARCH AND DEVELOPMENT</b>		
<b>Inputs</b>	108	14.2
Government R&D expenditure	99	99
GDP (% GDP)	59	16.9
GERD per researcher	88	99
Researchers per thousand labour force	46	49
Tertiary graduates from STEM programmes (%)	39	84.0
<b>Quality of innovation environment</b>	99	99
GERD performed by business enterprises (%)	75	1
GERD financed by business enterprises (%)	83	6.3
Researchers in business enterprises (%)	52	0.2
Firms that spend on R&D (%)	99	99
<b>Quality of business environment</b>	99	99
High-skilled employment (%)	99	99
Intellectual property payments (% total trade)	82	6.6
State of startup development	58	48.0
<b>Outputs</b>	107	22.3
Government R&D expenditure	99	99
Average documents per researcher	97	34.2
Citations per document	89	18.0
Patent applications (per 100 billion GDP)	85	45.4
<b>Quality of business environment</b>	99	99
Intellectual property receipts (% total trade)	90	2.3
Research and development expenditure (per 100 billion GDP)	23	18.0
PCT applications (per 100 billion GDP)	90	26.0
Firms producing new goods and services (%)	99	99



# ALGERIA

	Rank	Value
<b>Consumer electronics</b>	100	1.1
Treatment applications per 100 million GDP	82	16
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	104	3.7
<b>Energy</b>	149	1.9
<b>Energy</b>	81	100
Access to electricity's proximity	89	23.5
Depth of innovative companies	83	40.5
ISO 9001 quality certificates (% GDP)	112	3.8
ISO 14001 environmental certificates (% GDP)	108	3.3
<b>Environment</b>	100	1
CERO forecast from abroad (%)	101	9
Cost savings per strategic alliance deals (% GDP)	123	3.9
Computer software spending (% GDP)	123	0.4
<b>Government services</b>	100	1.1
New business density per thousand population	112	1.7
Firms with new products/services (%)	106	108
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	118	22.2
<b>Infrastructure</b>	111	36.2
<b>Coverage</b>	80	20.5
3G/4G mobile network coverage (% population)	89	83.9
Secure Internet servers per 1 million population	128	1.1
Investment in telecommunication services (% GDP)	67	31
<b>Quality</b>	128	4.3
Mobile upload and download speeds	104	104
Fixed broadband upload and download speeds	115	9
Fixed broadband subscriptions (by speed) per hundred people	87	10.6
<b>Availability</b>	80	50.9
Fixed broadband bandwidth (% Gbps per capita)	80	89.9
Mobile broadband basket (% Gbps per capita)	45	71.7
Internet and telephony competition	135	30
<b>Access</b>	83	31.5
<b>Subscriptions</b>	77	41.1
Active mobile-broadband subscriptions per fixed-line inhabitants	50	30.0
International Internet bandwidth per user	100	32.6
Households with Internet access at home (%)	69	74.5
<b>Skills and employment</b>	110	10.1
Individuals with standard ICT skills (%)	84	15.5
Tertiary graduates from ICT programmes (%)	87	21.9
ICT employment (%)	100	4.8
<b>Usage</b>	118	30.0
<b>Services</b>	104	11.1
Government online services	142	27.7
Fixed broadband Internet traffic per subscription	59	16.2
Mobile broadband Internet traffic per subscription	81	8.3
Internet users (%)	84	55.9
<b>Commerce</b>	121	14.1
ICT/FIT patent applications (per 100,000 GDP)	86	27.9
E-participation	100	13.9
Internet activities by individuals (%)	83	37.5
Trade in digitally deliverable services (% total trade)	31	57.4
<b>ECONOMY</b>	126	33.4
<b>Economic complexity/structure</b>	112	43.4
<b>International investment</b>	81	11.0
Overhead capital formation (% GDP)	1	80.5
Logistics performance	114	36.2
Transport productive capacity	147	7.9
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	108	34.2
Ease of starting a business	129	26
Recovery recovery rate	45	55.2
Entrepreneurial employee activity rate	77	3.8
Growth of corporate transactions	118	9
<b>Business operations</b>	121	42.8
<b>Trade and investment</b>	100	20
Trade (% GDP)	119	16.4
High-technology trade (% total trade)	49	51.9
Market concentration	124	89.8
Market concentration	81	82
Product diversification	100	31.1
China's financial openness	137	16.4
Foreign direct investment, net inflows (% GDP)	120	32
Data dynamics	100	46
<b>Financing and domestic value added</b>	140	30.0
<b>Financing and credit</b>	110	21.4
Domestic credit to private sector (% GDP)	107	10.4
MSME financing gap (% GDP)	69	108
Tax and contribution rate (% profit)	148	40.0
Bank nonperforming loans (%)	100	45.0
Unmet loan demand	101	17.2
Medium- and high-tech activities value added	181	2.8
Industry and services value added (% GDP)	87	89.7
Labour underutilization rate	102	36.0
Output per worker	85	17.8
<b>ENABLING ENVIRONMENT</b>	117	46.3
<b>Governance</b>	128	22.9
Political environment	121	17.0
Peace and stability	125	17.5
View and accountability	128	18.8
Quality of institutions	117	27.0
Rule of law	120	21.6
Control of corruption	110	25.4
Government effectiveness	108	23.7
<b>Socio-economic</b>	88	50.8
Gender equity	145	34.9
Female-to-male ratio in parliament	143	6.8
Female-to-male labour force participation	148	18.1
Female-to-male ratio in internal wage	100	77.7
Gender inequality	72	89.6
Social protection coverage (% population)	109	109
Adult literacy rate	86	39.1
Youth not in employment, education or training (%)	88	57.0
<b>Standard of living</b>	81	31
Poverty headcount ratio (% population)	1	85
GDP per capita	81	31.1
<b>Health and environment</b>	81	61.8
<b>Health</b>	81	37.0
Universal health coverage	30	76
Healthy life expectancy (years)	89	79.2
Under-five mortality rate	87	81.5
<b>Environmental performance</b>	121	43.0
Renewable energy consumption (%)	140	0.2
Household footprint per capita	79	86.1
Natural hazard exposure	100	51

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ANGOLA

## KEY INDICATORS

GDP US\$ billions	203.708
Population	32,866,268
HDI	0.581

**GKI RANK** 148/154

**GKI SCORE** 28.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Angola is a weak performer in terms of its knowledge infrastructure. It ranks 148th out of 154 countries in the Global Knowledge Index 2021 and 27th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

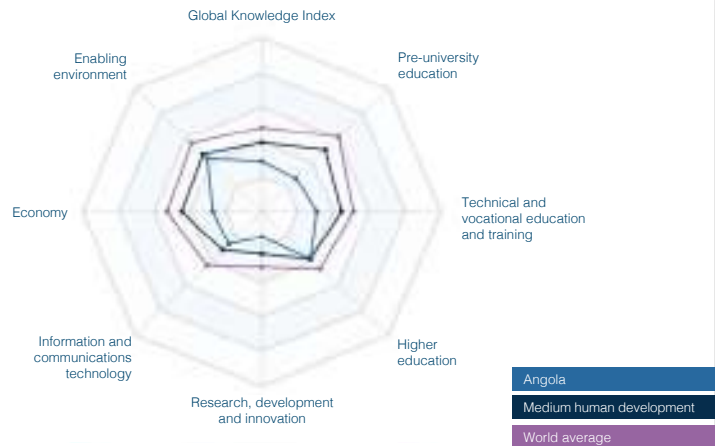
- + Female-to-male labour force participation
- + Youth not in employment, education or training (%)
- + Ecological footprint per capita
- + Printing and publishing output (% manufactured output)
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

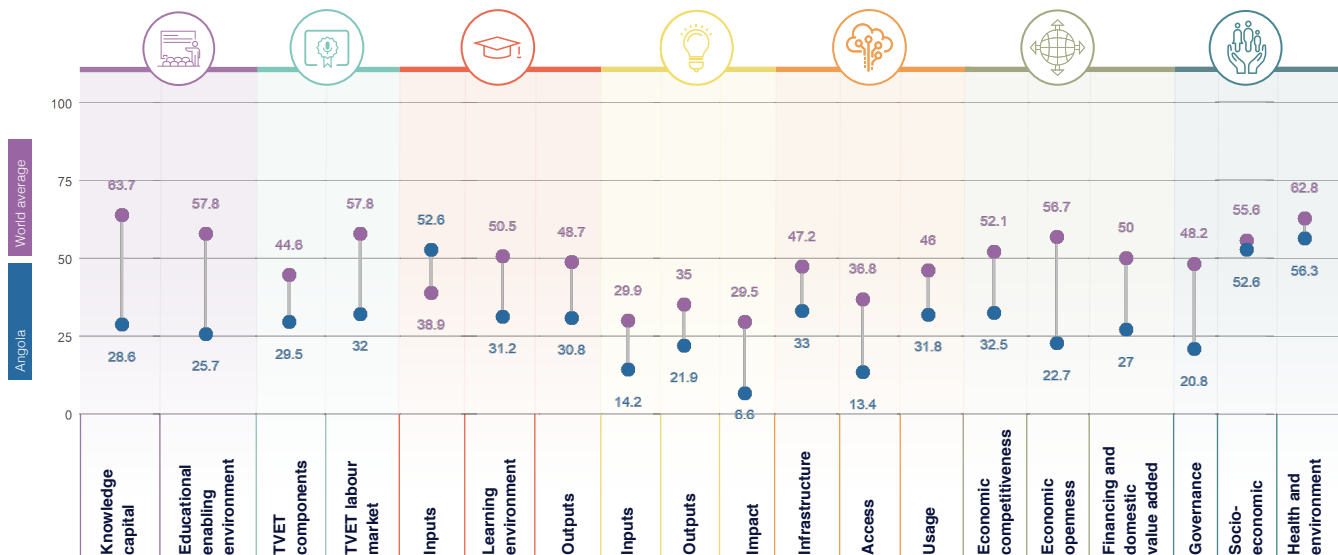
- Gross attendance ratio for tertiary education, location parity
- Intellectual property receipts (% total trade)
- Research institutions prominence
- Extent of corporate transparency
- Foreign direct investment, net inflows (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	149	27.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	149	30.7
HIGHER EDUCATION	113	38.2
RESEARCH, DEVELOPMENT AND INNOVATION	153	14.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	122	26.1
ECONOMY	154	27.4
ENABLING ENVIRONMENT	120	43.2



## GKI PILLARS







# ANGOLA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	143	21.1
Enrollment	134	44
Net enrolment rate in primary education	126	94
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	120	22.7
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	113	95.3
Success rate rate in the last grade of lower secondary education	141	24
Completion	141	11.1
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	143	16.1
<b>Educational enabling environment</b>	<b>143</b>	<b>26.7</b>
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	121	11.5
Pupil-based teacher ratio in primary education	34	7.4
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	85	7
Schools with access to computers in secondary education (%)	85	22
Early learning	123	13.2
Class attendance rate in early childhood education	85	11.3
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	77	15.3
Quality and infrastructure	119	25.5
Completion rate in upper secondary education, gender parity	118	84.7
Completion rate in upper secondary education, wealth parity	111	5.5
Completion rate in upper secondary education, location parity	118	16.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>122</b>	<b>25.5</b>
Companies training apprentices	85	14.5
Firms offering formal training (%)	85	17.8
Labour force with short-cycle tertiary education (%)	85	84.2
Participation rate in formal and non-formal education and training	44	16.5
TVET resources	111	22.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	57	22.5
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	141	21.1
Extent of staff training	141	12.5
Quality of vocational training	138	25.0
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>	<b>144</b>	<b>32</b>
Efficiency of the labour market	122	11.1
Firms considered with inappropriately educated workforce (%)	85	11.9
Employment educational mismatch (%)	106	14.2
Proportion of skilled production workers	86	40.8
Unemployment rate with vocational education	85	85.8
Real TVET unemployment	116	11
Share of TVET occupations	118	25
Manufacturing employment (%)	132	1
Quality and infrastructure	126	16.1
Enrollment in vocational education, gender parity	104	47.6
Useable employment rate	122	21.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>28</b>	<b>12.8</b>
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	116	116
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	122	12.2
Ratios/teacher ratio in tertiary education	112	54.9
Research in higher education (%)	44	81
<b>Learning environment</b>	<b>128</b>	<b>31.2</b>
Directly paid academic freedom	114	17.0
Teachers in tertiary education, gender parity	104	12.7
Labour mobility rate	116	116
Academic freedom	111	42.5
Quality and infrastructure	121	14.5
Class attendance rate in tertiary education, gender parity	85	11.0
Class attendance rate in tertiary education, wealth parity	86	2.4
Class attendance rate in tertiary education, location parity	86	6
<b>Outputs</b>	<b>128</b>	<b>36.8</b>
Efficiency	111	8.8
Educational attainment rate, bachelor's or equivalent	87	4.8
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	86	12.0
Labour force participation rate with advanced education	54	83.4
Unemployment rate with advanced education	87	88.0
Impact	141	13.0
University tertiary enrollment in FTE	141	11
UNITE students per FTE personnel in higher education	87	11.0
<b>INNOVATION, SCIENCE AND TECHNOLOGY</b>		
<b>Inputs</b>	<b>122</b>	<b>14.2</b>
Government R&D expenditure	122	11.1
GDP (% GDP)	118	0.4
GERD per researcher	86	23.1
Researchers per thousand labour force	107	0.1
Tertiary graduates from STEM programmes (%)	109	22.2
<b>Quality of innovation environment</b>	<b>111</b>	<b>11.1</b>
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
<b>Quality of innovation environment</b>	<b>122</b>	<b>14.2</b>
High-skill employment (%)	86	16.0
Intellectual property payments (% total trade)	82	17.0
State of digital development	142	25.1
<b>Outputs</b>	<b>128</b>	<b>17.2</b>
Government R&D expenditure	122	11.1
Average documents per researcher	89	16.5
Citations per document	148	6
Patent applications (per 100 billion GDP)	85	42.4
<b>Quality of innovation environment</b>	<b>111</b>	<b>11.1</b>
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	122	15.4
Firms producing new goods and services (%)	116	116



# ANGOLA

	Rank	Value
<b>Consumer electronics</b>	81	25.3
Treatment applications per 100 million GDP	80	7.8
Cultural goods exports (% exports)	74.8	8
Printing and publishing output (% manufactured output)	42	80.3
<b>Science</b>	139	3.8
<b>Health</b>	139	3.8
Risks of institutions' probitiveness	115	9
Depth of innovative companies	103	35.0
ISO 9001 quality certificates (% GDP)	102	1.7
ISO 14001 environmental certificates (% GDP)	143	0.8
<b>Energy</b>	100	3.8
CERO licensed from abroad (%)	108	108
Joint ventures per strategic resource deals (% GDP)	118	3.8
Computer software spending (% GDP)	108	108
<b>Government services</b>	100	3.8
New business density per thousand population	108	108
Firms with new products/services (%)	106	108
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	102	38.2
<b>Infrastructure</b>	119	32
<b>Coverage</b>	108	32
30MHz mobile network coverage (% population)	122	47.9
Secure Internet servers per 1 million population	105	0.8
Investment in telecommunication services (% GDP)	111	20.9
<b>Quality</b>	108	3.8
Mobile speed and download speeds	88	21.9
Fixed broadband upload and download speeds	87	3.8
Fixed broadband subscriptions (y speed) per hundred people	118	0.3
<b>Availability</b>	85	87.1
Fixed broadband basket (% GNI per capita)	112	80.8
Mobile broadband basket (% GNI per capita)	113	44.3
Internet and telephony competition	75	87.1
<b>Access</b>	108	13.8
<b>Subscribers</b>	101	31
Active mobile-broadband subscriptions per fixed-line inhabitants	108	7.8
International Internet bandwidth per user	143	60.8
Households with Internet access at home (%)	143	6.8
<b>Skills and employment</b>	100	10.1
Individuals with standard ICT skills (%)	108	108
Tertiary graduates from ICT programmes (%)	85	34.2
ICT employment (%)	118	2.8
<b>Usage</b>	118	31.2
<b>Services</b>	107	21.8
Government online services	112	45.8
Fixed broadband Internet traffic per subscription	87	3.8
Mobile broadband Internet traffic per subscription	108	2.1
Internet users (%)	118	32.5
<b>Commerce</b>	85	41.8
ICT/FIT patent applications (per 100,000 GDP)	108	108
E-participation	113	45.2
Internet activities by individuals (%)	108	108
Trade in digitally deliverable services (% total trade)	70	35.3
<b>ECONOMY</b>	104	27.8
<b>Economic complexity/structure</b>	148	32.3
<b>Manufacturing</b>	141	31.3
Overhead capital formation (% GDP)	104	42
Logistics performance	144	36.2
Transport productive capacity	108	12.5
Building quality control	143	40

	Rank	Value
<b>Business agility</b>	102	34.3
Time of starting a business	104	78.8
Recovery recovery time	108	108
Entrepreneurial employee activity rate	85	25
Growth of corporate transactions	118	8
<b>Corporate openness</b>	104	32.7
Trust and dissatisfaction	102	32.8
Tax (% GDP)	80	24.5
High-technology trade (% total trade)	108	30
Market concentration	102	13.1
Market concentration	141	60
Product diversity	101	12.1
Climate financial openness	108	8
Foreign direct investment, net inflows (% GDP)	101	8
Cost dynamics	108	38.8
<b>Financing and domestic value added</b>	102	27
<b>Financing and costs</b>	102	21.7
Domestic credit to private sector (% GDP)	108	3.8
MSME financing gap (% GDP)	80	37.1
Tax and contribution rate (% profit)	102	88.2
Bank nonperforming loans (%)	102	8
Unmet loan demand	108	20.8
Medium- and high-tech activities value added	107	3.3
Industry and services value added (% GDP)	87	85
Labour underutilization rate	102	42.1
Output per worker	108	6.8
<b>ENABLING ENVIRONMENT</b>	108	41.3
<b>Governance</b>	112	20.8
<b>Political environment</b>	112	26.3
Peace and stability	90	20.8
View and accountability	118	23.8
Quality of institutions	108	15.4
Rule of law	102	16.8
Control of corruption	102	16.3
Government effectiveness	108	11.1
<b>Socio-economic</b>	88	32.8
<b>Gender equity</b>	88	35.1
Female-to-male ratio in parliament	85	41.8
Female-to-male labour force participation	7	86.2
Female-to-male ratio in internal wage	87	80.2
<b>Gender equality</b>	100	37.7
Social protection coverage (% population)	118	7.8
Adult literacy rate	102	86.3
Youth not in employment, education or training (%)	85	80.8
<b>Standard of living</b>	108	28.8
Poverty headcount ratio (% population)	81	54.8
GDP per capita	107	8
<b>Health and environment</b>	107	56.3
<b>Health</b>	101	37.8
Universal health coverage	141	40
Healthy life expectancy (years)	107	33.8
Under-five mortality rate	108	35.8
<b>Environmental performance</b>	81	70.1
Renewable energy consumption (%)	35	88.8
Household footprint per capita	81	87.8
Natural hazard exposure	37	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ARGENTINA

**GKI RANK** 80/154

**GKI SCORE** 47.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Argentina is a moderate performer in terms of its knowledge infrastructure. It ranks 80th out of 154 countries in the Global Knowledge Index 2021 and 61st out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Enrolment in bachelor's or equivalent level (%)
- + Intellectual property payments (% total trade)
- + Academic freedom
- + Female-to-male ratio in parliament
- + Market concentration

### AREAS OF IMPROVEMENT

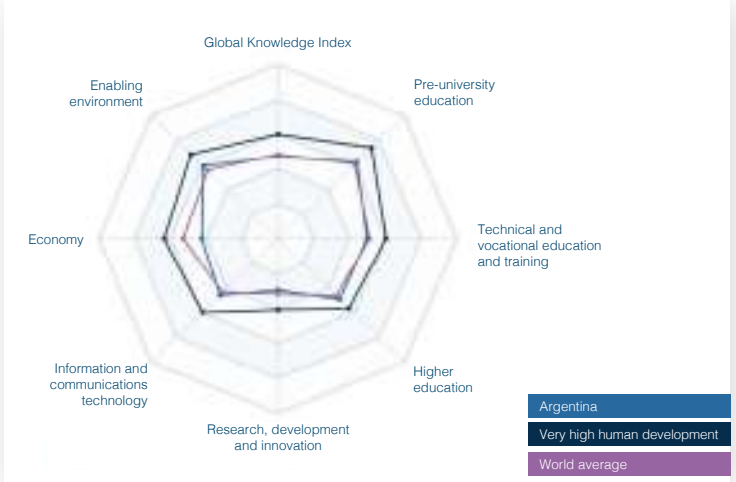
- Firms constrained with inadequately educated workforce (%)
- ICT PCT patent applications (per 100 billion GDP)
- Gross fixed capital formation (% GDP)
- Trade (% GDP)
- Tax and contribution rate (% profit)

### KEY INDICATORS

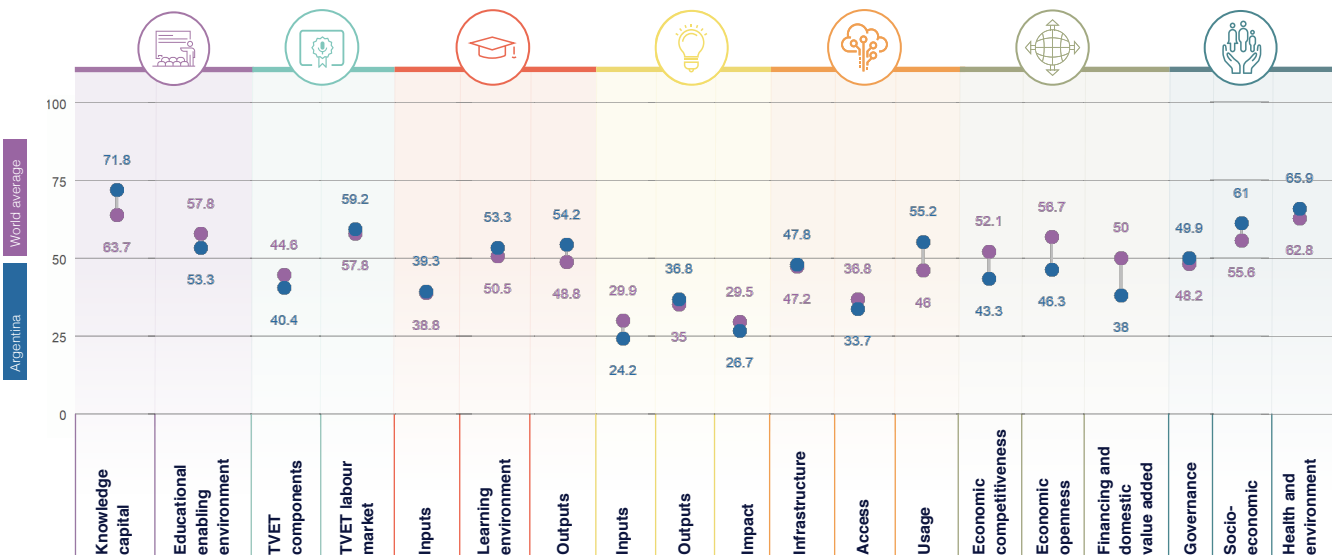
**GDP** US\$ billions ..... **893.311**  
**Population** ..... **45,195,777**  
**HDI** ..... **0.845**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	87	62.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	80	49.8
HIGHER EDUCATION	57	48.9
RESEARCH, DEVELOPMENT AND INNOVATION	81	29.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	70	45.6
ECONOMY	126	42.5
ENABLING ENVIRONMENT	57	58.9



## GKI PILLARS







# ARGENTINA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	79	71.8
Enrollment	33	91.1
Net enrolment rate in primary education	22	98.7
Net enrolment rate in lower secondary education	29	95.7
Net enrolment rate in upper secondary education	46	87.9
Completion	10	73.9
Years of compulsory education in primary and secondary	9	82.9
Completion rate in upper secondary education	85	66.1
Success rate rate in the last grade of lower secondary education	84	77.8
Completion	10	41.7
Assessment of 15-year-old students in math, science and reading	67	29.9
Learning-adjusted years of schooling	72	59.5
<b>Educational enabling environment</b>	<b>168</b>	<b>85.3</b>
Expenditure	77	32.4
Government expenditure on primary education (% GDP)	84	24.2
Government expenditure on secondary education (% GDP)	84	26.3
Government funding per primary student (% GDP per capita)	88	34.1
Government funding per secondary student (% GDP per capita)	75	24.9
Resources	81	61.1
Pupil-based teacher ratio in primary education	194	194
Pupil-based teacher ratio in secondary education	194	194
Schools with access to computers in primary education (%)	59	66.3
Schools with access to computers in secondary education (%)	79	87
Early learning	10	83.0
Class attendance rate in early childhood education	82	83.9
Proportion of children who are developmentally on track	40	79.5
Proportion of children with stimulating home learning environments	79	85.2
Pupil-based teacher ratio in preprimary education	194	194
Quality and infrastructure	194	194
Completion rate in upper secondary education, gender parity	194	194
Completion rate in upper secondary education, wealth parity	194	194
Completion rate in upper secondary education, location parity	194	194
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>88</b>	<b>40.4</b>
Companies training apprentices	117	71.1
Firms offering formal training (%)	96	48.5
Labour force with short-cycle tertiary education (%)	194	194
Participation rate in formal and non-formal education and training	52	88
TVET resources	194	194
Government expenditure on vocational education (%)	194	194
Share of students enrolled in secondary vocational programmes	194	194
Share of students enrolling in postsecondary vocational programmes	194	194
TVET quality and infrastructure	31	81.9
Extent of staff training	87	94.8
Quality of vocational training	30	82.9
Ratio of high-skil TVET occupations earnings to average wage	29	40.7
Ratio of medium-skill TVET occupations earnings to average wage	21	50.1
<b>TVET labour market</b>	<b>79</b>	<b>86.2</b>
Efficiency of the labour market	108	41.0
Firms considered well-integrated with workforce (%)	119	25
Employment educational mismatch (%)	39	75.7
Proportion of skilled production workers	100	34.7
Unemployment rate with vocational education	194	194
Real TVET unemployment	81	70.2
Share of TVET occupations	29	87.0
Manufacturing employment (%)	85	47.8
Quality and infrastructure	10	76
Enrollment in vocational education, gender parity	194	194
Useable employment rate	83	70

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>73</b>	<b>38.3</b>
Expenditure	42	55.8
Government expenditure per tertiary student	78	13.0
Teaching staff compensation (% tertiary expenditure)	11	89.8
Enrollment	28	41.9
Enrollment in bachelor's or equivalent level (%)	3	92.8
Enrollment in masters, doctoral or equivalent (%)	44	34.9
Resources	108	38.7
Pupil-teacher ratio in tertiary education	194	194
Researchers in higher education (%)	60	38.7
<b>Learning environment</b>	<b>68</b>	<b>53.3</b>
<b>Quality and academic freedom</b>	<b>88</b>	<b>53.0</b>
Teachers in tertiary education, gender parity	194	194
Labour mobility rate	67	12.9
Academic freedom	16	54.9
<b>Quality and infrastructure</b>	<b>194</b>	<b>194</b>
Class attendance rate in tertiary education, gender parity	194	194
Class attendance rate in tertiary education, wealth parity	194	194
Class attendance rate in tertiary education, location parity	194	194
<b>Outputs</b>	<b>88</b>	<b>54.2</b>
<b>Efficiency</b>	<b>194</b>	<b>194</b>
Educational attainment rate, bachelor's or equivalent	194	194
Educational attainment rate, master's or equivalent	194	194
Educational attainment rate, doctoral or equivalent	194	194
Employment	41	81.0
Labour force participation rate with advanced education	55	75.7
Unemployment rate with advanced education	45	87.0
<b>Impact</b>	<b>117</b>	<b>25.0</b>
University tertiary enrollment in R&D	88	37.4
OECD students per 1000 personnel in higher education	84	16.1
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>10</b>	<b>24.2</b>
<b>Human capital</b>	<b>108</b>	<b>71.2</b>
GDP (% GDP)	64	9.8
GERD per researcher	79	14.5
Researchers per thousand labour force	48	18.0
Tertiary graduates from STEM programmes (%)	108	28.0
<b>Quality of innovation environment</b>	<b>10</b>	<b>100.0</b>
GERD performed by business enterprises (%)	54	4
GERD financed by business enterprises (%)	88	23.0
Researchers in business enterprises (%)	88	12.7
Firms that spend on R&D (%)	23	46.0
<b>Quality of business environment</b>	<b>41</b>	<b>61.1</b>
High-skilled employment (%)	47	28.2
Intellectual property payments (% total trade)	13	83.1
State of startup development	88	48.8
<b>Outputs</b>	<b>10</b>	<b>100.0</b>
<b>Quality of innovation environment</b>	<b>108</b>	<b>100.0</b>
Average documents per researcher	80	42.0
Citations per document	108	13.0
Patent applications (per 100 billion GDP)	62	52.4
<b>Quality of business environment</b>	<b>108</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	28	20.0
Research design applications (per 100 billion GDP)	88	8.3
PCT applications (per 100 billion GDP)	81	49.7
Firms producing new goods and services (%)	37	83.5



# ARGENTINA

	Rank	Value
<b>Consumer Electronics</b>	17	89.9
Treatment applications per 100 million GDP	29	51.2
Cultural goods exports (% exports)	75	5.4
Printing and publishing output (% manufactured output)	95	50.9
<b>Energy</b>	86	15.7
<b>Finance</b>	35	37.3
Ratio of institutions' provisions	20	36.5
Depth of innovative companies	83	45.2
ISO 9001 quality certificates (% GDP)	46	27.7
ISO 14001 environmental certificates (% GDP)	81	12.0
<b>Infrastructure</b>	10	97.9
CERD received from abroad (%)	43	19.6
Cost savings per strategic storage deals (% GDP)	113	3.5
Computer software spending (% GDP)	62	19.8
<b>Government Services</b>	100	0.1
New business density per thousand population	128	0.8
Firms with new products/services (%)	89	89
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>75</b>	<b>46.8</b>
<b>Infrastructure</b>	72	47.8
<b>Coverage</b>	80	40
3G/LTE mobile network coverage (% population)	28	87.8
Secure Internet servers per 1 million population	55	11.3
Investment in telecommunication services (% GDP)	60	25.9
<b>Quality</b>	80	22.1
Mobile upload and download speeds	57	20.1
Fixed broadband upload and download speeds	81	10.6
Fixed broadband subscriptions (by speed) per hundred people	59	34.4
<b>Accessibility</b>	75	75.3
Fixed broadband bandwidth (% Gbps per capita)	100	63.9
Mobile broadband basket (% Gbps per capita)	60	65.8
Internet and telephony competition	70	80.7
<b>Access</b>	86	23.7
<b>Subscriptions</b>	75	41.2
Active mobile broadband subscriptions per fixed-line inhabitants	75	35.1
International Internet bandwidth per user	83	36.8
Households with Internet access at home (%)	67	76
<b>Skills and employment</b>	100	16.2
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	108	13.9
ICT employment (%)	24	22.5
<b>Usage</b>	85	66.2
<b>Services</b>	47	52.6
Government online services	30	84.7
Fixed broadband Internet traffic per subscription	104	19
Mobile broadband Internet traffic per subscription	100	5.8
Internet users (%)	60	72.0
<b>Commerce</b>	50	80.8
ICT/FIT patent applications (per 100,000 GDP)	100	21.2
E-participation	25	85.7
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	20	85
<b>ECONOMY</b>	<b>128</b>	<b>62.3</b>
<b>Economic Competitiveness</b>	114	43.2
<b>Efficiency</b>	100	41.5
Overhead capital formation (% GDP)	100	25
Logistics performance	61	47.2
Transport productive capacity	127	15.2
Building quality control	75	72.3

	Rank	Value
<b>Business Agility</b>	100	46.1
Time of starting a business	127	80.4
Recovery time	125	32.8
Entrepreneurial employee activity rate	80	11.8
Growth of corporate transactions	50	21.4
<b>Customer experience</b>	117	46.3
<b>Trust and innovation</b>	50	57.3
Trade (% GDP)	142	9.8
High-technology trade (% total trade)	64	47.8
Market concentration	89	77.1
Market concentration	17	54.0
Product diversity	110	55.2
Climate financial openness	86	38.4
Foreign direct investment, net inflows (% GDP)	85	27.3
Cost dynamics	110	40
<b>Financing and domestic value added</b>	127	33
<b>Financing and costs</b>	100	40.4
Domestic credit to private sector (% GDP)	129	9
MSME financing gap (% GDP)	41	32.4
Tax and contribution rate (% profit)	101	9
Bank nonperforming loans (%)	69	84.3
Unmet loan demand	100	31.0
Medium- and high-tech activities value added	59	58.8
Industry and services value added (% GDP)	100	52.0
Labour underutilization rate	124	37.1
Output per worker	52	27.3
<b>ENABLING ENVIRONMENT</b>	<b>57</b>	<b>62.8</b>
<b>Governance</b>	85	49.5
Political environment	55	27.1
Peace and stability	85	45.8
View and accountability	41	63.7
Quality of institutions	61	42.5
Rule of law	100	34.9
Control of corruption	75	50
Government effectiveness	87	43.5
<b>Socio-economic</b>	59	89
Gender equity	38	75.6
Female-to-male ratio in parliament	17	73.6
Female-to-male labour force participation	100	87.9
Female-to-male ratio in internal wage	55	87.8
Gender inequality	60	71.1
Social protection coverage (% population)	49	82.8
Adult literacy rate	22	84.7
Youth not in employment, education or training (%)	89	81
<b>Standard of living</b>	100	29.1
Poverty headcount ratio (% population)	100	40.0
GDP per capita	86	17.3
<b>Health and environment</b>	<b>58</b>	<b>65.9</b>
Health	49	81.1
Universal health coverage	40	76
Healthy life expectancy (years)	49	76.7
Under-five mortality rate	50	83.7
Environmental performance	100	46.0
Renewable energy consumption (%)	114	10.0
Household footprint per capita	89	77.9
Natural hazard exposure	65	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ARMENIA

**GKI RANK** 71/154

**GKI SCORE** 48.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Armenia is a moderate performer in terms of its knowledge infrastructure. It ranks 71st out of 154 countries in the Global Knowledge Index 2021 and 14th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Pupil-trained teacher ratio in pre-primary education
- + Employment educational mismatch (%)
- + Pupil-teacher ratio in tertiary education
- + Enrolment in vocational education, gender parity
- + Fixed broadband Internet traffic per subscription

### AREAS OF IMPROVEMENT

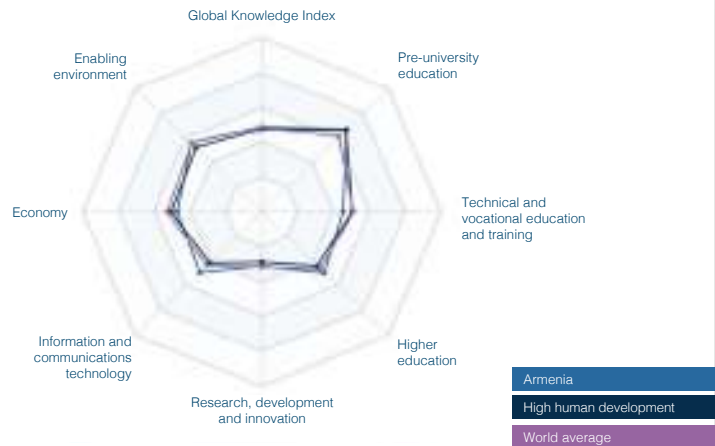
- Labour underutilization rate
- Government expenditure on primary education (% of GDP)
- Intellectual property payments (% total trade)
- Intellectual property receipts (% total trade)
- Extent of corporate transparency

### KEY INDICATORS

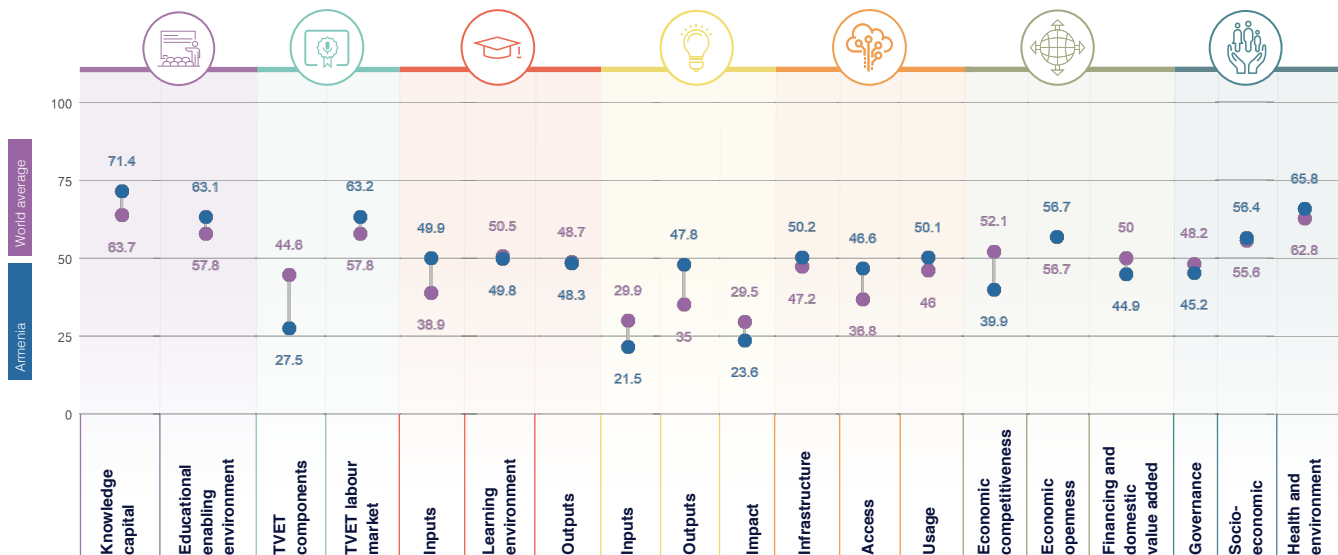
**GDP** US\$ billions ..... **37.315**  
**Population** ..... **2,963,234**  
**HDI** ..... **0.776**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	71	67.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	104	45.4
HIGHER EDUCATION	53	49.3
RESEARCH, DEVELOPMENT AND INNOVATION	71	30.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	63	49.0
ECONOMY	100	47.2
ENABLING ENVIRONMENT	67	55.8



## GKI PILLARS







# ARMENIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	71	67.2
Enrollment	73	71.4
Enrollment rate in primary education	84	81.0
Net enrolment rate in primary education	110	60.1
Net enrolment rate in lower secondary education	85	86.4
Net enrolment rate in upper secondary education	38	91.2
Completion	50	71.7
Years of compulsory education in primary and secondary	5	62.0
Completion rate in upper secondary education	84	80.0
Success rate rate in the last grade of lower secondary education	80	73.0
Completion	80	54.0
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	79	54.0
<b>Educational enabling environment</b>	72	62.5
Expenditure	100	22.4
Government expenditure on primary education (% GDP)	128	10
Government expenditure on secondary education (% GDP)	85	23.7
Government funding per primary student (% GDP per capita)	81	31.2
Government funding per secondary student (% GDP per capita)	80	31.0
Resources	41	82.0
Pupil-based teacher ratio in primary education	45	80.0
Pupil-based teacher ratio in secondary education	28	88.0
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	63	60.4
Class attendance rate in early childhood education	78	36.0
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	1	100
Quality and infrastructure	60	61.1
Completion rate in upper secondary education, gender parity	100	75.0
Completion rate in upper secondary education, wealth parity	43	63.0
Completion rate in upper secondary education, location parity	65	64.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	144	21.0
Companies training apprentices	100	10.1
Firms offering formal training (%)	75	33.1
Labour force with short-cycle tertiary education (%)	104	104
Participation rate in formal and non-formal education and training	104	104
TVET resources	100	11
Government expenditure on vocational education (%)	70	9.8
Share of students enrolled in secondary vocational programmes	63	13.3
Share of students enrolled in postsecondary vocational programmes	104	104
TVET quality and infrastructure	104	20.0
Extent of staff training	87	44.8
Quality of vocational training	80	46.3
Ratio of high-skill TVET occupations earnings to average wage	100	11.1
Ratio of medium-skill TVET occupations earnings to average wage	30	30
<b>TVET labour market</b>	80	60.2
Efficiency of the labour market	60	14.1
Firms considered with inappropriately educated workforce (%)	108	32.4
Employment educational mismatch (%)	2	60.7
Proportion of skilled production workers	80	80.0
Unemployment rate with vocational education	104	104
High TVET unemployment	60	61.7
Share of TVET occupations	60	51.0
Manufacturing employment (%)	70	35.0
Quality and infrastructure	40	61.0
Enrollment in vocational education, gender parity	3	50.0
Useable employment rate	80	40

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	37	49.8
Expenditure	87	29.0
Government expenditure per tertiary student	108	4.4
Teaching staff compensation (% tertiary expenditure)	22	84.2
Enrollment	67	32.0
Enrollment in bachelor's or equivalent level (%)	63	27.0
Enrollment in masters, doctoral or equivalent (%)	67	17.1
Resources	3	97.0
Ratios/teacher ratio in tertiary education	3	67.0
Researchers in higher education (%)	104	104
<b>Learning environment</b>	78	48.8
Timely and academic freedom	87	47.0
Teachers in tertiary education, gender parity	60	43.0
Labour mobility rate	40	20.0
Academic freedom	70	37.0
Quality and infrastructure	28	61.7
Class attendance rate in tertiary education, gender parity	20	61.0
Class attendance rate in tertiary education, wealth parity	37	37.7
Class attendance rate in tertiary education, location parity	18	25.9
<b>Outputs</b>	74	46.3
Attainment	50	41.4
Educational attainment rate, bachelor's or equivalent	30	62.0
Educational attainment rate, master's or equivalent	104	104
Educational attainment rate, doctoral or equivalent	37	26.2
Employment	101	61.0
Labour force participation rate with advanced education	43	38.4
Unemployment rate with advanced education	100	49.4
Impact	88	35.0
University tertiary enrollment in R&D	101	33.0
UNITE documents per 100 personnel in higher education	104	104
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	104	21.0
Access to credit resources	100	10.0
GDP (% GDP)	54	3.8
GPEI per researcher	104	104
Researchers per thousand labour force	104	104
Tertiary graduates from STEM programmes (%)	104	28.0
Quality and infrastructure	100	10.0
GPEI performed by business enterprises (%)	104	104
GPEI financed by business enterprises (%)	70	30.0
Researchers in business enterprises (%)	104	104
Firms that spend on R&D (%)	60	21.0
Quality and infrastructure	100	10.0
High-skill employment (%)	18	90
Intellectual property payments (% total trade)	104	0
State of cluster development	70	46.0
<b>Outputs</b>	60	10.0
Access to credit resources	100	10.0
Average documents per researcher	104	104
Citations per document	11	61.7
Patent applications (per 100 billion GDP)	43	60
Quality and infrastructure	100	10.0
Intellectual property receipts (% total trade)	117	0
Research design applications (per 100 billion GDP)	70	4.8
PCT applications (per 100 billion GDP)	70	47.0
Firms producing new goods and services (%)	62	46.0



# ARMENIA

	Rank	Value
<b>Consumer Innovation Readiness</b>	10	85.3
Treatment applications per 100 million GDP	23	45.3
Cultural goods exports (% exports)	34	35.1
Printing and publishing output (% manufactured output)	111	25.5
<b>Health</b>	35	37.5
Rate of institutions' performance	82	8.8
Depth of innovative companies	83	54.1
ISO 9001 quality certificates (% GDP)	115	3.7
ISO 14001 environmental certificates (% GDP)	139	0.8
<b>Energy</b>	140	3.5
CERO forecast from abroad (%)	65	10.6
Cost savings per strategic storage deals (% GDP)	103	4.1
Computer software spending (% GDP)	62	11.7
<b>Government Services</b>	37	36
New business density per thousand population	50	15.1
Firms with new products/services (%)	26	34.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	63	64
<b>Infrastructure</b>	85	55.3
<b>Coverage</b>	85	44.1
3G/LTE mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	75	4.4
Investment in telecommunication services (% GDP)	49	23.9
<b>Speed</b>	91	22.5
Mobile upload and download speeds	114	114
Fixed broadband upload and download speeds	114	114
Fixed broadband subscriptions (by speed) per hundred people	68	21.5
<b>Availability</b>	10	50.4
Fixed broadband basket (% GNI per capita)	85	73.3
Mobile broadband basket (% GNI per capita)	60	67.7
Internet and telephony competition	1	100
<b>Access</b>	23	46.8
<b>Subscribers</b>	81	57.2
Active mobile-broadband subscriptions per fixed-line inhabitants	73	36.4
International Internet bandwidth per user	15	88.8
Households with Internet access at home (%)	65	34.5
<b>Skills and employment</b>	57	35.1
Individuals with standard ICT skills (%)	114	114
Tertiary graduates from ICT programmes (%)	73	29.9
ICT employment (%)	25	42.5
<b>Usage</b>	75	60.1
<b>Services</b>	57	52.3
Government online services	65	70
Fixed broadband Internet traffic per subscription	5	80.8
Mobile broadband Internet traffic per subscription	47	19.9
Internet users (%)	65	64.7
<b>Commerce</b>	75	57.1
ICT/FIT patent applications (per 100,000 GDP)	73	34.6
E-participation	85	75
Internet activities by individuals (%)	114	114
Trade in digitally deliverable services (% total trade)	105	27.2
<b>ECONOMY</b>	100	67.2
<b>Economic Competitiveness</b>	123	35.3
<b>Infrastructure Investment</b>	107	44.2
Overhead capital formation (% GDP)	124	34
Logistics performance	81	45.2
Transport productive capacity	94	22.7
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	108	33.3
Ease of starting a business	9	98.1
Recovery recovery rate	71	42.6
Entrepreneurial employee activity rate	77	3.8
Growth of corporate transactions	118	9
<b>Employee experience</b>	71	56.7
Trust and dissatisfaction	57	51.5
Tax (% GDP)	75	27.9
High-technology trade (% total trade)	79	44.3
Market concentration	87	66.3
Market concentration	110	64.5
Product diversity	59	57.2
Climate financial openness	55	83.6
Foreign direct investment, net inflows (% GDP)	83	35.1
Cost dynamics	83	59
<b>Financing and domestic value added</b>	100	41.5
Financing and costs	57	51.1
Domestic credit to private sector (% GDP)	49	27
MSME financing gap (% GDP)	25	70.0
Tax and contribution rate (% profit)	22	85.1
Bank nonperforming loans (%)	87	72.0
Unmet loan demand	143	23.0
Medium- and high-tech activities value added	119	9
Industry and services value added (% GDP)	97	56.7
Labour underutilization rate	148	13.0
Output per worker	72	49
<b>ENABLING ENVIRONMENT</b>	87	55.8
<b>Governance</b>	77	45.2
Political environment	91	37.5
Peace and stability	100	25.0
Value and accountability	73	48.3
Quality of institutions	55	52.7
Rule of law	68	51.0
Control of corruption	59	57.7
Government effectiveness	83	48.0
<b>Socio-economic</b>	78	56.4
Gender equity	56	71.2
Female-to-male ratio in parliament	44	50.7
Female-to-male labour force participation	112	63.6
Female-to-male ratio in internal wage	1	100
Gender inequality	69	57.1
Social protection coverage (% population)	59	53.1
Adult literacy rate	9	89.7
Youth not in employment, education or training (%)	140	30.4
Standard of living	81	37
Poverty headcount ratio (% population)	82	63.2
GDP per capita	71	70.8
<b>Health and environment</b>	58	65.8
Health	47	74
Universal health coverage	75	69
Healthy life expectancy (years)	83	76.9
Under-five mortality rate	85	61.5
Environmental performance	85	52.0
Renewable energy consumption (%)	100	11.8
Household footprint per capita	81	60.3
Natural hazard exposure	81	59

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# AUSTRALIA

## KEY INDICATORS

GDP US\$ billions	1,250.903
Population	25,499,881
HDI	0.944

**GKI RANK** 20/154

**GKI SCORE** 64.2

**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**

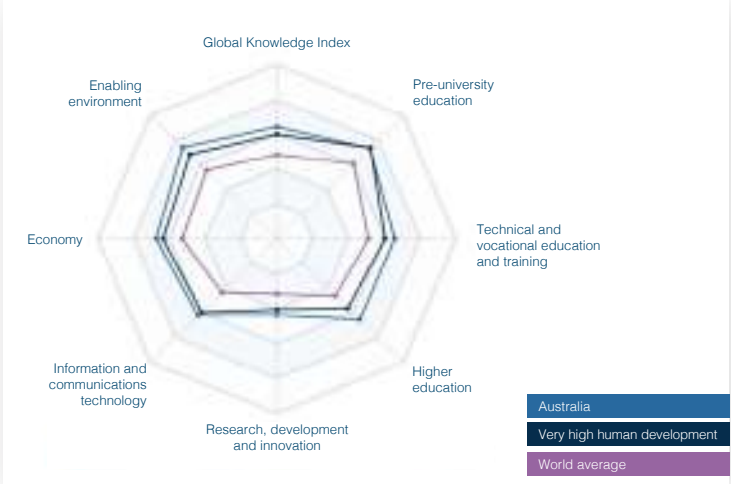
Australia is a leading performer in terms of its knowledge infrastructure. It ranks 20th out of 154 countries in the Global Knowledge Index 2021 and 20th out of the 61 countries with very high human development.

- AREAS OF STRENGTH**
- + Universal health coverage
  - + Entrepreneurial employee activity rate
  - + Inbound mobility rate
  - + Ease of starting a business
  - + Educational attainment rate, doctorate or equivalent

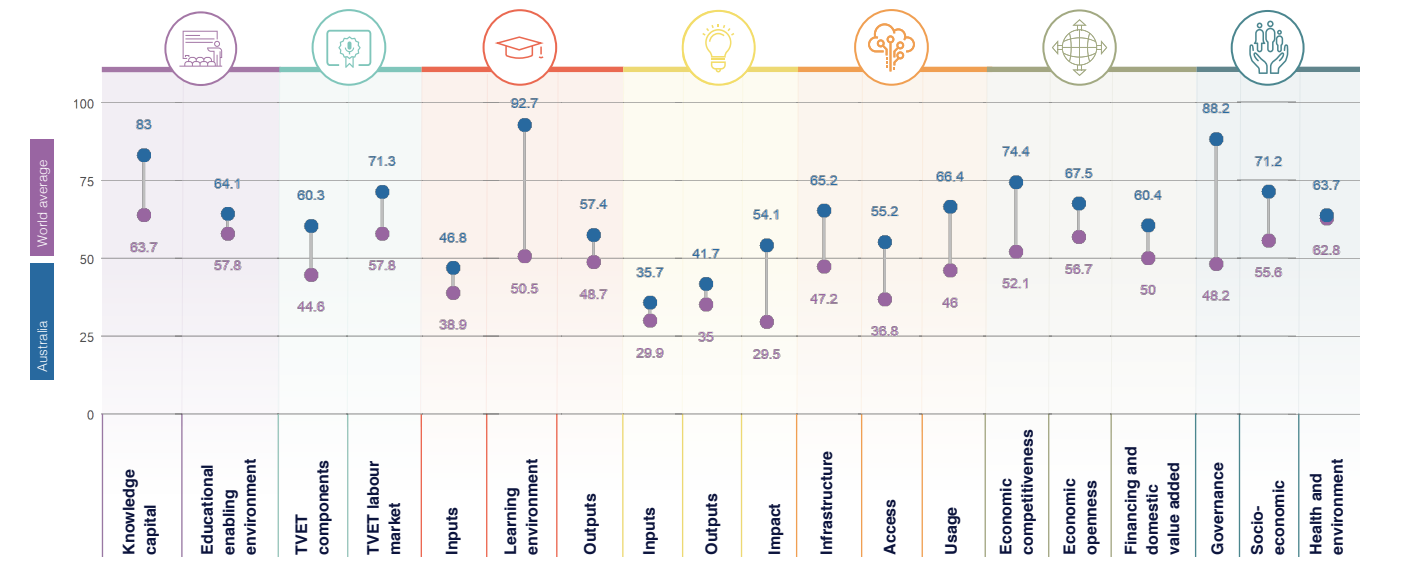
- AREAS OF IMPROVEMENT**
- Manufacturing employment (%)
  - Renewable energy consumption (%)
  - Market concentration
  - Ecological footprint per capita
  - Ratio of medium-skill TVET occupations earnings to average wage

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	47	73.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	19	65.8
HIGHER EDUCATION	12	65.6
RESEARCH, DEVELOPMENT AND INNOVATION	24	43.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	23	62.2
ECONOMY	25	67.4
ENABLING ENVIRONMENT	21	74.4



## GKI PILLARS







# AUSTRALIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	28	83
Enrollment	30	85.1
Net enrolment rate in primary education	26	87.9
Net enrolment rate in lower secondary education	43	87.3
Net enrolment rate in upper secondary education	24	83
Completion	64	75.9
Years of compulsory education in primary and secondary	42	76.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	116	116
Completion	11	75.9
Assessment of 15-year-old students in math, science and reading	18	87.3
Learning-adjusted years of schooling	11	85
<b>Educational enabling environment</b>	71	84.5
Enrollment	10	82.9
Government expenditure on primary education (% GDP)	45	38.9
Government expenditure on secondary education (% GDP)	54	31.1
Government funding per primary student (% GDP per capita)	43	88.8
Government funding per secondary student (% GDP per capita)	67	37
Resources	1	100
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	10	82.9
Class attendance rate in early childhood education	40	86.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	11	84.9
Commence training, worldwide	9	73.9
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	18	84.9
Participation rate in formal and non-formal education and training	11	74.9
TVET resources	10	82.9
Government expenditure on vocational education (%)	46	36.7
Share of students enrolled in secondary vocational programmes	23	51.9
Share of students enrolling in postsecondary vocational programmes	1	100
TVET quality and infrastructure	10	82.9
Extent of staff training	32	88.9
Quality of vocational training	23	83.9
Ratio of high-skill TVET occupations earnings to average wage	79	29.9
Ratio of median-skill TVET occupations earnings to average wage	112	80.1
<b>TVET labour market</b>	28	71.9
Efficiency of the labour market	4	82.9
Firms considered with inappropriately educated workforce (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	28	87.9
Real TVET unemployment	10	82.9
Share of TVET occupations	47	84.1
Manufacturing employment (%)	129	21.7
Quality and infrastructure	10	82.9
Enrollment in vocational education, gender parity	81	75.9
Useable employment rate	35	80.9

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	47	88.8
Enrollment	10	23.9
Government expenditure per tertiary student	21	21.9
Teaching staff compensation (% tertiary expenditure)	89	37.7
Enrollment	1	89
Enrollment in bachelor's or equivalent level (%)	7	49.9
Enrollment in masters, doctoral or equivalent (%)	12	38.9
Resources	116	116
Pupil-teacher ratio in tertiary education	116	116
Research in higher education (%)	116	116
<b>Learning environment</b>	1	92.7
Directly paid academic freedom	1	92.7
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	1	100
Academic freedom	25	85.9
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	48	87.4
Efficiency	11	87.9
Educational attainment rate, bachelor's or equivalent	7	84.7
Educational attainment rate, master's or equivalent	38	32.9
Educational attainment rate, doctoral or equivalent	4	73.9
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	64	47.1
University tertiary collaboration in R&D	28	80.4
OECD students per 1000 personnel in higher education	43	43.9
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	10	82.9
Commence R&D worldwide	10	82.9
GDP (% GDP)	29	37.9
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	64	34.9
Quality and infrastructure	10	82.9
GERD performed by business enterprises (%)	22	37.9
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
Quality and infrastructure	10	82.9
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	59	32.9
State of cluster development	37	64.9
<b>Outputs</b>	11	87.9
Commence R&D worldwide	10	82.9
Average documents per researcher	116	116
Citations per document	41	22.9
Patent applications (per 100 billion GDP)	35	88.9
Quality and infrastructure	10	82.9
Intellectual property receipts (% total trade)	37	21.9
Research design applications (per 100 billion GDP)	44	17.9
PCT applications (per 100 billion GDP)	27	76.9
Firms producing new goods and services (%)	116	116



# AUSTRALIA

	Rank	Value
<b>Consumer &amp; business confidence</b>	75	61.9
Treatment applications per 100 million GDP	29	51.1
Cultural goods exports (% exports)	86	10.7
Printing and publishing output (% manufactured output)	17	50.5
<b>Finance</b>	5	60.5
<b>Trade</b>	77	50.1
Rules of institutions' progressive	12	71
Depth of innovative companies	25	60.0
ISO 9001 quality certificates (% GDP)	51	55.5
ISO 14001 environmental certificates (% GDP)	40	50.0
<b>Energy</b>	75	49.0
CERO forecast from abroad (%)	116	116
Coal reserves per storage volume deals (% GDP)	9	71.1
Computer software spending (% GDP)	60	20.0
<b>Government efficiency</b>	75	50
New business density per thousand population	7	70
Firms with new products/services (%)	116	116
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>22</b>	<b>62.2</b>
<b>Infrastructure</b>	27	60.0
<b>Coverage</b>	59	61.2
30MHz mobile network coverage (% population)	26	60.4
Secure Internet servers per 1 million population	19	37.5
Investment in telecommunication services (% GDP)	29	46.0
<b>Speed</b>	31	60.0
Mobile upload and download speeds	1	60.0
Fixed broadband upload and download speeds	52	15.1
Fixed broadband subscriptions (by speed) per hundred people	27	66.7
<b>Availability</b>	59	60.0
Fixed broadband bandwidth (% Gbps per capita)	38	60.0
Mobile broadband basket (% Gbps per capita)	40	71
Internet and telephony competition	1	100
<b>Access</b>	28	60.0
<b>Subscriptions</b>	31	61.0
Active mobile-broadband subscriptions per fixed-line inhabitants	13	55.0
International Internet bandwidth per user	88	47.8
Households with Internet access at home (%)	40	60.0
<b>Skills and employment</b>	75	60.0
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	33	41
ICT employment (%)	18	57.4
<b>Usage</b>	21	66.4
<b>Services</b>	30	60.0
Government online services	7	56.7
Fixed broadband Internet traffic per subscription	19	26.1
Mobile broadband Internet traffic per subscription	32	22.1
Internet users (%)	30	60.0
<b>Commerce</b>	75	72.0
ICT/FIT patent applications (per 100 million GDP)	26	60.7
E-participation	9	60.4
Internet activities by individuals (%)	6	66.0
Trade in digitally deliverable services (% total trade)	54	42.0
<b>ECONOMY</b>	<b>28</b>	<b>67.8</b>
<b>Economic competitiveness</b>	8	74.4
<b>Infrastructure investment</b>	30	50.1
Overhead capital formation (% GDP)	78	40.0
Logistics performance	17	66.0
Transport productive capacity	80	25.4
Building quality control	8	60.0

	Rank	Value
<b>Business agility</b>	5	63.7
Ease of starting a business	6	66.0
Recovery recovery rate	15	69.0
Entrepreneurial employee activity rate	3	72.0
Growth of corporate transactions	1	100
<b>Employee openness</b>	65	67.0
<b>Trade and investment</b>	102	50.0
Trade (% GDP)	102	15.0
High-technology trade (% total trade)	47	52
Market concentration	110	64.0
Market concentration	121	60.1
<b>Product openness</b>	11	61.0
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	47	45.7
Data dynamics	1	100
<b>Financing and domestic value added</b>	27	60.4
<b>Financing and loans</b>	30	70.0
Domestic credit to private sector (% GDP)	12	54.4
MSME financing gap (% GDP)	116	116
Tax and contribution rate (% profit)	116	60.0
Bank nonperforming loans (%)	12	60.0
<b>Unmet needs index</b>	41	60.0
Medium- and high-tech activities value added	58	55.0
Industry and services value added (% GDP)	19	72.0
Labour underutilization rate	100	66.0
Output per worker	32	45.0
<b>ENABLING ENVIRONMENT</b>	<b>21</b>	<b>74.4</b>
<b>Governance</b>	12	66.2
<b>Political environment</b>	17	63.0
Peace and stability	27	73.1
View and accountability	14	60.0
Quality of institutions	15	60.0
Rule of law	12	60.0
Control of corruption	13	60.0
Government effectiveness	11	60.0
<b>Socio-economic</b>	27	71.2
<b>Gender equity</b>	25	76.1
Female-to-male ratio in parliament	81	45.0
Female-to-male labour force participation	83	66.1
Female-to-male ratio in internal wage	40	39
<b>Gender inequality</b>	15	60.0
Social protection coverage (% population)	1	100
Adult literacy rate	116	116
Youth not in employment, education or training (%)	27	67.0
<b>Standard of living</b>	81	63.0
Poverty headcount ratio (% population)	116	116
GDP per capita	18	60.0
<b>Health and environment</b>	<b>75</b>	<b>60.7</b>
<b>Health</b>	11	61.7
Universal health coverage	1	67
Healthy life expectancy (years)	23	66.4
Under-five mortality rate	20	60.0
<b>Environmental performance</b>	116	60.0
Renewable energy consumption (%)	110	70
Household footprint per capita	141	66.0
Natural hazard exposure	86	52

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# AUSTRIA

**GKI RANK** 14/154

**GKI SCORE** 66.8

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Austria is a leading performer in terms of its knowledge infrastructure. It ranks 14th out of 154 countries in the Global Knowledge Index 2021 and 14th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Quality of vocational training
- + Mobile broadband basket (% GNI per capita)
- + Logistics performance
- + Enrolment in master's, doctoral or equivalent (%)
- + Product concentration

### AREAS OF IMPROVEMENT

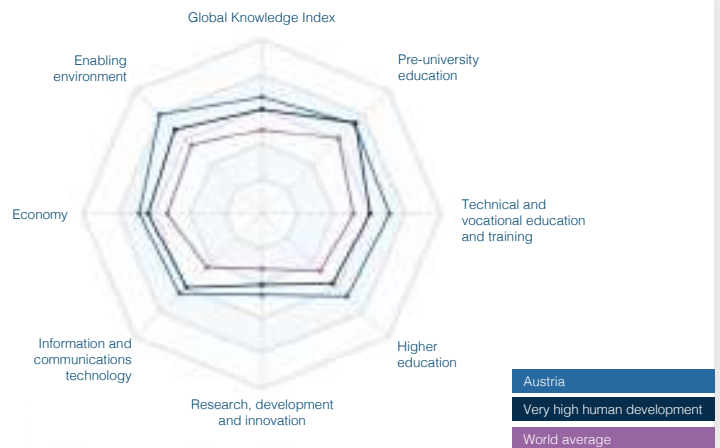
- Tax and contribution rate (% profit)
- Government expenditure on primary education (% of GDP)
- Ecological footprint per capita
- Investment in telecommunication services (% GDP)
- Foreign direct investment, net inflows (% GDP)

### KEY INDICATORS

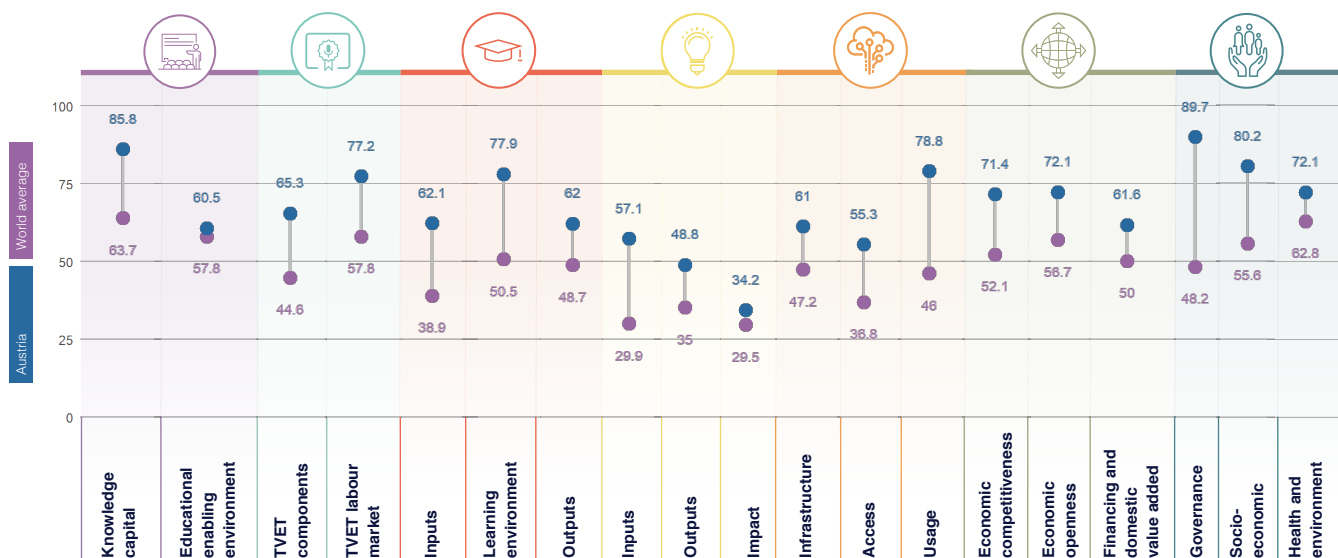
**GDP US\$ billions** 464.763  
**Population** 9,006,400  
**HDI** 0.922

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	49	73.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	4	71.3
HIGHER EDUCATION	9	67.3
RESEARCH, DEVELOPMENT AND INNOVATION	18	46.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	16	65
ECONOMY	15	68.4
ENABLING ENVIRONMENT	10	80.7



## GKI PILLARS







# AUSTRIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	48	75.2
Investment	42	88.8
Net enrolment rate in primary education	33	95.0
Net enrolment rate in lower secondary education	5	99.9
Net enrolment rate in upper secondary education	29	95.9
Completion	46	89.9
Years of compulsory education in primary and secondary	9	83.9
Completion rate in upper secondary education	9	82.9
Success rate rate in the last grade of lower secondary education	24	82.3
Completion	27	81.2
Completion	25	75
Assessment of 15-year-old students in math, science and reading	26	84.1
Learning-adjusted years of schooling	28	82
<b>Educational enabling environment</b>		
Expenditure	78	86.8
Government expenditure on primary education (% GDP)	42	10.0
Government expenditure on secondary education (% GDP)	100	20
Government expenditure on tertiary education (% GDP)	27	40.8
Government funding per primary student (% GDP per capita)	21	51.8
Government funding per secondary student (% GDP per capita)	25	43.0
Government funding per tertiary student (% GDP per capita)	29	43.0
Ratio	106	106
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	106	106
Schools with access to computers in secondary education (%)	106	106
Early learning	107	40
Class attendance rate in early childhood education	95	80
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	11	81.0
Completion rate in upper secondary education, gender parity	6	80.1
Completion rate in upper secondary education, wealth parity	29	79.5
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	41	88.3
Communication and writing	19	79.9
Firms offering formal training (%)	39	82.7
Labour force with short-cycle tertiary education (%)	44	77.2
Participation rate in formal and non-formal education and training	7	81.1
<b>TVET indicators</b>		
Government expenditure on vocational education (%)	49	76.4
Share of students enrolled in secondary vocational programmes	13	55.9
Share of students enrolled in postsecondary vocational programmes	14	55.4
Share of students enrolling in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>		
Extent of staff training	29	82.2
Extent of staff training	13	84.8
Quality of vocational training	2	76.0
Ratio of high-skilled TVET occupations earnings to average wage	36	26.6
Ratio of medium-skilled TVET occupations earnings to average wage	40	46.0
<b>TVET labour market</b>		
Efficiency of the labour market	9	77.2
Efficiency of the labour market	22	75.5
Firms considered well-integrated into the workforce (%)	81	82.6
Employment educational mismatch (%)	41	75.6
Proportion of skilled production workers	8	86
Unemployment rate with vocational education	20	88.7
High TVET employment	14	81.5
Share of TVET occupations	43	74.5
Manufacturing employment (%)	26	84.8
Quality and infrastructure	11	81
Expenditure in vocational education, gender parity	34	89.7
Useable employment rate	20	82.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	8	82.1
Expenditure	11	81
Government expenditure per tertiary student	8	75.8
Teaching staff compensation (% tertiary expenditure)	21	84.7
Expenditure	7	81.1
Expenditure in bachelor's or equivalent level (%)	49	28.0
Expenditure in master's, doctoral or equivalent (%)	4	82.7
Expenditure	10	82.1
Expenditure	5	86.5
Research in higher education (%)	66	27.0
<b>Learning environment</b>		
Directly paid academic freedom	11	71.0
Teachers in tertiary education, gender parity	48	35
Labour mobility rate	9	82.2
Academic freedom	3	86.0
<b>Quality and infrastructure</b>		
Quality and infrastructure	106	106
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>		
Research	38	82
Research	37	44.5
Educational attainment rate, bachelor's or equivalent	59	38.0
Educational attainment rate, master's or equivalent	26	42.7
Educational attainment rate, doctoral or equivalent	17	40
Employment	32	83.0
Labour force participation rate with advanced education	58	75.1
Unemployment rate with advanced education	24	81.0
Impact	23	87.0
University tertiary enrollment in FTE	18	64.1
OECD students per FTE personnel in higher education	29	51.6
<b>Government expenditure and financing</b>		
Government expenditure	18	86.2
Government expenditure	11	82.2
Government expenditure	9	81.2
GDP (% GDP)	6	64.0
OECD per researcher	15	88.0
Researchers per thousand labour force	7	71.1
Tertiary graduates from STEM programmes (%)	19	88
<b>Government expenditure and financing</b>		
GDP performed by business enterprises (%)	9	81
GDP financed by business enterprises (%)	17	67
Researchers in business enterprises (%)	6	76.0
Firms that spend on R&D (%)	18	81.0
Quality and infrastructure	61	81.0
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	60	30
State of cluster development	15	85.7
<b>Quality and infrastructure</b>		
Quality and infrastructure	10	82.2
Average documents per researcher	84	87.1
Citations per document	30	35.3
Patent applications (per 100 billion GDP)	11	76.5
<b>Quality and infrastructure</b>		
Quality and infrastructure	10	82.2
Intellectual property receipts (% total trade)	24	22.0
Research design applications (per 100 billion GDP)	18	36.1
PCT applications (per 100 billion GDP)	12	87.0
Firms producing new goods and services (%)	29	86



# AUSTRIA

	Rank	Value
<b>Consumer Innovation Adoption</b>	31	87.0
Treatment applications per 100 million GDP	39	42.0
Cultural goods exports (% exports)	53	-5
Printing and publishing output (% manufacturing output)	54	24.9
<b>Health</b>	55	55.3
<b>Trade</b>	61	26.7
Ratio of institutions' provisions	30	22.8
Depth of innovative companies	32	59.3
ISO 9001 quality certificates (% GDP)	40	30.0
ISO 14001 environmental certificates (% GDP)	34	24
<b>Energy</b>	67	69.0
CERO forecast from abroad (%)	30	29.0
Coal reserves per storage volume deals (% GDP)	45	15.5
Computer software spending (% GDP)	15	46.5
<b>Government Services</b>	66	69.0
New business density per thousand population	66	3.1
Firms with new products/services (%)	61	67.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	14	92
<b>Infrastructure</b>	45	81
<b>Coverage</b>	59	48.3
3G/4G mobile network coverage (% population)	62	81.7
Secure Internet servers per 1 million population	23	34.5
Investment in telecommunication services (% GDP)	101	12.8
<b>Speed</b>	41	49.2
Mobile upload and download speeds	66	47.9
Fixed-broadband upload and download speeds	47	17.4
Fixed-broadband subscriptions (by speed) per hundred people	36	56.1
<b>Availability</b>	3	56.4
Fixed broadband bandwidth (% Gbps per capita)	17	81.1
Mobile broadband basket (% Gbps per capita)	4	82.2
Internet and telephony competition	1	100
<b>Access</b>	26	58.3
<b>Subscriptions</b>	17	59.0
Active mobile-broadband subscriptions per fixed-line inhabitants	31	47
International Internet bandwidth per user	60	38.7
Households with Internet access at home (%)	30	80.6
<b>Skills and employment</b>	10	57.5
Individuals with standard ICT skills (%)	9	75.4
Tertiary graduates from ICT programmes (%)	69	32.0
ICT employment (%)	22	47.6
<b>Usage</b>	4	78.9
<b>Services</b>	4	82.5
Government online services	7	54.7
Fixed broadband Internet traffic per subscription	104	7.8
Mobile broadband Internet traffic per subscription	6	65.8
Internet users (%)	22	80.0
<b>Commerce</b>	10	71.2
ICT/FIT patent applications (per 100 million GDP)	24	84.5
E-participation	6	87.0
Internet activities by individuals (%)	1	88.9
Trade in digitally deliverable services (% total trade)	50	49.0
<b>ECONOMY</b>	13	68.4
<b>Economic Competitiveness</b>	11	71.4
<b>Efficiency of Investment</b>	14	72.1
Overhead capital formation (% GDP)	40	65.0
Logistics performance	4	73.7
Transport productive capacity	41	36.0
Building quality control	22	86.7

	Rank	Value
<b>Business Agility</b>	14	70.1
Ease of starting a business	101	83.2
Recovery recovery rate	16	86.0
Entrepreneurial employee activity rate	5	80.7
Growth of corporate transactions	13	85.7
<b>Employee activities</b>	25	72.3
<b>Trade and Investment</b>	22	73.0
Trade (% GDP)	37	47.5
High-technology trade (% total trade)	30	59.0
Market concentration	9	83.5
Market concentration	34	80.7
<b>Product Innovation</b>	10	73.1
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	140	20.1
Cost dynamics	1	100
<b>Financing and domestic value added</b>	24	81.0
<b>Financing and costs</b>	10	81.0
Domestic credit to private sector (% GDP)	30	55.5
IMRS financing gap (% GDP)	104	7.8
Tax and contribution rate (% profit)	120	56.8
Bank nonperforming loans (%)	22	84.0
<b>Unmet needs index</b>	11	81.4
Medium- and high-tech activities value added	22	53.2
Industry and services value added (% GDP)	37	86
Labour underutilization rate	42	79.0
Output per worker	13	46.1
<b>ENABLING ENVIRONMENT</b>	13	86.7
<b>Governance</b>	11	89.7
<b>Political environment</b>	14	83.1
Peace and stability	25	74.5
View and accountability	9	85.7
Quality of institutions	11	84.2
Rule of law	1	87.1
Control of corruption	16	80.0
Government effectiveness	13	84.7
<b>Socio-economic</b>	19	80.2
<b>Gender equity</b>	19	81.0
Female-to-male ratio in parliament	21	87.0
Female-to-male labour force participation	26	81.1
Female-to-male ratio in internal wage	64	50.0
<b>Gender equality</b>	13	81.4
Social protection coverage (% population)	15	85.0
Adult literacy rate	104	7.8
Youth not in employment, education or training (%)	10	80.0
<b>Standard of living</b>	11	81.1
Poverty headcount ratio (% population)	27	81.0
GDP per capita	13	49.0
<b>Health and environment</b>	12	72.1
<b>Health</b>	21	86
Universal health coverage	25	79
Healthy life expectancy (years)	23	83.8
Under-five mortality rate	19	85.7
<b>Environmental performance</b>	40	63.0
Renewable energy consumption (%)	50	35.1
Household footprint per capita	108	83.0
Natural hazard exposure	25	76

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# AZERBAIJAN

**GKI RANK** 96/154

**GKI SCORE** 44.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Azerbaijan is a modest performer in terms of its knowledge infrastructure. It ranks 96th out of 154 countries in the Global Knowledge Index 2021 and 32nd out of the 39 countries with high human development.

### KEY INDICATORS

**GDP US\$ billions** 138.505  
**Population** 10,139,175  
**HDI** 0.756

### AREAS OF STRENGTH

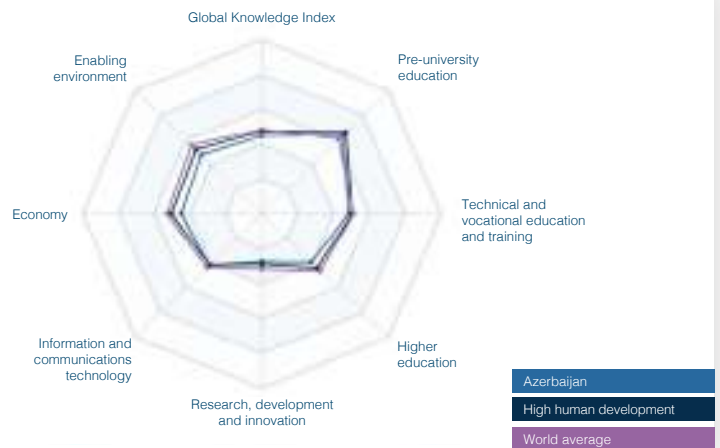
- + Net enrolment rate in upper secondary education
- + Firms with new product/service (%)
- + Ease of starting a business
- + Poverty headcount ratio (% population)
- + Enrolment in vocational education, gender parity

### AREAS OF IMPROVEMENT

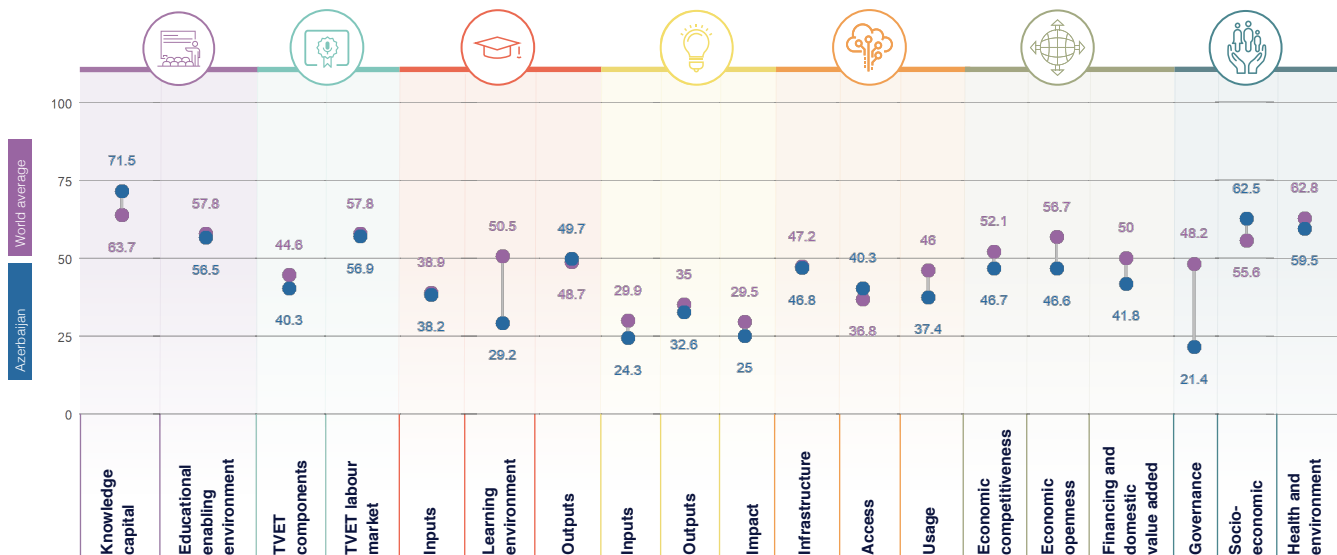
- Ratio of medium-skill TVET occupations earnings to average wage
- GERD performed by business enterprises (%)
- Cultural goods exports (% exports)
- GERD financed from abroad (%)
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	86	64
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	85	48.6
HIGHER EDUCATION	109	39
RESEARCH, DEVELOPMENT AND INNOVATION	97	27.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	80	41.5
ECONOMY	116	45
ENABLING ENVIRONMENT	105	47.8



## GKI PILLARS





# AZERBAIJAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	71	71.3
Enrolment	88	88.1
Net enrolment rate in primary education	100	100.0
Net enrolment rate in lower secondary education	23	99.1
Net enrolment rate in upper secondary education	1	100
Completion	28	82.9
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	19	54.3
Success rate rate in the last grade of lower secondary education	21	61.8
Completion	80	42.0
Assessment of 15-year-old students in math, science and reading	63	27.6
Learning-adjusted years of schooling	75	57.3
<b>Educational enabling environment</b>		
Expenditure	113	10.0
Government expenditure on primary education (% GDP)	128	11.3
Government expenditure on secondary education (% GDP)	79	24.2
Government funding per primary student (% GDP per capita)	98	18.9
Government funding per secondary student (% GDP per capita)	80	19.0
Resources	81	80.3
Pupil-based teacher ratio in primary education	30	81.3
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	41	86.0
Schools with access to computers in secondary education (%)	44	89.6
Early learning	33	83.0
Class attendance rate in early childhood education	99	34.0
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	30	87.0
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Companies training apprentices	110	41.8
Firms offering formal training (%)	55	41.8
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET enrolment	81	40.0
Government expenditure on vocational education (%)	79	9
Share of students enrolled in secondary vocational programmes	81	20.0
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	110	30.4
Extent of staff training	30	89.8
Quality of vocational training	41	50.4
Ratio of high-skil TVET occupations earnings to average wage	116	116
Ratio of median-skil TVET occupations earnings to average wage	116	8
<b>TVET labour market</b>		
Efficiency of the labour market	41	22.0
Firms considered with inequality educated workforce (%)	19	87.1
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	100	27.1
Unemployment rate with vocational education	20	88.0
Real TVET unemployment	107	29.0
Share of TVET occupations	104	42.0
Manufacturing employment (%)	102	76.1
Quality and infrastructure	30	76.4
Enrolment in vocational education, gender parity	8	50.1
Useable employment rate	117	40.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	100	11.1
Government expenditure per tertiary student	73	11.4
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	87	11.0
Enrolment in bachelor's or equivalent level (%)	83	38
Enrolment in masters, doctoral or equivalent (%)	79	9.8
Resources	9	88.0
Rp/teacher ratio in tertiary education	17	88.0
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
Directly paid academic freedom	110	29.0
Teachers in tertiary education, gender parity	54	31.0
Labour mobility rate	77	8.0
Academic freedom	144	7.0
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Retention	41	38.0
Educational attainment rate, bachelor's or equivalent	55	39.0
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	19	80.0
University tertiary collaboration in R&D	22	88.0
UNITE indicators per 100 personnel in higher education	116	116
<b>Entrepreneurship, innovation and services trade</b>		
<b>Inputs</b>		
Access to credit facilities	110	18.1
GDP (% GDP)	86	5.8
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	29	44.8
<b>Quality of innovation environment</b>		
GERD performed by business enterprises (%)	87	9
GERD financed by business enterprises (%)	50	38.1
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	21.7
Quality of innovation environment	110	18.1
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	134	9
State of cluster development	28	58.0
<b>Outputs</b>		
Access to credit facilities	110	18.1
Average documents per researcher	116	116
Citations per document	18	47.0
Patent applications (per 100 billion GDP)	70	45.2
<b>Infrastructure and innovation ecosystem</b>		
Intellectual property receipts (% total trade)	117	9
Research design applications (per 100 billion GDP)	97	1.3
PCT applications (per 100 billion GDP)	50	40.0
Firms producing new goods and services (%)	88	28.0



# AZERBAIJAN

	Rank	Value
<b>Consumer electronics</b>	100	0.3
Treatment applications per 100 million GDP	70	19.0
Cultural goods exports (% exports)	143	0
Printing and publishing output (% manufactured output)	83	23.0
<b>Energy</b>	95	33
<b>Energy</b>	95	33
Renewable investment percentage	76	10.6
Depth of innovative companies	21	64.1
ISO 9001 quality certificates (% GDP)	93	7.3
ISO 14001 environmental certificates (% GDP)	81	4.4
<b>Environment</b>	100	0.0
CERO forecast from abroad (%)	100	0
Cost savings per strategic alliance deals (% GDP)	93	5.8
Computer software spending (% GDP)	90	0.1
<b>Government services</b>	95	10.1
New business density per thousand population	80	0.2
Firms with new products/services (%)	4	86.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	80	41.2
<b>Infrastructure</b>	78	46.3
<b>Coverage</b>	80	41.2
3G/4G mobile network coverage (% population)	70	64.3
Secure Internet servers per 1 million population	82	5.1
Investment in telecommunication services (% GDP)	60	21.0
<b>Quality</b>	71	30.0
Mobile upload and download speeds	81	30
Fixed broadband upload and download speeds	80	10
Fixed broadband subscriptions (by speed) per hundred people	79	13.6
<b>Availability</b>	75	26.0
Fixed broadband latency (% QM per capita)	81	62.7
Mobile broadband basket (% QM per capita)	72	80
Internet and telephony competition	90	50.0
<b>Access</b>	68	40.3
<b>Subscribers</b>	81	30.0
Active mobile broadband subscriptions per hundred inhabitants	80	31.4
International Internet bandwidth per user	71	40.1
Households with Internet access at home (%)	61	79.0
<b>Skills and employment</b>	80	30.4
Individuals with standard ICT skills (%)	60	16.7
Tertiary graduates from ICT programmes (%)	29	44.0
ICT employment (%)	104	19
<b>Usage</b>	89	27.4
<b>Services</b>	87	40.0
Government online services	84	70.0
Fixed broadband Internet traffic per subscriber	88	3.8
Mobile broadband Internet traffic per subscriber	82	6.1
Internet users (%)	81	60.1
<b>Commerce</b>	110	31.0
ICT/FIT patent applications (per 100,000 GDP)	60	22.0
E-participation	70	69.1
Internet activities by individuals (%)	79	0
Trade in digitally deliverable services (% total trade)	70	30.7
<b>ECONOMY</b>	71	40
<b>Economic Competitiveness</b>	97	46.7
<b>Infrastructure Investment</b>	80	40.0
Overhead capital formation (% GDP)	80	81.4
Logistics performance	113	36.0
Transport productive capacity	108	20
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	100	40.1
Ease of starting a business	1	99.2
Recovery recovery rate	66	45.1
Entrepreneurial employee activity rate	106	19
Growth of corporate transactions	118	0
<b>Customer experience</b>	114	40.0
Trust and dissatisfaction	142	40.0
Tax (% GDP)	75	28.0
High-technology trade (% total trade)	110	34.1
Market concentration	148	27.0
Market concentration	60	60.0
Product diversity	90	40.7
Climate financial openness	77	46.4
Foreign direct investment, net inflows (% GDP)	31	49.7
Cost dynamics	80	50
<b>Financing and domestic value added</b>	118	41.0
<b>Financing and costs</b>	111	20.0
Domestic credit to private sector (% GDP)	110	0
MSME financing gap (% GDP)	34	70
Tax and contribution rate (% profit)	80	86.7
Bank nonperforming loans (%)	104	19
Unmet loan demand	114	31.1
Medium and high-tech activities value added	97	16.0
Industry and services value added (% GDP)	70	82.1
Labour underutilization rate	103	42.1
Output per worker	87	11.8
<b>ENABLING ENVIRONMENT</b>	146	47.8
<b>Governance</b>	132	21.4
Political environment	142	10.7
Peace and stability	117	21.7
View and accountability	146	0.8
Quality of institutions	110	20
Rule of law	116	26
Control of corruption	133	16.0
Government effectiveness	85	61.7
<b>Socio-economic</b>	54	62.0
Gender equity	85	68.1
Female-to-male ratio in parliament	100	22.0
Female-to-male labour force participation	96	88.6
Female-to-male ratio in internal wage	85	62.0
Gender inequality	80	67.0
Social protection coverage (% population)	74	37.0
Adult literacy rate	0	86.7
Youth not in employment, education or training (%)	75	64.0
<b>Standard of living</b>	81	67.1
Poverty headcount ratio (% population)	0	62.0
GDP per capita	73	11.8
<b>Health and environment</b>	108	50.0
Health	88	21.0
Universal health coverage	80	60
Healthy life expectancy (years)	86	60
Under-five mortality rate	94	84
Environmental performance	100	47.0
Renewable energy consumption (%)	108	0
Household footprint per capita	80	88.8
Natural hazard exposure	86	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BAHRAIN

**GKI RANK** 55/154

**GKI SCORE** 52.2

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Bahrain is a strong performer in terms of its knowledge infrastructure. It ranks 55th out of 154 countries in the Global Knowledge Index 2021 and 51st out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Vulnerable employment rate
- + Households with Internet access at home (%)
- + Internet users (%)
- + Mobile broadband Internet traffic per subscription
- + Researchers in higher education (%)

### AREAS OF IMPROVEMENT

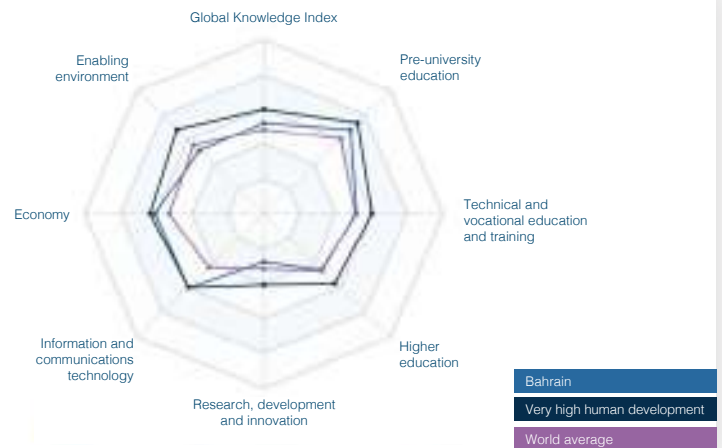
- Academic freedom
- Renewable energy consumption (%)
- Researchers in business enterprises (%)
- Ecological footprint per capita
- Enrolment in vocational education, gender parity

### KEY INDICATORS

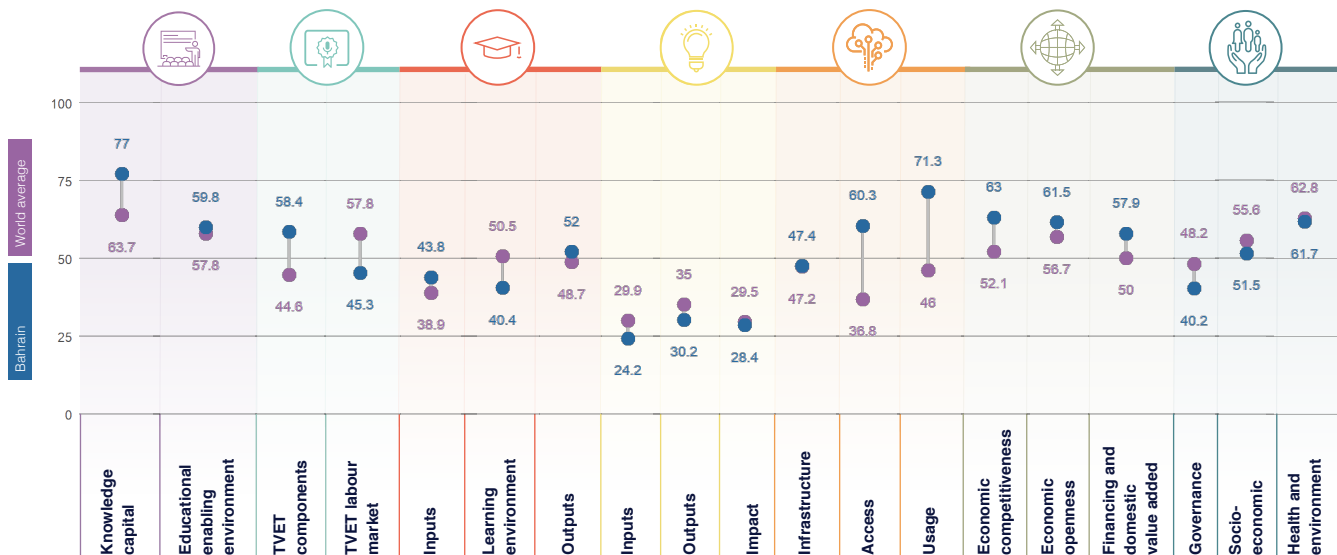
**GDP US\$ billions** 69.651  
**Population** 1,701,583  
**HDI** 0.852

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	68	68.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	76	51.8
HIGHER EDUCATION	76	45.4
RESEARCH, DEVELOPMENT AND INNOVATION	94	27.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	30	59.6
ECONOMY	43	60.8
ENABLING ENVIRONMENT	91	51.1



## GKI PILLARS





# BAHRAIN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	88	88.4
Enrollment	83	77
Net enrolment rate in primary education	99	92.9
Net enrolment rate in lower secondary education	99	94.8
Net enrolment rate in upper secondary education	97	85.4
Completion	79	75.2
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	100	100
Success rate rate in the last grade of lower secondary education	99	77.1
Completion	99	80.8
Assessment of 15-year-old students in math, science and reading	100	100
Learning-adjusted years of schooling	47	65.8
<b>Educational enabling environment</b>	<b>79</b>	<b>86.8</b>
Expenditure	100	122.5
Government expenditure on primary education (% GDP)	119	16.3
Government expenditure on secondary education (% GDP)	88	16.3
Government funding per primary student (% GDP per capita)	82	26.6
Government funding per secondary student (% GDP per capita)	75	26.1
Resources	92	80
Pupil-based teacher ratio in primary education	90	55.9
Pupil-based teacher ratio in secondary education	9	86.1
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	83	83
Class attendance rate in early childhood education	88	84.3
Proportion of children who are developmentally on track	100	100
Proportion of children with stimulating home learning environments	100	100
Pupil-based teacher ratio in preprimary education	88	83.7
Quality and infrastructure	100	100
Completion rate in upper secondary education, gender parity	100	100
Completion rate in upper secondary education, wealth parity	100	100
Completion rate in upper secondary education, location parity	100	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>85</b>	<b>88.4</b>
Communications training and learning	100	100
Firms offering formal training (%)	100	100
Labour force with short-cycle tertiary education (%)	100	100
Participation rate in formal and non-formal education and training	100	100
TVET resources	99	100.5
Government expenditure on vocational education (%)	100	100
Share of students enrolled in secondary vocational programmes	99	10.8
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	91	81.3
Extent of staff training	29	81.9
Quality of vocational training	31	81
Ratio of high-skill TVET occupations earnings to average wage	100	100
Ratio of median-skill TVET occupations earnings to average wage	100	100
<b>TVET labour market</b>	<b>120</b>	<b>88.3</b>
Efficiency of the labour market	100	100
Firms considered with inequality educated workforce (%)	100	100
Employment educational mismatch (%)	100	100
Proportion of skilled production workers	100	100
Unemployment rate with vocational education	100	100
High TVET unemployment	110	110.2
Share of TVET occupations	120	24.7
Manufacturing employment (%)	88	29.7
Quality and infrastructure	100	100
Enrollment in vocational education, gender parity	119	15.7
Useable employment rate	2	80.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>88</b>	<b>83.8</b>
Expenditure	99	39.9
Government expenditure per tertiary student	28	36.0
Teaching staff compensation (% tertiary expenditure)	100	100
Enrollment	99	20.7
Enrollment in bachelor's or equivalent level (%)	80	33.8
Enrollment in masters, doctoral or equivalent (%)	88	6.8
Resources	99	73.7
Rap teacher ratio in tertiary education	100	56.9
Researchers in higher education (%)	4	80.8
<b>Learning environment</b>	<b>716</b>	<b>83.4</b>
<b>Quality and academic freedom</b>	<b>100</b>	<b>41.8</b>
Teachers in tertiary education, gender parity	99	32.8
Labour mobility rate	17	40
Academic freedom	100	6.1
<b>Quality and infrastructure</b>	<b>100</b>	<b>100</b>
Class attendance rate in tertiary education, gender parity	100	100
Class attendance rate in tertiary education, wealth parity	100	100
Class attendance rate in tertiary education, location parity	100	100
<b>Outputs</b>	<b>88</b>	<b>82</b>
<b>Attainment</b>	<b>92</b>	<b>88.9</b>
Educational attainment rate, bachelor's or equivalent	99	89.8
Educational attainment rate, master's or equivalent	98	7.8
Educational attainment rate, doctoral or equivalent	49	12.7
Employment	1	89.8
Labour force participation rate with advanced education	100	100
Unemployment rate with advanced education	11	84.9
<b>Impact</b>	<b>99</b>	<b>34.8</b>
University tertiary enrollment in R&D	99	38.8
OECD students per 1000 personnel in higher education	99	31.8
<b>Government expenditure and economic data</b>		
<b>Inputs</b>	<b>99</b>	<b>14.2</b>
Government expenditure	99	100
GDP (% GDP)	100	1.8
GERD per researcher	44	28.2
Researchers per thousand labour force	77	4
Tertiary graduates from STEM programmes (%)	99	28.8
<b>Quality and infrastructure</b>	<b>100</b>	<b>100</b>
GERD performed by business enterprises (%)	79	0.8
GERD financed by business enterprises (%)	83	28.9
Researchers in business enterprises (%)	83	0.1
Firms that spend on R&D (%)	100	100
<b>Quality and infrastructure</b>	<b>99</b>	<b>100</b>
High-skill employment (%)	100	100
Intellectual property payments (% total trade)	100	100
State of cluster development	11	55.9
<b>Outputs</b>	<b>99</b>	<b>100.2</b>
<b>Quality and infrastructure</b>	<b>100</b>	<b>100</b>
Average documents per researcher	23	89
Citations per document	98	17.1
Patent applications (per 100 billion GDP)	100	30.8
<b>Quality and infrastructure</b>	<b>100</b>	<b>100</b>
Intellectual property receipts (% total trade)	100	100
Research design applications (per 100 billion GDP)	100	1
PCT applications (per 100 billion GDP)	100	30.5
Firms producing new goods and services (%)	100	100



# BAHRAIN

	Rank	Value		Rank	Value
<b>Consumer Innovation Adoption</b>			<b>Business Agility</b>		
Treatment applications per 100 million GDP	115	2.8	Ease of starting a business	80	89.6
Cultural goods exports (% exports)	27	34.9	Recovery recovery rate	59	44.8
Printing and publishing output (% manufactured output)	30	30	Entrepreneurial employee activity rate	106	19
<b>Energy</b>	<b>85</b>	<b>25.3</b>	Growth of corporate transactions	79	57.1
<b>Energy</b>	<b>85</b>	<b>25.3</b>	<b>Employee activities</b>	<b>87</b>	<b>61.5</b>
Renewable investment penetration	119	4.8	Trade and investment	42	67.7
Depth of innovative companies	35	57.4	Trade (% GDP)	14	81.5
ISO 9001 quality certificates (% GDP)	46	26.5	High-technology trade (% total trade)	82	44.1
ISO 14001 environmental certificates (% GDP)	42	19.1	Market concentration	100	89
<b>Finance</b>	<b>107</b>	<b>10.1</b>	Market concentration	88	81.4
CERD received from abroad (%)	37	23.7	Product ownership	90	87.2
Bank returns per strategic finance deals (% GDP)	8	35.3	Charitable financial openness	1	168
Computer software spending (% GDP)	28	20.5	Foreign direct investment, net inflows (% GDP)	115	35
<b>Government Services</b>	<b>107</b>	<b>10.1</b>	Gov dynamics	122	36.6
New business density per thousand population	47	15.4	<b>Financing and domestic value added</b>	<b>38</b>	<b>57.2</b>
Firms with new products/services (%)	106	19	Financing and loans	52	61.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>84</b>	<b>58.8</b>	Domestic credit to private sector (% GDP)	47	27.7
<b>Infrastructure</b>	<b>78</b>	<b>47.4</b>	MSME financing gap (% GDP)	106	19
<b>Coverage</b>	<b>89</b>	<b>43.5</b>	Tax and contribution rate (% profit)	1	84.1
3G/4G mobile network coverage (% population)	1	100	Bank nonperforming loans (%)	106	19
Secure Internet servers per 1 million population	85	3.8	Unexcused leave taken	90	89
Investment in telecommunication services (% GDP)	82	27.2	Medium- and high-tech activities value added	88	26.7
<b>Quality</b>	<b>71</b>	<b>21.4</b>	Industry and services value added (% GDP)	6	82.8
Mobile upload and download speeds	33	34.4	Labour underutilization rate	46	71.5
Fixed broadband upload and download speeds	65	0.4	Output per worker	30	31.7
Fixed broadband subscriptions (y-speed) per hundred people	76	18.5	<b>ENABLING ENVIRONMENT</b>	<b>81</b>	<b>81.5</b>
<b>Availability</b>	<b>101</b>	<b>17.1</b>	<b>Governance</b>	<b>88</b>	<b>40.2</b>
Fixed broadband bandwidth (% Gbps per capita)	37	80.8	Political environment	122	17.3
Mobile broadband basket (% Gbps per capita)	80	80	Peace and stability	110	25.8
Internet and telephony competition	85	81.7	View and accountability	142	3.4
<b>Access</b>	<b>47</b>	<b>68.3</b>	Quality of institutions	55	65
<b>Subscriptions</b>	<b>11</b>	<b>81.0</b>	Rule of law	48	87.8
Active mobile-broadband subscriptions per hundred inhabitants	28	46.1	Control of corruption	60	53.4
International Internet bandwidth per user	11	81.8	Government effectiveness	87	88.8
Households with Internet access at home (%)	3	89.8	<b>Socio-economic</b>	<b>89</b>	<b>51.5</b>
<b>Skills and employment</b>	<b>25</b>	<b>80.8</b>	Gender equity	118	25
Individuals with standard ICT skills (%)	15	88.7	Female-to-male ratio in parliament	122	17.8
Tertiary graduates from ICT programmes (%)	84	32.5	Female-to-male labour force participation	122	67.4
ICT employment (%)	106	19	Female-to-male ratio in internal wage	1	100
<b>Usage</b>	<b>12</b>	<b>71.3</b>	Gender inequality	82	82.0
<b>Services</b>	<b>6</b>	<b>71.5</b>	Social protection coverage (% population)	45	85.1
Government online services	44	35.8	Adult literacy rate	106	19
Fixed broadband Internet traffic per subscription	10	49.5	Youth not in employment, education or training (%)	86	57.8
Mobile broadband Internet traffic per subscription	4	86.4	Standard of living	86	38.7
Internet users (%)	3	89.5	Poverty headcount ratio (% population)	106	19
<b>Connectivity</b>	<b>21</b>	<b>81.1</b>	GDP per capita	28	29.7
ICT FDI posted applications (per 100,000 GDP)	106	19	<b>Health and environment</b>	<b>83</b>	<b>61.7</b>
E-participation	80	77.4	Health	81	81.7
Internet activities by individuals (%)	39	84.8	Universal health coverage	34	77
Trade in digitally deliverable services (% total trade)	27	81.2	Healthy life expectancy (years)	89	72.8
<b>ECONOMY</b>	<b>43</b>	<b>60.8</b>	Under-five mortality rate	45	85.7
<b>Economic Competitiveness</b>	<b>33</b>	<b>63</b>	Economic and performance	122	41.8
Manufacturing investment	11	82.2	Renewable energy consumption (%)	102	8
Overhead capital formation (% GDP)	22	80.8	Household budget per capita	147	23.9
Logistics performance	56	48.4	Natural hazard exposure	4	81
Transport productive capacity	11	89			
Building quality control	47	80			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 120/154

**GKI SCORE** 38.1

**WORLD AVERAGE** 48.4

# BANGLADESH

## KEY INDICATORS

**GDP US\$ billions** 793.489  
**Population** 164,689,383  
**HDI** 0.632

## COUNTRY PERFORMANCE SUMMARY

Bangladesh is a modest performer in terms of its knowledge infrastructure. It ranks 120th out of 154 countries in the Global Knowledge Index 2021 and 18th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

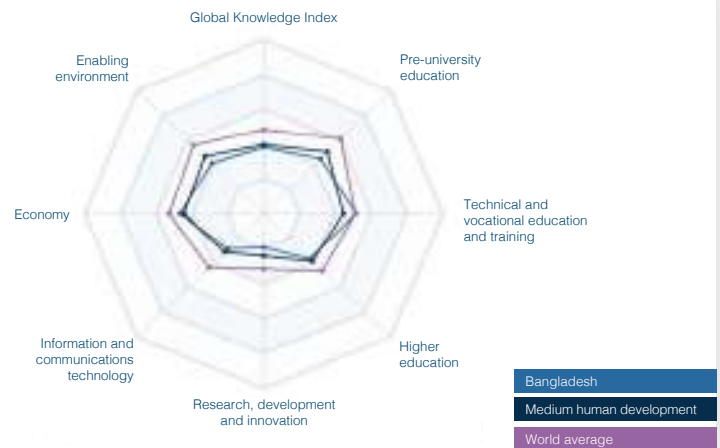
- + Ecological footprint per capita
- + Labour force with short-cycle tertiary education (%)
- + Gross attendance ratio for tertiary education, wealth parity
- + Gross fixed capital formation (% GDP)
- + Teaching staff compensation (% tertiary expenditure)

### AREAS OF IMPROVEMENT

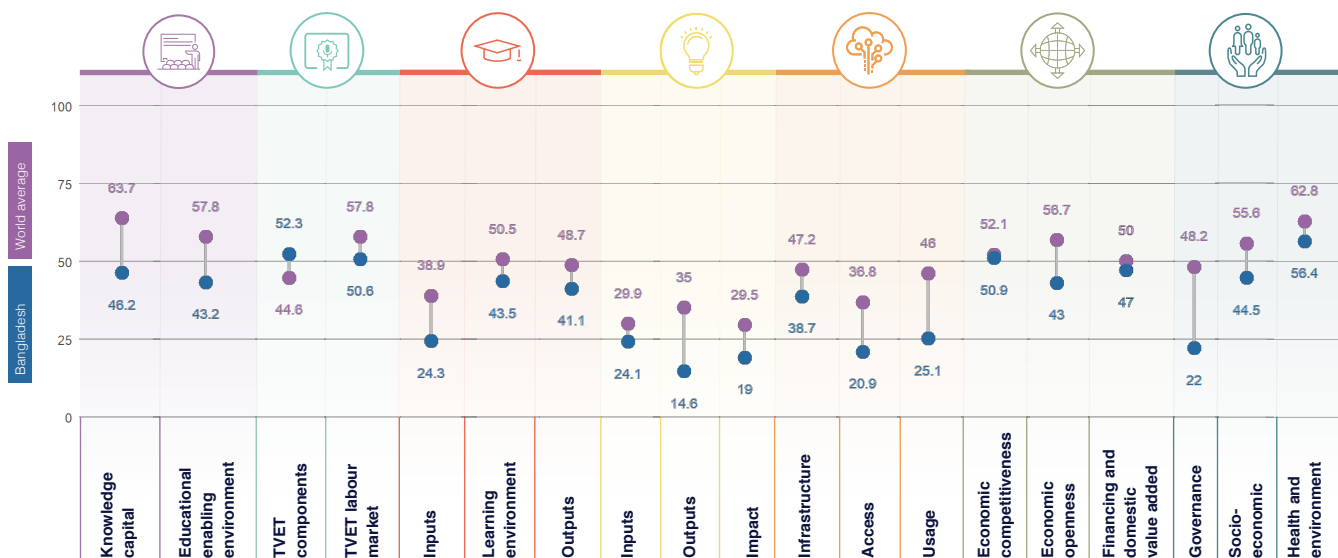
- Printing and publishing output (% manufactured output)
- ICT PCT patent applications (per 100 billion GDP)
- New business density per thousand population
- PCT applications (per 100 billion GDP)
- Natural hazard exposure

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	119	44.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	77	51.5
HIGHER EDUCATION	122	36.3
RESEARCH, DEVELOPMENT AND INNOVATION	136	19.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	117	28.3
ECONOMY	101	46.9
ENABLING ENVIRONMENT	134	41



## GKI PILLARS





# BANGLADESH

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	118	44.7
Enrollment	122	86.3
Net enrolment rate in primary education	101	87.3
Net enrolment rate in lower secondary education	106	79
Net enrolment rate in upper secondary education	105	57.3
Completion	122	45.5
Years of compulsory education in primary and secondary	148	38.5
Completion rate in upper secondary education	100	25.0
Success rate rate in the last grade of lower secondary education	72	71.7
Completion	100	33.7
Assessment of Grade 6 students in math, science and reading	106	106
Learning-adjusted years of schooling	113	35.7
<b>Educational enabling environment</b>	118	45.3
Expenditure	122	13.1
Government expenditure on primary education (% GDP)	104	32
Government expenditure on secondary education (% GDP)	109	12.5
Government funding per primary student (% GDP per capita)	104	108
Government funding per secondary student (% GDP per capita)	114	4.7
Resources	100	33.2
Pupil-based teacher ratio in primary education	87	41.7
Pupil-based teacher ratio in secondary education	75	38.8
Schools with access to computers in primary education (%)	65	41.7
Schools with access to computers in secondary education (%)	85	78.5
Early learning	100	51.0
Class attendance rate in early childhood education	79	36.1
Proportion of children who use developmentally apt toys	34	83.8
Proportion of children who are stimulating toys learning environments	81	55.8
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	111	83.7
Completion rate in upper secondary education, gender parity	75	80.8
Completion rate in upper secondary education, wealth parity	80	34.1
Completion rate in upper secondary education, location parity	64	77.8
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	88	33.3
Companies training apprentices	41	31.5
Firms offering formal training (%)	85	35.8
Labour force with short-cycle tertiary education (%)	8	87.8
Participation rate in formal and non-formal education and training	106	106
TVET resources	100	100
Government expenditure on vocational education (%)	104	104
Share of students enrolled in secondary vocational programmes	100	8
Share of students enrolled in postsecondary vocational programmes	1	108
TVET quality and infrastructure	111	46.1
Extent of staff training	108	34.7
Quality of vocational training	122	35.4
Ratio of high-skil TVET occupations earnings to average wage	21	83.8
Ratio of medium-skill TVET occupations earnings to average wage	31	52.5
<b>TVET labour market</b>	111	88.8
Efficiency of the labour market	100	33.0
Firms considered with inappropriately educated workforce (%)	89	71.7
Employment educational mismatch (%)	85	42
Proportion of skilled production workers	87	82.8
Unemployment rate with vocational education	84	34.4
Real TVET unemployment	111	31.5
Share of TVET occupations	100	43.7
Manufacturing employment (%)	40	81.4
Quality and infrastructure	108	45.7
Enrollment in vocational education, gender parity	105	56.4
Useable employment rate	118	43

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	128	34.3
Expenditure	81	33.8
Government expenditure per tertiary student	112	32
Teaching staff compensation (% tertiary expenditure)	12	82.8
Enrollment	100	11
Enrollment in bachelor's or equivalent level (%)	88	13.7
Enrollment in masters, doctoral or equivalent (%)	82	3.3
Resources	108	33
Pupil-teacher ratio in tertiary education	104	38
Researchers in higher education (%)	106	106
<b>Learning environment</b>	101	43.3
<b>Quality and academic freedom</b>	101	33.8
Teachers in tertiary education, gender parity	88	26.4
Labour mobility rate	106	106
Academic freedom	122	26.3
<b>Equity and inclusiveness</b>	100	64.1
Class attendance rate in tertiary education, gender parity	54	78.8
Class attendance rate in tertiary education, wealth parity	8	87.7
Class attendance rate in tertiary education, location parity	25	84
<b>Outputs</b>	100	47.1
<b>Attainment</b>	101	33
Educational attainment rate, bachelor's or equivalent	63	35.8
Educational attainment rate, master's or equivalent	42	21.7
Educational attainment rate, doctoral or equivalent	54	11.7
<b>Employment</b>	111	33.8
Labour force participation rate with advanced education	41	78.1
Unemployment rate with advanced education	82	88.8
<b>Impact</b>	101	26.8
University tertiary enrollment in R&D	104	26.4
CRISIS documents per 100 personnel in higher education	106	106
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	100	34.7
Government R&D expenditure	111	100
GDP (% GDP)	106	106
GERD per researcher	106	106
Researchers per thousand labour force	104	106
Tertiary graduates from STEM programmes (%)	112	28.8
<b>Quality of innovation environment</b>	100	33.1
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	27	35.1
<b>Quality of business environment</b>	100	33.3
High-skilled employment (%)	88	13.2
Intellectual property payments (% total trade)	108	5.8
State of digital development	83	43.8
<b>Outputs</b>	108	18.8
<b>Quality of innovation environment</b>	108	33.3
Average documents per researcher	106	106
Citations per document	38	21.8
Patent applications (per 100 billion GDP)	128	13.4
<b>Quality of business environment</b>	100	33.3
Intellectual property receipts (% total trade)	82	3.7
Research and development expenditure (per 100 billion GDP)	88	8.8
PCT applications (per 100 billion GDP)	137	3.7
Firms producing new goods and services (%)	73	28.4





# BANGLADESH

	Rank	Value
<b>Consumer Electronics</b>		
Telemark applications per 100 million GDP	100	3.8
Cultural goods exports (% exports)	115	3.4
Printing and publishing output (% manufactured output)	106	1.8
<b>Energy</b>	120	30
<b>Trade</b>	85	31.3
Ratio of institutions' provisions	80	19.8
Depth of innovative companies	92	43.0
ISO 9001 quality certificates (% GDP)	109	2.1
ISO 14001 environmental certificates (% GDP)	117	3.2
<b>Finance</b>	100	31.0
CERD received from abroad (%)	106	11.8
Joint ventures per strategic industry deals (% GDP)	89	5.5
Computer software spending (% GDP)	74	15.1
<b>Government Services</b>	100	31.0
New business density per thousand population	104	0.1
Firms with one or more advisers (%)	89	58.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	117	25.2
<b>Infrastructure</b>	188	36.2
<b>Coverage</b>	80	42.9
3G/4G mobile network coverage (% population)	88	87
Secure Internet servers per 1 million population	105	2
Investment in telecommunication services (% GDP)	79	30
<b>Quality</b>	100	31.1
Mobile upload and download speeds	188	3.2
Fixed broadband upload and download speeds	95	12.6
Fixed broadband subscriptions (y speed) per hundred people	86	6.4
<b>Availability</b>	100	31.0
Fixed broadband latency (% QM per capita)	89	76.1
Mobile broadband basket (% QM per capita)	81	54.0
Internet and telephony competition	112	80.2
<b>Access</b>	114	26.8
<b>Subscribers</b>	100	31.0
Active mobile-broadband subscriptions per fixed-line inhabitants	106	22.6
International Internet bandwidth per user	80	42.4
Households with Internet access at home (%)	100	31.0
<b>Skills and employment</b>	100	31.0
Individuals with standard ICT skills (%)	106	19
Tertiary graduates from ICT programmes (%)	100	13.2
ICT employment (%)	117	2.1
<b>Usage</b>	122	20.5
<b>Services</b>	100	31.0
Government online services	87	81.2
Fixed broadband Internet traffic per subscriber	76	9.2
Mobile broadband Internet traffic per subscriber	87	7.4
Internet users (%)	146	6.1
<b>Commerce</b>	100	31.0
ICT FDI parent applications (per 100 million GDP)	111	14
E-participation	82	87.3
Internet activities by individuals (%)	106	19
Trade in digitally deliverable services (% total trade)	107	15.1
<b>ECONOMY</b>	101	66.3
<b>Economic Competitiveness</b>	81	50.0
<b>Infrastructure Investment</b>	75	41.4
Overhead capital formation (% GDP)	14	21.6
Logistics performance	66	39.4
Transport productive capacity	106	20.2
Building quality control	80	80.7

	Rank	Value
<b>Business Agility</b>	81	32.0
Time of starting a business	113	82.4
Recovery recovery time	100	31.0
Entrepreneurial employee activity rate	106	19
Growth of corporate transactions	89	42.0
<b>Business operations</b>	128	4.0
<b>Trade and investment</b>	111	20.0
Trade (% GDP)	140	9.7
High-technology trade (% total trade)	34	90
Market concentration	118	80.4
Market concentration	43	83
<b>Product Innovation</b>	100	31.0
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	107	31.6
Cost dynamics	81	59
<b>Financing and domestic value added</b>	83	47
<b>Financing and costs</b>	100	31.0
Domestic credit to private sector (% GDP)	85	16.5
MSME financing gap (% GDP)	79	80.4
Tax and contribution rate (% profit)	86	34.2
Bank nonperforming loans (%)	81	67.4
<b>Unmet needs index</b>	100	31.0
Medium- and high-tech activities value added	118	6.6
Industry and services value added (% GDP)	79	81.0
Labour underutilization rate	38	86.7
Output per worker	124	4.1
<b>ENABLING ENVIRONMENT</b>	134	41
<b>Governance</b>	138	22
<b>Political environment</b>	123	21.0
Peace and stability	127	40
View and accountability	118	26.8
Quality of institutions	127	22.5
Rule of law	108	30.6
Control of corruption	122	16.8
Government effectiveness	128	20.2
<b>Socio-economic</b>	117	46.3
<b>Gender equity</b>	100	42.1
Female-to-male ratio in parliament	86	26.4
Female-to-male labour force participation	128	38.4
Female-to-male ratio in internal wage	100	62.0
<b>Gender equality</b>	80	31.0
Social protection coverage (% population)	106	19
Adult literacy rate	86	87.7
Youth not in employment, education or training (%)	110	44.1
<b>Standard of living</b>	86	31
Poverty headcount ratio (% population)	72	80.2
GDP per capita	118	3.7
<b>Health and environment</b>	126	56.4
<b>Health</b>	100	31.0
Universal health coverage	121	40
Healthy life expectancy (years)	86	87.2
Under-five mortality rate	100	75
<b>Environmental performance</b>	100	49.0
Renewable energy consumption (%)	81	21.0
Household footprint per capita	11	88.2
Natural hazard exposure	102	81

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 62/154

**GKI SCORE** 50.8

**WORLD AVERAGE** 48.4

# BARBADOS

## COUNTRY PERFORMANCE SUMMARY

Barbados is a strong performer in terms of its knowledge infrastructure. It ranks 62nd out of 154 countries in the Global Knowledge Index 2021 and 57th out of the 61 countries with very high human development.

## KEY INDICATORS

**GDP US\$ billions** 3,698  
**Population** 287,371  
**HDI** 0.814

## AREAS OF STRENGTH

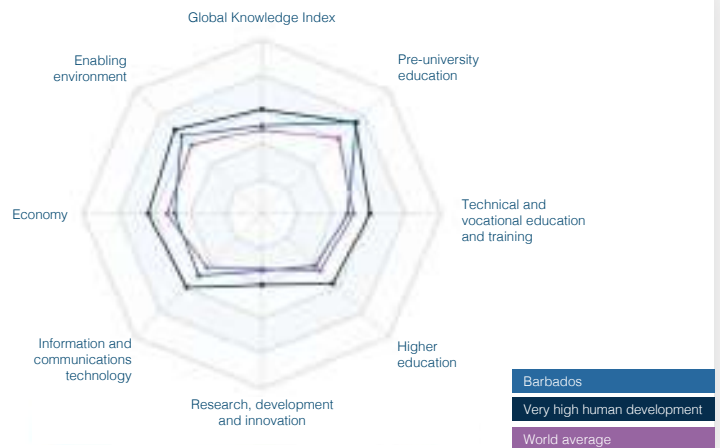
- + ICT PCT patent applications (per 100 billion GDP)
- + PCT applications (per 100 billion GDP)
- + Gross attendance ratio for tertiary education, wealth parity
- + Peace and stability
- + Cultural goods exports (% exports)

## AREAS OF IMPROVEMENT

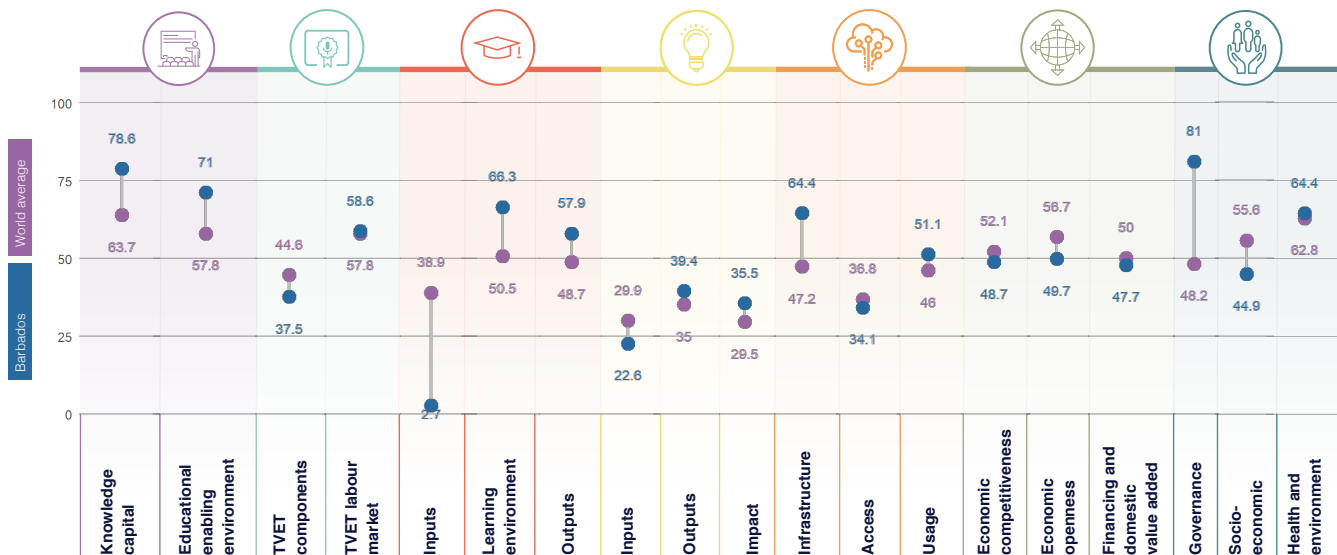
- Growth of innovative companies
- Share of students enrolled in post-secondary vocational programmes
- Mobile broadband Internet traffic per subscription
- Chinn-Ito financial openness
- Teaching staff compensation (% tertiary expenditure)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	39	74.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	87	48
HIGHER EDUCATION	89	42.3
RESEARCH, DEVELOPMENT AND INNOVATION	60	32.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	59	49.9
ECONOMY	94	48.7
ENABLING ENVIRONMENT	44	63.4



## GKI PILLARS







# BARBADOS

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	48	74.8
Enrollment	100	73.0
Net enrolment rate in primary education	100	92.4
Net enrolment rate in lower secondary education	84	85.0
Net enrolment rate in upper secondary education	46	84.4
Completion	52	81.1
Years of compulsory education in primary and secondary	28	83.0
Completion rate in upper secondary education	30	84.0
Success rate rate in the last grade of lower secondary education	88	83.0
Completion	114	114
Assessment of Trinidad students in math, science and reading	114	114
Learning-adjusted years of schooling	114	114
<b>Educational enabling environment</b>	<b>39</b>	<b>71</b>
Enrollment	60	73.0
Government expenditure on primary education (% GDP)	57	25.1
Government expenditure on secondary education (% GDP)	73	25.2
Government funding per primary student (% GDP per capita)	25	52.0
Government funding per secondary student (% GDP per capita)	30	59.4
Resources	71	51.1
Pupil-based teacher ratio in primary education	25	90
Pupil-based teacher ratio in secondary education	60	88.0
Schools with access to computers in primary education (%)	114	114
Schools with access to computers in secondary education (%)	114	114
Early learning	11	80.0
Class attendance rate in early childhood education	114	114
Proportion of children who are developmentally on track	25	70.0
Proportion of children with stimulating home learning environments	22	81.0
Pupil-based teacher ratio in preprimary education	34	88.0
Quality and infrastructure	1	81.4
Completion rate in upper secondary education, gender parity	43	84.0
Completion rate in upper secondary education, wealth parity	12	81.0
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>118</b>	<b>27.0</b>
Commence training and learning	70	43.0
Firms offering formal training (%)	51	43.0
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	114	114
TVET resources	100	30
Government expenditure on vocational education (%)	57	90
Share of students enrolled in secondary vocational programmes	114	114
Share of students enrolled in postsecondary vocational programmes	89	31
TVET quality and infrastructure	30	80
Extent of staff training	88	81.0
Quality of vocational training	72	50.4
Ratio of high-skill TVET occupations earnings to average wage	39	33.0
Ratio of medium-skill TVET occupations earnings to average wage	81	37.0
<b>TVET labour market</b>	<b>81</b>	<b>80.0</b>
Efficiency of the labour market	100	30
Firms considered well-integrated with workforce (%)	100	57.0
Employment educational mismatch (%)	57	80.1
Proportion of skilled production workers	114	114
Unemployment rate with vocational education	114	114
High TVET unemployment	30	11.0
Share of TVET occupations	40	80.0
Manufacturing employment (%)	128	30.0
Quality and infrastructure	30	80.0
Enrollment in vocational education, gender parity	114	114
Useable employment rate	31	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>148</b>	<b>2.7</b>
Enrollment	128	2.7
Government expenditure per tertiary student	114	114
Teaching staff compensation (% tertiary expenditure)	83	20.7
Enrollment	114	114
Enrollment in bachelor's or equivalent level (%)	114	114
Enrollment in masters, doctoral or equivalent (%)	114	114
Resources	114	114
Pupil-teacher ratio in tertiary education	114	114
Researchers in higher education (%)	114	114
<b>Learning environment</b>	<b>39</b>	<b>66.3</b>
<b>Quality and academic freedom</b>	<b>34</b>	<b>71.0</b>
Teachers in tertiary education, gender parity	114	114
Labour mobility rate	11	43.0
Academic freedom	11	84
Quality and infrastructure	1	81.0
Class attendance rate in tertiary education, gender parity	78	81.1
Class attendance rate in tertiary education, wealth parity	1	90.0
Class attendance rate in tertiary education, location parity	18	22.0
<b>Outputs</b>	<b>46</b>	<b>57.0</b>
Enrollment	114	114
Educational attainment rate, bachelor's or equivalent	114	114
Educational attainment rate, master's or equivalent	114	114
Educational attainment rate, doctoral or equivalent	114	114
Employment	27	80.4
Labour force participation rate with advanced education	57	78.0
Unemployment rate with advanced education	35	88.0
Impact	18	31.0
University tertiary enrollment in R&D	112	31.0
CRIDE scholars rate per 100 personnel in higher education	114	114
<b>Government's contribution to innovation and research</b>		
Inputs	10	22.0
Government R&D expenditure	114	114
GDP (% GDP)	114	114
GERD per researcher	114	114
Researchers per thousand labour force	114	114
Tertiary graduates from STEM programmes (%)	114	114
Quality and infrastructure	11	22.0
GERD performed by business enterprises (%)	114	114
GERD financed by business enterprises (%)	114	114
Researchers in business enterprises (%)	114	114
Firms that spend on R&D (%)	52	25.0
Quality and infrastructure	11	22.0
High-skill employment (%)	74	11.0
Intellectual property payments (% total trade)	72	14.1
State of cluster development	120	34.0
<b>Outputs</b>	<b>10</b>	<b>22.0</b>
Government R&D expenditure	114	114
Average documents per researcher	114	114
Citations per document	96	17.4
Patent applications (per 100 billion GDP)	114	114
Quality and infrastructure	11	22.0
Intellectual property receipts (% total trade)	23	30.4
Research design applications (per 100 billion GDP)	114	114
PCT applications (per 100 billion GDP)	1	90.0
Firms producing new goods and services (%)	86	33.0



# BARBADOS

	Rank	Value
<b>Consumer credit</b>		
Treatment applications per 100 million GDP	106	106
Cultural goods exports (% exports)	9	69.2
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	112	4.8
Depth of innovative companies	128	35.3
ISO 9001 quality certificates (% GDP)	62	10.9
ISO 14001 environmental certificates (% GDP)	80	0.4
<b>Intelligence</b>		
CERT threat from abroad (%)	106	106
Cost savings per strategic storage deals (% GDP)	104	104
Computer software spending (% GDP)	106	106
<b>Government services</b>		
New business density per thousand population	106	106
Firms with new products/services (%)	89	55.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>52</b>	<b>65.9</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
30MHz mobile network coverage (% population)	33	69.5
Secure Internet servers per 1 million population	88	5.8
Investment in telecommunication services (% GDP)	25	60.1
<b>Quality</b>		
Mobile speed and download speeds	106	106
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (y speed) per hundred people	18	76.2
<b>Accessibility</b>		
Fixed broadband bandwidth (% Gbps per capita)	81	73.6
Mobile broadband basket (% Gbps per capita)	30	54.0
Internet and telephony competition	123	57.2
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	127	17.8
International Internet bandwidth per user	18	38
Households with Internet access at home (%)	75	70.1
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	106	106
Tertiary graduates from ICT programmes (%)	106	106
ICT employment (%)	88	26.2
<b>Usage</b>		
<b>Services</b>		
Government online services	94	57.2
Fixed broadband Internet traffic per subscription	75	9.5
Mobile broadband Internet traffic per subscription	121	0.8
Internet users (%)	47	80.8
<b>Commerce</b>		
ICT/FIT patent applications (per 100,000 GDP)	1	109
E-participation	87	89.0
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	82	35.0
<b>ECONOMY</b>	<b>44</b>	<b>61.2</b>
<b>Economic Competitiveness</b>		
<b>Efficiency</b>		
Overhead capital formation (% GDP)	127	25.8
Logistics performance	106	106
Transport productive capacity	19	45.5
Building quality control	128	43.3

	Rank	Value
<b>Business agility</b>		
Cost of starting a business	85	85.4
Recovery recovery time	32	71.3
Entrepreneurial employee activity rate	89	8
Growth of corporate transactions	79	57.1
<b>Employee experience</b>		
Trust and disaffection	43	34
Talent (% GDP)	95	34.2
High-technology trade (% total trade)	27	48.8
Market concentration	44	62.1
Market concentration	73	60.8
Product diversity	113	39.5
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	35	45.5
Cost dynamics	110	40
<b>Financing and domestic value added</b>	<b>58</b>	<b>47.2</b>
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	42	30
MSME financing gap (% GDP)	87	24
Tax and contribution rate (% profit)	70	21.8
Bank nonperforming loans (%)	106	106
Unmet loan demand	10	40.1
Medium- and high-tech activities value added	38	46.8
Industry and services value added (% GDP)	106	106
Labour underutilization rate	80	82.8
Output per worker	80	12.8
<b>ENABLING ENVIRONMENT</b>	<b>44</b>	<b>61.4</b>
<b>Governance</b>		
Political environment	11	83.8
Peace and stability	1	81
View and accountability	29	89.8
Quality of institutions	58	75.2
Rule of law	80	83.8
Control of corruption	28	85.8
Government effectiveness	41	79.2
<b>Socio-economic</b>	<b>118</b>	<b>44.8</b>
Gender equity	106	50.8
Female-to-male ratio in parliament	100	25
Female-to-male labour force participation	21	88.8
Female-to-male ratio in internal wage	106	106
Gender inequality	11	81
Social protection coverage (% population)	58	84
Adult literacy rate	18	89.8
Youth not in employment, education or training (%)	112	47.4
<b>Standard of living</b>		
Poverty headcount ratio (% population)	106	106
GDP per capita	76	11.1
<b>Health and environment</b>	<b>89</b>	<b>68.4</b>
<b>Health</b>		
Universal health coverage	34	77
Healthy life expectancy (years)	82	76.2
Under-five mortality rate	85	80.2
<b>Environmental performance</b>		
Renewable energy consumption (%)	130	6.1
Household footprint per capita	89	36.8
Natural hazard exposure	57	83

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BELARUS

**GKI RANK** 46/154

**GKI SCORE** 54.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Belarus is a strong performer in terms of its knowledge infrastructure. It ranks 46th out of 154 countries in the Global Knowledge Index 2021 and 43rd out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 179.971  
**Population** 9,449,321  
**HDI** 0.823

### AREAS OF STRENGTH

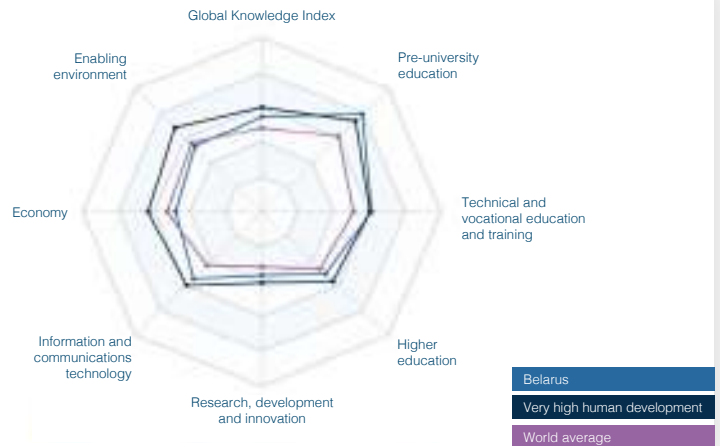
- + ISO 9001 quality certificates (% GDP)
- + High-skilled employment (%)
- + Pupil-trained teacher ratio in pre-primary education
- + Poverty headcount ratio (% population)
- + Vulnerable employment rate

### AREAS OF IMPROVEMENT

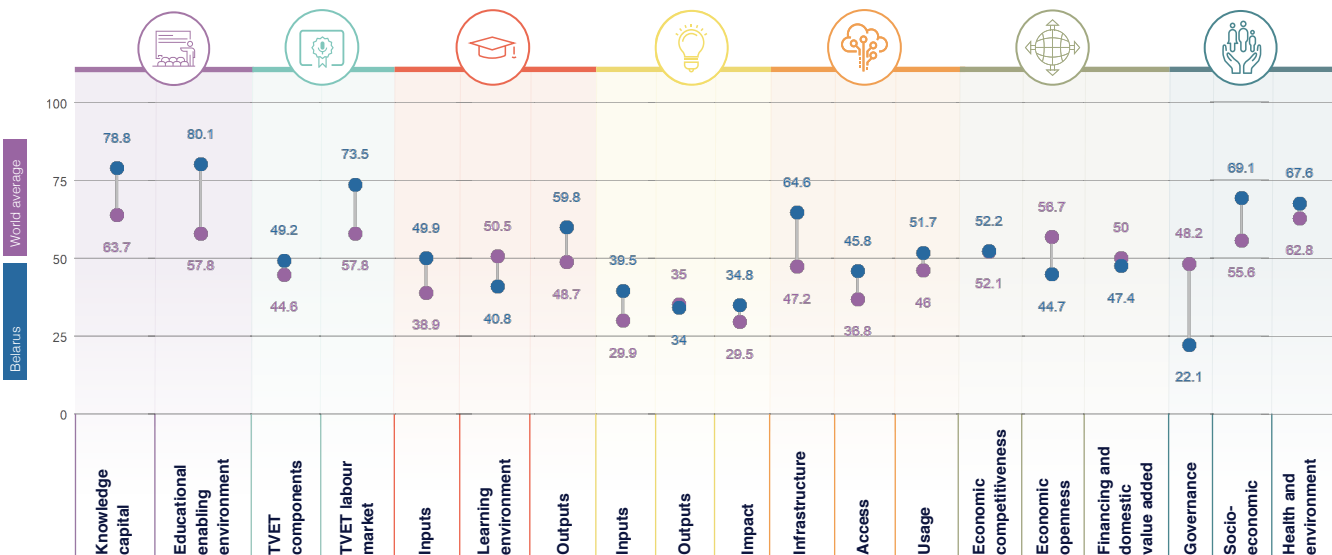
- Entrepreneurial employee activity rate
- MSME financing gap (% GDP)
- Market concentration
- Voice and accountability
- Academic freedom

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	15	79.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	38	61.3
HIGHER EDUCATION	47	50.2
RESEARCH, DEVELOPMENT AND INNOVATION	45	36.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	47	54
ECONOMY	96	48.1
ENABLING ENVIRONMENT	81	52.9



## GKI PILLARS







# BELARUS

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	44	79.4
Enrollment	50	90.4
Net enrolment rate in primary education	80	94.0
Net enrolment rate in lower secondary education	72	90.2
Net enrolment rate in upper secondary education	21	94
Completion	53	77.5
Years of compulsory education in primary and secondary	67	63.2
Completion rate in upper secondary education	32	90.0
Success rate rate in the last grade of lower secondary education	60	74.5
Completion	33	93.0
Assessment of "Olympiad" students in math, science and reading	29	94.4
Learning-adjusted years of schooling	28	90.0
<b>Educational enabling environment</b>		
Expenditure	51	91
Government expenditure on primary education (% GDP)	114	114
Government expenditure on secondary education (% GDP)	13	46
Government funding per primary student (% GDP per capita)	114	114
Government funding per secondary student (% GDP per capita)	10	52.0
Resources	39	96.4
Pupil-based teacher ratio in primary education	29	87.5
Pupil-based teacher ratio in secondary education	8	89.0
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	10	93.0
Class attendance rate in early childhood education	27	84.0
Proportion of children who are developmentally on track	20	71.0
Proportion of children with stimulating home learning environments	9	93.0
Pupil-based teacher ratio in preprimary education	4	90
Quality and infrastructure	21	91.4
Completion rate in upper secondary education, gender parity	27	94.0
Completion rate in upper secondary education, wealth parity	30	91.3
Completion rate in upper secondary education, location parity	26	94.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Commence training enrollment	95	10.5
Firms offering formal training (%)	65	38.5
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET enrolment	30	91.1
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	52	20.2
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	116	116
Extent of staff training	116	116
Quality of vocational training	116	116
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of median-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	33	54.0
Firms considered with inappropriately educated workforce (%)	89	66.7
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	48	84.0
Unemployment rate with vocational education	15	89.7
Real TVET unemployment	11	91.2
Share of TVET occupations	22	70.5
Manufacturing employment (%)	25	87.0
Quality and infrastructure	32	74.7
Enrollment in vocational education, gender parity	81	87.0
Useable employment rate	1	94.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	31	43.0
Government expenditure per tertiary student	71	12
Teaching staff compensation (% tertiary expenditure)	8	69
Enrollment	33	27.0
Enrollment in bachelor's or equivalent level (%)	8	47
Enrollment in master's, doctoral or equivalent (%)	61	3.8
Resources	11	81.3
Pupil-teacher ratio in tertiary education	42	81.3
Researcher in higher education (%)	116	116
<b>Learning environment</b>		
Timely and academic freedom	111	23.0
Teachers in tertiary education, gender parity	21	43.0
Labour mobility rate	40	20.0
Academic freedom	140	7.2
Quality and infrastructure	11	87.0
Class attendance rate in tertiary education, gender parity	47	77.1
Class attendance rate in tertiary education, wealth parity	33	85.2
Class attendance rate in tertiary education, location parity	1	35.2
<b>Outputs</b>		
Attainment	44	50.5
Educational attainment rate, bachelor's or equivalent	22	73.7
Educational attainment rate, master's or equivalent	61	3.8
Educational attainment rate, doctoral or equivalent	40	14.0
Employment	10	86
Labour force participation rate with advanced education	17	84.5
Unemployment rate with advanced education	19	80.0
Impact	116	116
University tertiary enrollment in R&D	116	116
CRIDE students per 100 personnel in higher education	116	116
<b>Government's contribution to innovation and economic growth</b>		
Impact	33	10.2
Quality and infrastructure	11	87.0
Government R&D expenditure	11	87.0
GDP (% GDP)	50	12
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	9	83.0
<b>Government's contribution to innovation and economic growth</b>		
GERD performed by business enterprises (%)	43	11.4
GERD financed by business enterprises (%)	35	20.7
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	57	22.4
Quality and infrastructure	11	87.0
High-skill employment (%)	3	87.0
Intellectual property payments (% total trade)	74	15.0
State of cluster development	116	116
<b>Support</b>		
Quality and infrastructure	11	87.0
Average documents per researcher	116	116
Citations per document	44	22.3
Patent applications (per 100 billion GDP)	20	61.2
Quality and infrastructure	11	87.0
Intellectual property receipts (% total trade)	32	22.0
Research design applications (per 100 billion GDP)	71	3.1
PCT applications (per 100 billion GDP)	78	47.2
Firms producing new goods and services (%)	48	64.7



# BELARUS

	Rank	Value
<b>Consumer Innovation Readiness</b>	107	61.3
Treatment applications per 100 million GDP	79	18.0
Cultural goods exports (% exports)	85	5.8
Printing and publishing output (% manufactured output)	90	0.2
<b>Science</b>	95	10.9
<b>Health</b>	95	10.9
Risks of institutions' persistence	104	104
Depth of innovative corporates	104	104
ISO 9001 quality certificates (% GDP)	1	100
ISO 14001 environmental certificates (% GDP)	52	17.0
<b>Industry</b>	95	10.9
CERD received from abroad (%)	33	25.1
Joint ventures per strategic industry deals (% GDP)	115	3.2
Computer software spending (% GDP)	100	3.8
<b>Government Services</b>	95	10.9
New business density per thousand population	81	5.8
Firms with new products/services (%)	76	83.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>47</b>	<b>34</b>
<b>Infrastructure</b>	29	80.8
<b>Coverage</b>	58	41.2
30MHz mobile network coverage (% population)	80	80.0
Secure Internet servers per 1 million population	47	95.0
Investment in telecommunication services (% GDP)	81	22.0
<b>Speed</b>	95	10.9
Mobile upload and download speeds	104	104
Fixed broadband upload and download speeds	104	104
Fixed broadband subscriptions (by speed) per hundred people	38	38
<b>Availability</b>	29	80.8
Fixed broadband latency (% QM per capita)	20	88.8
Mobile broadband basket (% QM per capita)	49	72.0
Internet and telephony competition	1	100
<b>Access</b>	29	80.8
<b>Usability</b>	81	37.0
Active mobile-broadband subscriptions per hundred inhabitants	53	40.1
International Internet bandwidth per user	20	38
Households with Internet access at home (%)	64	77.1
<b>Skills and employment</b>	95	10.9
Individuals with standard ICT skills (%)	58	22.1
Tertiary graduates from ICT programmes (%)	30	43.7
ICT employment (%)	28	40.0
<b>Usage</b>	22	81.2
<b>Services</b>	65	48.0
Government online services	84	70.0
Fixed broadband internet traffic per subscription	65	15.0
Mobile broadband internet traffic per subscription	30	22.7
Internet users (%)	28	84.0
<b>Commerce</b>	95	10.9
ICT FDI parent applications (per 100 million GDP)	81	37.0
E-participation	90	70
Internet activities by individuals (%)	27	89.0
Trade in digitally deliverable services (% total trade)	70	37.0
<b>ECONOMY</b>	<b>84</b>	<b>68.1</b>
<b>Economic Competitiveness</b>	77	52.2
<b>Infrastructure Investment</b>	95	10.9
Overhead capital formation (% GDP)	40	84.0
Logistics performance	100	39.4
Transport productive capacity	79	25.0
Building quality control	20	86.7

	Rank	Value
<b>Business Agility</b>	95	10.9
Ease of starting a business	27	93.0
Recovery recovery rate	87	43.0
Entrepreneurial employee activity rate	84	2.7
Growth of corporate transactions	50	21.4
<b>Employee experience</b>	122	44.7
<b>Trust and development</b>	95	10.9
Trust (% GDP)	25	51.4
High-technology trade (% total trade)	90	40
Market concentration	28	88.0
Market concentration	100	60.0
Product diversity	140	27.0
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	80	38.1
Cost dynamics	104	104
<b>Financing and domestic value added</b>	30	47.4
<b>Financing and costs</b>	100	42.0
Domestic credit to private sector (% GDP)	100	11.7
MSME financing gap (% GDP)	100	36.0
Tax and contribution rate (% profit)	100	80.0
Bank nonperforming loans (%)	74	80.1
Unsecured loans ratio	95	60.4
Medium- and high-tech activities value added	28	48.0
Industry and services value added (% GDP)	54	57.0
Labour underutilization rate	28	75.0
Output per worker	75	48
<b>ENABLING ENVIRONMENT</b>	<b>81</b>	<b>52.8</b>
<b>Governance</b>	128	22.1
<b>Political environment</b>	108	15
Peace and stability	110	21.2
View and accountability	142	0.7
Quality of institutions	114	20.0
Rule of law	104	16.0
Control of corruption	75	48.1
Government effectiveness	120	24.1
<b>Socio-economic</b>	31	60.1
<b>Gender equity</b>	20	81.7
Female-to-male ratio in parliament	20	86.7
Female-to-male labour force participation	68	38.0
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	95	70.0
Social protection coverage (% population)	82	34.2
Adult literacy rate	5	89.0
Youth not in employment, education or training (%)	49	70.0
<b>Standard of living</b>	28	83.8
Poverty headcount ratio (% population)	5	94
GDP per capita	28	78.0
<b>Health and environment</b>	<b>40</b>	<b>67.8</b>
<b>Health</b>	47	80.0
Universal health coverage	40	70
Healthy life expectancy (years)	87	72.0
Under-five mortality rate	15	80.0
<b>Environmental performance</b>	80	33.7
Renewable energy consumption (%)	122	7.5
Household footprint per capita	100	70.0
Natural hazard exposure	95	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 16/154

**GKI SCORE** 65.5

**WORLD AVERAGE** 48.4

# BELGIUM

## COUNTRY PERFORMANCE SUMMARY

Belgium is a leading performer in terms of its knowledge infrastructure. It ranks 16th out of 154 countries in the Global Knowledge Index 2021 and 16th out of the 61 countries with very high human development.

### KEY INDICATORS

GDP US\$ billions ..... 557,041  
 Population ..... 11,589,616  
 HDI ..... 0.931

### AREAS OF STRENGTH

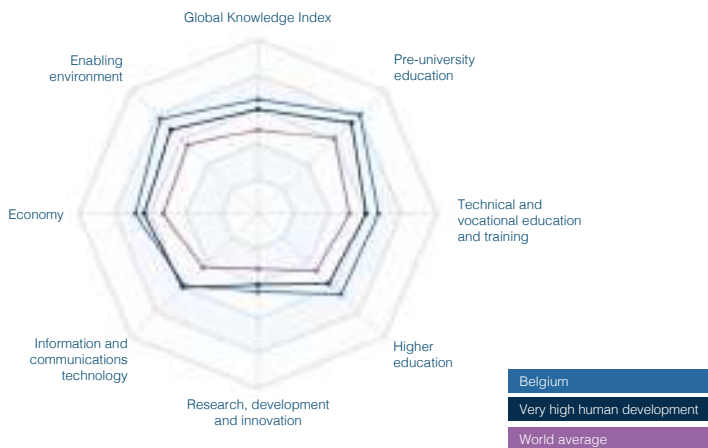
- + Government expenditure on vocational education (%)
- + Logistics performance
- + Insolvency recovery rate
- + Academic freedom
- + Share of students enrolled in secondary vocational programmes

### AREAS OF IMPROVEMENT

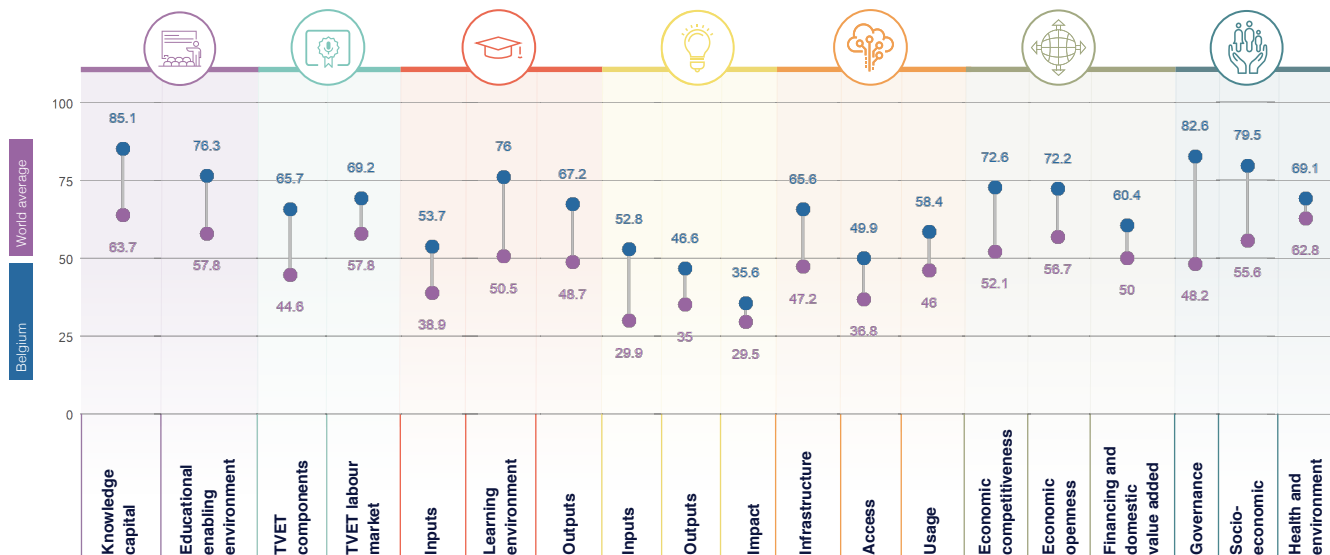
- Ecological footprint per capita
- Firms constrained with inadequately educated workforce (%)
- Tax and contribution rate (% profit)
- Tertiary graduates from ICT programmes (%)
- Foreign direct investment, net inflows (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	9	80.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	13	67.4
HIGHER EDUCATION	11	65.6
RESEARCH, DEVELOPMENT AND INNOVATION	22	45
INFORMATION AND COMMUNICATIONS TECHNOLOGY	36	58
ECONOMY	14	68.4
ENABLING ENVIRONMENT	16	77.1



## GKI PILLARS



# BELGIUM

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	8	90.7
Enrolment	14	85.1
Net enrolment rate in primary education	44	87.3
Net enrolment rate in lower secondary education	13	89.6
Net enrolment rate in upper secondary education	16	87.7
Completion	42	81.1
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	43	84.0
Success rate rate in the last grade of lower secondary education	86	86.4
Completion	11	75.0
Assessment of 15-year-old students in math, science and reading	17	87.7
Learning-adjusted years of schooling	18	84.8
<b>Educational enabling environment</b>	<b>28</b>	<b>78.3</b>
Enrolment	11	37
Government expenditure on primary education (% GDP)	63	34.2
Government expenditure on secondary education (% GDP)	58	30
Government funding per primary student (% GDP per capita)	31	83.8
Government funding per secondary student (% GDP per capita)	53	32.7
Resources	1	100
Pupil-based teacher ratio in primary education	104	104
Pupil-based teacher ratio in secondary education	104	104
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	104	104
Class attendance rate in early childhood education	104	104
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	11	81
Completion rate in upper secondary education, gender parity	7	80.1
Completion rate in upper secondary education, wealth parity	31	77.7
Completion rate in upper secondary education, location parity	18	84.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>	<b>9</b>	<b>88.2</b>
Companies training apprentices	11	81.0
Firms offering formal training (%)	11	71.9
Labour force with short-cycle tertiary education (%)	17	71.1
Participation rate in formal and non-formal education and training	26	81.2
TVET resources	5	73.0
Government expenditure on vocational education (%)	2	80.5
Share of students enrolled in secondary vocational programmes	5	87.8
Share of students enrolling in postsecondary vocational programmes	71	80.5
TVET quality and infrastructure	11	41.4
Extent of staff training	73	84.6
Quality of vocational training	14	87.8
Ratio of high-skil TVET occupations earnings to average wage	86	77.8
Ratio of medium-skill TVET occupations earnings to average wage	85	49.0
<b>TVET labour market</b>	<b>48</b>	<b>88.3</b>
Efficiency of the labour market	11	81.0
Firms considered with inequality educated workforce (%)	100	23.6
Employment educational mismatch (%)	26	73.3
Proportion of skilled production workers	30	73.7
Unemployment rate with vocational education	59	79.4
Real TVET unemployment	41	81.7
Share of TVET occupations	32	87.3
Manufacturing employment (%)	88	42
Quality and infrastructure	11	81.0
Enrolment in vocational education, gender parity	50	84.4
Useable employment rate	34	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>23</b>	<b>83.7</b>
Enrolment	11	88.1
Government expenditure per tertiary student	14	82.8
Teaching staff compensation (% tertiary expenditure)	27	47.8
Enrolment	17	81.0
Enrolment in bachelor's or equivalent level (%)	14	43.0
Enrolment in master's, doctoral or equivalent (%)	26	54.0
Resources	10	84.3
Pupil-teacher ratio in tertiary education	72	76.3
Research in higher education (%)	74	34.2
<b>Learning environment</b>	<b>18</b>	<b>76</b>
Timely and academic freedom	11	71
Teachers in tertiary education, gender parity	8	85.5
Labour mobility rate	28	56.4
Academic freedom	21	87
Quality and infrastructure	104	104
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>	<b>18</b>	<b>87.2</b>
Attainment	17	80.2
Educational attainment rate, bachelor's or equivalent	8	82.5
Educational attainment rate, master's or equivalent	13	58.2
Educational attainment rate, doctoral or equivalent	36	28.0
Employment	11	81
Labour force participation rate with advanced education	78	72.5
Unemployment rate with advanced education	28	81.7
Impact	20	56.4
University tertiary enrollment in R&D	12	88.7
OECD indicators per 100 persons in higher education	30	50
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>11</b>	<b>72.2</b>
Access to credit resources	11	33.1
GDP (% GDP)	40	55.0
GERD per researcher	19	47.2
Researchers per thousand labour force	8	32.7
Tertiary graduates from STEM programmes (%)	88	32.4
Quality and infrastructure	11	81.0
GERD performed by business enterprises (%)	8	83.7
GERD financed by business enterprises (%)	8	38.0
Researchers in business enterprises (%)	10	83.0
Firms that spend on R&D (%)	13	80
Quality and infrastructure	11	81.0
High-skilled employment (%)	104	104
Intellectual property payments (% total trade)	57	13.2
State of cluster development	17	80.0
<b>Outputs</b>	<b>21</b>	<b>88.3</b>
Access to credit resources	11	33
Average documents per researcher	47	83.5
Citations per document	27	38.0
Patent applications (per 100 billion GDP)	19	71.2
Quality and infrastructure	11	81.0
Intellectual property receipts (% total trade)	21	30.0
Research design applications (per 100 billion GDP)	42	15.8
PCT applications (per 100 billion GDP)	18	84.1
Firms producing new goods and services (%)	18	75.1

# BELGIUM

	Rank	Value		Rank	Value
<b>Business environment</b>			<b>Business agility</b>	9	81.9
Treatment applications (per 100 million GDP)	50	28.2	Cost of starting a business	44	82.5
Cultural goods exports (% exports)	60	12.9	Recovery recovery rate	5	87.1
Printing and publishing output (% manufactured output)	80	21.2	Entrepreneurial employee activity rate	15	82.7
<b>Energy</b>	46	59.9	Growth of corporate transactions	18	85.7
<b>Finance</b>	7	85.8	<b>Corporate openness</b>	28	72.2
Access to venture capital	23	28.2	Trust and disinvestment	77	71.0
Depth of innovative companies	34	59.2	Trade (% GDP)	30	70
ISO 9001 quality certificates (% GDP)	60	50.9	High-technology trade (% total trade)	20	89.0
ISO 14001 environmental certificates (% GDP)	80	70	Market concentration	25	86.1
<b>Industry</b>	27	72.0	Market concentration	47	82.0
CERD forecast from abroad (%)	30	24.8	Product diversity	44	80.7
Cost savings per strategic alliance deals (% GDP)	28	24.8	Charitable financial openness	1	100
Computer software spending (% GDP)	8	50.1	Foreign direct investment, net inflows (% GDP)	100	8
<b>Government services</b>	36	69.0	Cost dynamics	1	100
New business density per thousand population	40	16.7	<b>Financing and domestic value added</b>	28	80.4
Firms with new products/services (%)	72	83.1	Financing and costs	80	21.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>44</b>	<b>50</b>	Domestic credit to private sector (% GDP)	44	35.0
<b>Infrastructure</b>	29	80.8	MSME financing gap (% GDP)	106	118
<b>Coverage</b>	49	69.0	Tax and contribution rate (% profit)	100	81.8
30MHz mobile network coverage (% population)	1	100	Bank nonperforming loans (%)	38	82.1
Secure Internet servers per 1 million population	29	29.4	Unmet needs index	11	81.2
Investment in telecommunication services (% GDP)	69	20.4	Medium- and high-tech activities value added	16	88.7
<b>Quality</b>	20	84.4	Industry and services value added (% GDP)	30	85.0
Mobile upload and download speeds	15	80.8	Labour underutilization rate	27	74.5
Fixed-broadband upload and download speeds	32	24.1	Output per worker	6	49.0
Fixed-broadband subscriptions (by speed) per hundred people	11	88.6	<b>ENABLING ENVIRONMENT</b>	<b>18</b>	<b>77.1</b>
<b>Availability</b>	11	81.1	<b>Governance</b>	20	82.8
Fixed broadband bandwidth (% Gbps per capita)	78	81.1	Political environment	20	77.7
Mobile broadband basket (% Gbps per capita)	20	82.0	Peace and stability	40	84.0
Internet and telephony competition	1	100	View and accountability	18	80.6
<b>Access</b>	62	68.8	Quality of institutions	19	87.5
<b>Subscriptions</b>	30	80.0	Rule of law	18	88.0
Active mobile-broadband subscriptions per fixed-line inhabitants	62	30	Control of corruption	20	80.0
International Internet bandwidth per user	27	48.8	Government effectiveness	25	83.7
Households with Internet access at home (%)	29	81	<b>Socio-economic</b>	<b>12</b>	<b>79.5</b>
<b>Skills and employment</b>	46	69.2	Gender equity	11	84.0
Individuals with standard ICT skills (%)	39	46	Female-to-male ratio in parliament	19	72.4
Tertiary graduates from ICT programmes (%)	100	19.4	Female-to-male labour force participation	28	81.3
ICT employment (%)	44	59.1	Female-to-male ratio in internal wage	35	85.1
<b>Usage</b>	32	58.4	Government access	17	82.0
<b>Services</b>	57	50	Social protection coverage (% population)	1	100
Government online services	70	85.0	Adult literacy rate	106	118
Fixed broadband Internet traffic per subscription	25	32.0	Youth not in employment, education or training (%)	30	85.1
Mobile broadband Internet traffic per subscription	77	0.4	Standard of living	10	81.0
Internet users (%)	21	81.1	Poverty headcount ratio (% population)	30	79.7
<b>Commerce</b>	26	80.0	GDP per capita	18	42.0
ICT FDI patent applications (per 100 million GDP)	20	86.0	<b>Health and environment</b>	<b>25</b>	<b>80.1</b>
E-participation	70	85.0	Health	17	80.0
Internet activities by individuals (%)	20	71.6	Universal health coverage	6	84
Trade in digitally deliverable services (% total trade)	70	34	Healthy life expectancy (years)	27	83.2
<b>ECONOMY</b>	<b>14</b>	<b>80.4</b>	Under-five mortality rate	15	85.0
<b>Economic complexity indexes</b>	8	72.0	Government performance	107	80
Manufacture innovation	11	61.0	Renewable energy consumption (%)	112	11.1
Overhead capital formation (% GDP)	60	82.0	Household budget per capita	108	80.8
Logistics performance	9	70	Natural hazard exposure	15	80
Transport productive capacity	21	44.5			
Building quality control	47	80			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BELIZE

**GKI RANK** 99/154

**GKI SCORE** 43.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Belize is a modest performer in terms of its knowledge infrastructure. It ranks 99th out of 154 countries in the Global Knowledge Index 2021 and 33rd out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Transport productive capacity
- + Secure Internet servers per 1 million population
- + Government expenditure on secondary education (% of GDP)
- + Entrepreneurial employee activity rate
- + Labour force with short-cycle tertiary education (%)

### AREAS OF IMPROVEMENT

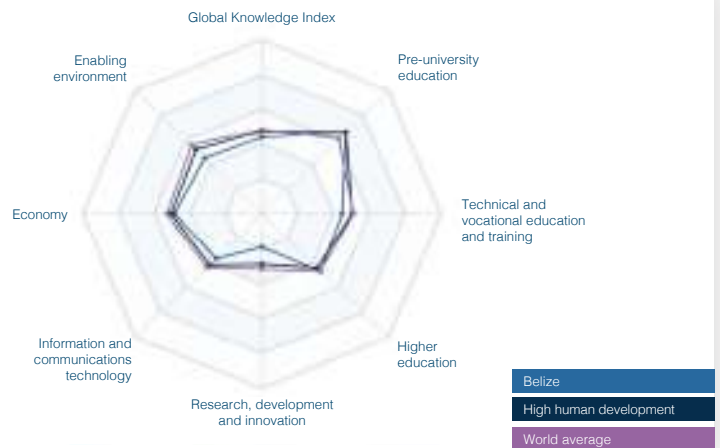
- University-industry collaboration in R&D
- Firms with new product/service (%)
- State of cluster development
- Intellectual property receipts (% total trade)
- Extent of corporate transparency

### KEY INDICATORS

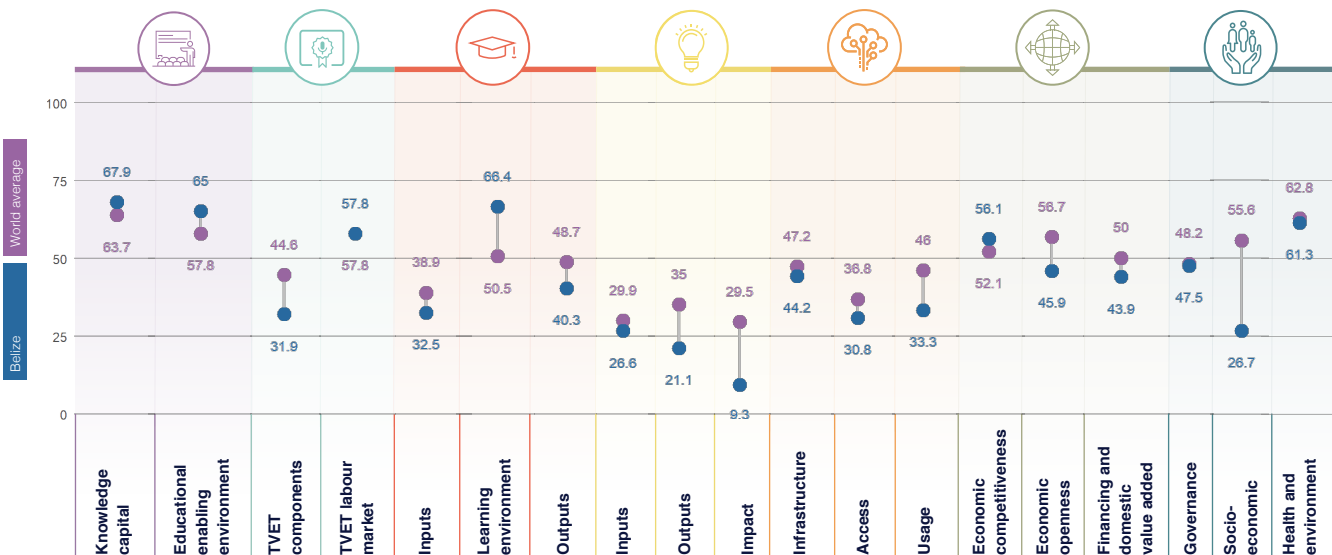
**GDP US\$ billions** 2.405  
**Population** 397,621  
**HDI** 0.716

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	77	66.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	107	44.9
HIGHER EDUCATION	71	46.4
RESEARCH, DEVELOPMENT AND INNOVATION	138	19
INFORMATION AND COMMUNICATIONS TECHNOLOGY	97	36.1
ECONOMY	95	48.7
ENABLING ENVIRONMENT	118	45.2



## GKI PILLARS







	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	83	47.8
Enrollment	89	80.7
Net enrolment rate in primary education	15	90.0
Net enrolment rate in lower secondary education	100	70.8
Net enrolment rate in upper secondary education	80	83.0
Completion	107	10.2
Years of compulsory education in primary and secondary	119	81.5
Completion rate in upper secondary education	80	80.0
Success rate rate in the last grade of lower secondary education	100	83.5
Completion	116	116
Assessment of Trinidad students in math, science and reading	116	116
Learning-adjusted years of schooling	116	116
<b>Educational enabling environment</b>	<b>88</b>	<b>88</b>
Expenditure	17	42.0
Government expenditure on primary education (% GDP)	21	52
Government expenditure on secondary education (% GDP)	5	50
Government funding per primary student (% GDP per capita)	21	47.2
Government funding per secondary student (% GDP per capita)	20	45.4
Resources	80	10.0
Pupil-based teacher ratio in primary education	30	84.0
Pupil-based teacher ratio in secondary education	48	73.1
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	41	60.0
Class attendance rate in early childhood education	77	30.9
Proportion of children who are developmentally on track	30	74.0
Presence of children with stimulating home learning environments	13	80
Pupil-based teacher ratio in preprimary education	57	70.0
Quality and infrastructure	11	83.0
Completion rate in upper secondary education, gender parity	43	80.0
Completion rate in upper secondary education, wealth parity	75	35.2
Completion rate in upper secondary education, location parity	59	80.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>100</b>	<b>81.8</b>
Commence training and learning	10	10.0
Firms offering formal training (%)	113	16.0
Labour force with short-cycle tertiary education (%)	6	81.4
Participation rate in formal and non-formal education and training	75	2.0
<b>TVET resources</b>	<b>100</b>	<b>10</b>
Government expenditure on vocational education (%)	88	8.8
Share of students enrolled in secondary vocational programmes	76	15.2
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and infrastructure</b>	<b>80</b>	<b>41.1</b>
Extent of staff training	100	37.6
Quality of vocational training	116	116
Ratio of high-skill TVET occupations earnings to average wage	19	84.0
Ratio of medium-skill TVET occupations earnings to average wage	37	40.7
<b>TVET labour market</b>	<b>48</b>	<b>81.8</b>
Efficiency of the labour market	100	30
Firms considered with inappropriately educated workforce (%)	89	48.0
Employment educational mismatch (%)	81	49.7
Presence of skilled graduate workers	116	116
Unemployment rate with vocational education	75	35.7
Real TVET unemployment	116	33.0
Share of TVET occupations	111	39.7
Manufacturing employment (%)	110	26
Quality and infrastructure	36	63.7
Enrollment in vocational education, gender parity	7	80.1
Useable employment rate	81	87.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>100</b>	<b>33.8</b>
Expenditure	113	7.1
Government expenditure per tertiary student	90	7.3
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	107	11.0
Enrollment in bachelor's or equivalent level (%)	100	9.8
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	21	80.0
Pupil-teacher ratio in tertiary education	44	80.0
Research in higher education (%)	116	116
<b>Learning environment</b>		
<b>Quality and academic freedom</b>	<b>6</b>	<b>81.0</b>
Teachers in tertiary education, gender parity	21	60.0
Labour mobility rate	116	116
Academic freedom	116	116
<b>Quality and infrastructure</b>	<b>31</b>	<b>47.0</b>
Class attendance rate in tertiary education, gender parity	103	10.0
Class attendance rate in tertiary education, wealth parity	19	80.4
Class attendance rate in tertiary education, location parity	20	8.8
<b>Outputs</b>	<b>113</b>	<b>60.0</b>
Attainment	10	11.0
Educational attainment rate, bachelor's or equivalent	82	18.7
Educational attainment rate, master's or equivalent	60	8.8
Educational attainment rate, doctoral or equivalent	116	116
Employment	10	81.0
Labour force participation rate with advanced education	12	87.0
Unemployment rate with advanced education	71	80.0
<b>Input</b>	<b>100</b>	<b>21.0</b>
University tertiary enrollment in FTE	107	24.0
CRIME	116	116
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>10</b>	<b>10.0</b>
Government R&D expenditure	10	10.0
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	49	38.0
<b>Output and infrastructure</b>	<b>100</b>	<b>10</b>
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Ratio that spend on R&D (%)	104	8.0
<b>Quality of research environment</b>	<b>100</b>	<b>100</b>
High-skill employment (%)	68	15.4
Intellectual property payments (% total trade)	80	17.0
State of digital development	113	20
<b>Outputs</b>	<b>100</b>	<b>21.0</b>
Government R&D expenditure	10	10.0
Average documents per researcher	116	116
Citations per document	110	7.8
Patent applications (per 100 billion GDP)	116	116
<b>Quality of research environment</b>	<b>10</b>	<b>100</b>
Intellectual property receipts (% total trade)	117	9
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	23	80.0
Firms producing new goods and services (%)	68	42.0





# BELIZE

	Rank	Value
<b>Business environment</b>	107	55.3
Treatment applications per 100 million GDP	106	104
Cultural goods exports (% exports)	33	28.1
Printing and publishing output (% manufactured output)	106	104
<b>Energy</b>	100	31.3
<b>Finance</b>	107	7
Access to investors' protection	104	104
Depth of innovative companies	104	104
ISO 9001 quality certificates (% GDP)	125	1
ISO 14001 environmental certificates (% GDP)	104	104
<b>Infrastructure</b>	100	10
CERD freedom from abuse (%)	106	104
Cost of internet per storage volume deals (% GDP)	104	104
Computer software spending (% GDP)	104	104
<b>International trade</b>	100	10.3
New business density per thousand population	42	16.0
Firms with new products/services (%)	119	14.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	87	36.3
<b>Infrastructure</b>	83	44.3
<b>Coverage</b>	3	83.3
30MHz mobile network coverage (% population)	100	81.2
Secure Internet servers per 1 million population	4	83.5
Investment in telecommunication services (% GDP)	21	63.3
<b>Quality</b>	85	10.3
Mobile internet and download speeds	104	104
Fixed broadband upload and download speeds	104	104
Fixed broadband subscriptions (y speed) per hundred people	78	16.5
<b>Availability</b>	100	47.4
Fixed broadband latency (% QM per capita)	119	80.4
Mobile broadband basket (% QM per capita)	128	30.7
Internet and telephone competition	143	40.2
<b>Access</b>	84	30.8
<b>Connectivity</b>	80	11
Active mobile broadband subscriptions per hundred inhabitants	125	16.0
International Internet bandwidth per user	81	24.1
Households with Internet access at home (%)	86	80.0
<b>Skills and employment</b>	80	20.7
Individuals with standard ICT skills (%)	104	104
Tertiary graduates from ICT programmes (%)	78	20.4
ICT employment (%)	24	13
<b>Usage</b>	100	23.3
<b>Services</b>	101	30.6
Government online services	143	20.0
Fixed broadband internet traffic per subscription	47	20.2
Mobile broadband internet traffic per subscription	85	6.1
Internet users (%)	100	44.2
<b>Commerce</b>	80	11.0
ICT/FIT patent applications (per 100 million GDP)	90	40
E-participation	106	29.0
Internet activities by individuals (%)	104	104
Trade in digitally deliverable services (% total trade)	110	30.0
<b>ECONOMY</b>	84	61.7
<b>Economic complexity/structure</b>	83	26.3
<b>Manufacturing</b>	80	21.3
Overhead capital formation (% GDP)	110	37.0
Logistics performance	104	104
Transport productive capacity	1	100
Building quality control	104	46.7

	Rank	Value
<b>Business agility</b>	80	53.0
Cost of starting a business	100	52
Recovery recovery rate	40	81.0
Entrepreneurial employee activity rate	4	83.0
Growth of corporate transactions	118	6
<b>Corporate openness</b>	118	40.0
<b>Trade and investment</b>	10	10
Trade (% GDP)	30	40.0
High-technology trade (% total trade)	100	30
Market concentration	102	87.2
Market concentration	114	82.1
Product diversity	100	37.0
Contract financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	35	43.0
Cost dynamics	104	104
<b>Financing and domestic value added</b>	100	45.0
<b>Financing and costs</b>	114	21.0
Domestic credit to private sector (% GDP)	81	23.0
MSME financing gap (% GDP)	80	80.0
Tax and contribution rate (% profit)	40	78.0
Bank nonperforming loans (%)	104	104
Unmet loan demand	10	37.0
Medium- and high-tech activities value added	86	31.0
Industry and services value added (% GDP)	100	45.1
Labour underutilization rate	29	33.0
Output per worker	113	6.1
<b>ENABLING ENVIRONMENT</b>	114	41.3
<b>Governance</b>	79	47.0
<b>Political environment</b>	81	63.0
Peace and stability	44	82.0
View and accountability	80	82.0
Quality of institutions	100	32.7
Rule of law	100	23.1
Control of corruption	77	47.1
Government effectiveness	119	37.9
<b>Socio-economic</b>	102	26.7
<b>Gender equity</b>	102	36.3
Female-to-male ratio in parliament	101	14.3
Female-to-male labour force participation	119	58.0
Female-to-male ratio in internal wage	104	104
<b>Gender equality</b>	102	32.0
Social protection coverage (% population)	75	36.1
Adult literacy rate	104	104
Youth not in employment, education or training (%)	122	41.7
<b>Standard of living</b>	100	6.8
Poverty headcount ratio (% population)	104	104
GDP per capita	108	8.8
<b>Health and environment</b>	88	61.3
<b>Health</b>	80	10.0
Universal health coverage	50	84
Healthy life expectancy (years)	75	70.0
Under-five mortality rate	87	91
<b>Environmental performance</b>	111	47.0
Renewable energy consumption (%)	40	41.0
Household footprint per capita	102	80.0
Natural hazard exposure	110	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 142/154

**GKI SCORE** 31.6

**WORLD AVERAGE** 48.4

# BENIN

## COUNTRY PERFORMANCE SUMMARY

Benin is a weak performer in terms of its knowledge infrastructure. It ranks 142nd out of 154 countries in the Global Knowledge Index 2021 and 16th out of the 27 countries with low human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **40.287**  
**Population** ..... **12,123,198**  
**HDI** ..... **0.545**

### AREAS OF STRENGTH

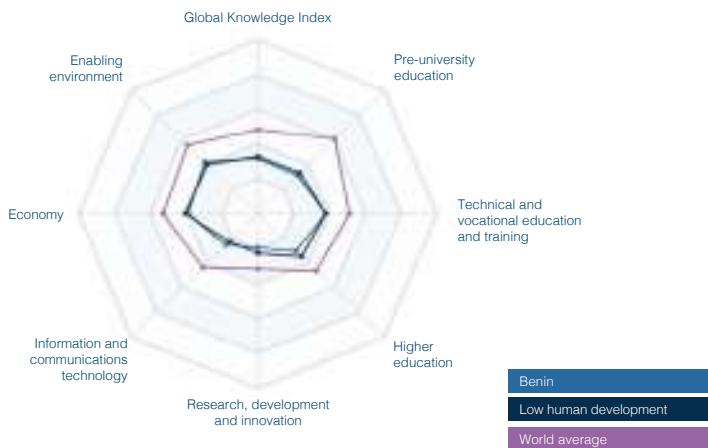
- + Unemployment rate with vocational education
- + Proportion of skilled production workers
- + Unemployment rate with advanced education
- + Female-to-male labour force participation
- + MSME financing gap (% GDP)

### AREAS OF IMPROVEMENT

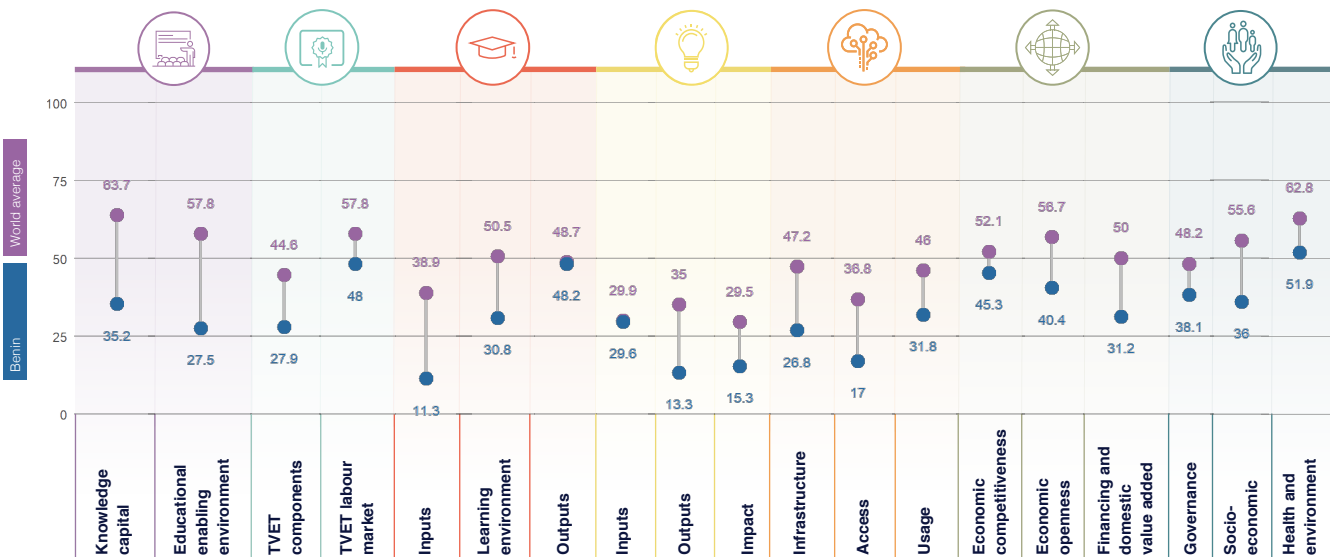
- Labour underutilization rate
- Intellectual property receipts (% total trade)
- Intellectual property payments (% total trade)
- Completion rate in upper secondary education, gender parity
- Pupil-teacher ratio in tertiary education

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	145	31.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	134	37.9
HIGHER EDUCATION	145	30.1
RESEARCH, DEVELOPMENT AND INNOVATION	135	19.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	127	25.2
ECONOMY	135	39
ENABLING ENVIRONMENT	127	42



## GKI PILLARS



# BENIN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	137	38.3
Enrolment	101	40.2
Net enrolment rate in primary education	89	70.5
Net enrolment rate in lower secondary education	101	47.4
Net enrolment rate in upper secondary education	105	23.6
Completion	119	23.7
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	103	30.2
Success rate rate in the last grade of lower secondary education	104	17.7
Completion	100	32.0
Assessment of 15-year-old students in math, science and reading	116	114
Learning-adjusted years of schooling	116	22.0
<b>Educational enabling environment</b>		
Expenditure	117	17.2
Government expenditure on primary education (% GDP)	54	23.9
Government expenditure on secondary education (% GDP)	69	11.8
Government funding per primary student (% GDP per capita)	114	13.8
Government funding per secondary student (% GDP per capita)	113	5.8
Resources	108	20.0
Pupil-based teacher ratio in primary education	82	85
Pupil-based teacher ratio in secondary education	80	18.2
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	103	23.2
Class attendance rate in early childhood education	111	17.9
Proportion of children who are developmentally on track	99	24.2
Proportion of children with stimulating home learning environments	94	25.9
Pupil-based teacher ratio in preprimary education	89	62.0
Quality and infrastructure	100	23.0
Completion rate in upper secondary education, gender parity	104	44.0
Completion rate in upper secondary education, wealth parity	110	2.3
Completion rate in upper secondary education, location parity	107	24.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	108	22.0
Firms offering formal training (%)	99	23.4
Labour force with short-cycle tertiary education (%)	82	41.0
Participation rate in formal and non-formal education and training	116	116
TVET enrolment	104	9.0
Government expenditure on vocational education (%)	89	11.7
Share of students enrolled in secondary vocational programmes	108	5.8
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	99	42.0
Extent of staff training	119	41.9
Quality of vocational training	45	55.0
Ratio of high-skil TVET occupations earnings to average wage	45	30.0
Ratio of medium-skil TVET occupations earnings to average wage	62	41.1
<b>TVET labour market</b>		
Efficiency of the labour market	94	22.0
Firms considered with inappropriately educated workforce (%)	89	49.0
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	4	81.0
Unemployment rate with vocational education	9	85.1
Real TVET unemployment	100	11.1
Share of TVET occupations	106	22.9
Manufacturing employment (%)	41	81.2
Quality and infrastructure	106	30
Enrolment in vocational education, gender parity	100	47.0
Useable employment rate	148	3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	87	37
Government expenditure per tertiary student	99	6.1
Teaching staff compensation (% tertiary expenditure)	28	47.8
Enrolment	110	6.2
Enrolment in bachelor's or equivalent level (%)	116	116
Enrolment in masters, doctoral or equivalent (%)	92	6.2
Resources	142	13
Rapiteacher ratio in tertiary education	108	0.6
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	108	23.0
Labour mobility rate	57	15.0
Academic freedom	67	62.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	88	43.7
Class attendance rate in tertiary education, wealth parity	65	17.0
Class attendance rate in tertiary education, location parity	88	2
<b>Outputs</b>		
Skilled labour	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	107	80.7
Labour force participation rate with advanced education	122	25.1
Unemployment rate with advanced education	9	85.4
Impact	87	32.0
University tertiary enrolment in R&D	100	23.0
CRIDE documents per 100 personnel in higher education	116	116
<b>Government's contribution to innovation and economic growth</b>		
Science	10	12.2
Share of GDP expenditure	97	100
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	88	38.0
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	48	20
Quality of research environment	116	116
High-skilled employment (%)	60	3.0
Intellectual property payments (% total trade)	132	9
State of cluster development	115	34.0
<b>Science</b>		
Government R&D expenditure	116	11.2
Average documents per researcher	116	116
Citations per document	128	9
Patent applications (per 100 billion GDP)	118	23.0
<b>Government's contribution to innovation and economic growth</b>		
Intellectual property receipts (% total trade)	117	9
Research design applications (per 100 billion GDP)	97	0.6
PCT applications (per 100 billion GDP)	113	24.0
Firms producing new goods and services (%)	64	43.1



# BENIN

	Rank	Value
<b>Consumer electronics</b>	100	1
Treatment applications per 100 million GDP	121	1.7
Cultural goods exports (% exports)	125	0.3
Printing and publishing output (% manufactured output)	196	119
<b>Energy</b>	122	12.2
<b>Energy</b>	127	12
Access to electricity's proximity	301	2
Depth of innovative companies	113	42.3
ISO 9001 quality certificates (% GDP)	119	2.7
ISO 14001 environmental certificates (% GDP)	108	1
<b>Energy</b>	127	12
CERD received from abroad (%)	116	119
Coal reserves per storage volume deals (% GDP)	86	4.8
Computer software spending (% GDP)	80	4.2
<b>Government services</b>	127	12.2
New business density per thousand population	101	2.8
Firms with one product/service (%)	107	83.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	122	22.2
<b>Infrastructure</b>	149	26.5
<b>Coverage</b>	122	24.3
3G/4G mobile network coverage (% population)	121	23.7
Secure Internet servers per 1 million population	138	0.8
Investment in telecommunication services (% GDP)	32	47.9
<b>Quality</b>	122	4.2
Mobile speed and download speeds	86	6.1
Fixed-broadband upload and download speeds	89	3.4
Fixed-broadband subscriptions (y speed) per hundred people	129	0.1
<b>Availability</b>	111	41.2
Fixed broadband bandwidth (% Gbps per capita)	128	46.7
Mobile broadband basket (% Gbps per capita)	123	30.1
Internet and telephony competition	142	35.2
<b>Access</b>	128	12
<b>Subscriptions</b>	122	11
Active mobile-broadband subscriptions per fixed-line inhabitants	134	11
International Internet bandwidth per user	113	26.6
Households with Internet access at home (%)	144	4.3
<b>Skills and employment</b>	80	10
Individuals with standard ICT skills (%)	116	19
Tertiary graduates from ICT programmes (%)	54	34.7
ICT employment (%)	111	2.8
<b>Usage</b>	119	31.2
<b>Services</b>	122	21.5
Government online services	100	51.2
Fixed broadband Internet traffic per subscription	116	19
Mobile broadband Internet traffic per subscription	85	8.8
Internet users (%)	121	25.1
<b>Services</b>	111	10
ICT FDI patent applications (per 100 million GDP)	116	19
E-participation	80	54.0
Internet activities by individuals (%)	116	19
Trade in digitally deliverable services (% total trade)	128	17.2
<b>ECONOMY</b>	122	29
<b>Economic complexity/structure</b>	100	45.3
<b>Manufacture innovation</b>	113	42.0
Overhead capital formation (% GDP)	41	80.8
Logistics performance	76	43.7
Transport productive capacity	141	9.7
Building quality control	115	80

	Rank	Value
<b>Business agility</b>	80	60.4
Ease of starting a business	55	83.8
Recovery recovery rate	114	26
Entrepreneurial employee activity rate	116	119
Growth of corporate transactions	86	26.0
<b>Business openness</b>	127	40.4
<b>Trade and investment</b>	101	42.0
Trade (% GDP)	120	16.2
High-technology trade (% total trade)	128	20.0
Market concentration	110	83.3
Market concentration	122	38.0
Product diversification	122	37.0
China's financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	100	35.4
Out dynamics	80	50
<b>Financing and domestic value added</b>	142	31.2
<b>Financing and credit</b>	112	40.4
Domestic credit to private sector (% GDP)	120	4.9
MSME financing gap (% GDP)	17	85
Tax and contribution rate (% profit)	122	88.4
Bank nonperforming loans (%)	116	119
Unmet loan demand	122	13.1
Medium- and high-tech activities value added	116	119
Industry and services value added (% GDP)	141	36.0
Labour underutilization rate	122	9
Output per worker	120	2.7
<b>ENABLING ENVIRONMENT</b>	120	42
<b>Governance</b>	84	30.1
<b>Political environment</b>	80	30.1
Peace and stability	101	23.7
View and accountability	86	42.0
Quality of institutions	86	42.1
Rule of law	119	24.0
Control of corruption	84	54.3
Government effectiveness	81	41.3
<b>Socio-economic</b>	128	30
<b>Gender equity</b>	122	51.5
Female-to-male ratio in parliament	142	0.2
Female-to-male labour force participation	9	88.8
Female-to-male ratio in internal wage	116	119
<b>Gender equality</b>	114	21.1
Social protection coverage (% population)	127	5.1
Adult literacy rate	119	23.8
Youth not in employment, education or training (%)	72	85.2
<b>Standard of living</b>	116	21.2
Poverty headcount ratio (% population)	100	40.0
GDP per capita	127	2.4
<b>Health and environment</b>	145	51.8
<b>Health</b>	122	11.7
Universal health coverage	141	40
Healthy life expectancy (years)	120	27.8
Under-five mortality rate	147	25.4
<b>Environmental performance</b>	31	30
Renewable energy consumption (%)	43	45.8
Household footprint per capita	39	80.8
Natural hazard exposure	55	71

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BHUTAN

**GKI RANK** 108/154

**GKI SCORE** 41

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Bhutan is a modest performer in terms of its knowledge infrastructure. It ranks 108th out of 154 countries in the Global Knowledge Index 2021 and 10th out of the 27 countries with medium human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **8.418**  
**Population** ..... **771,612**  
**HDI** ..... **0.654**

### AREAS OF STRENGTH

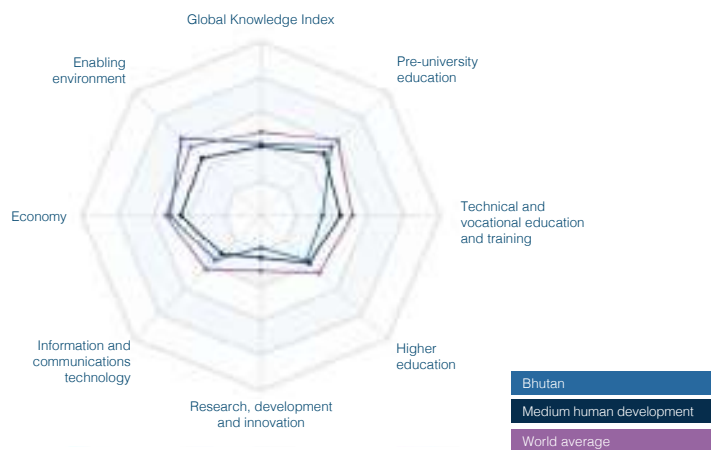
- + Government expenditure on secondary education (% of GDP)
- + Pupil-trained teacher ratio in pre-primary education
- + Gross fixed capital formation (% GDP)
- + MSME financing gap (% GDP)
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

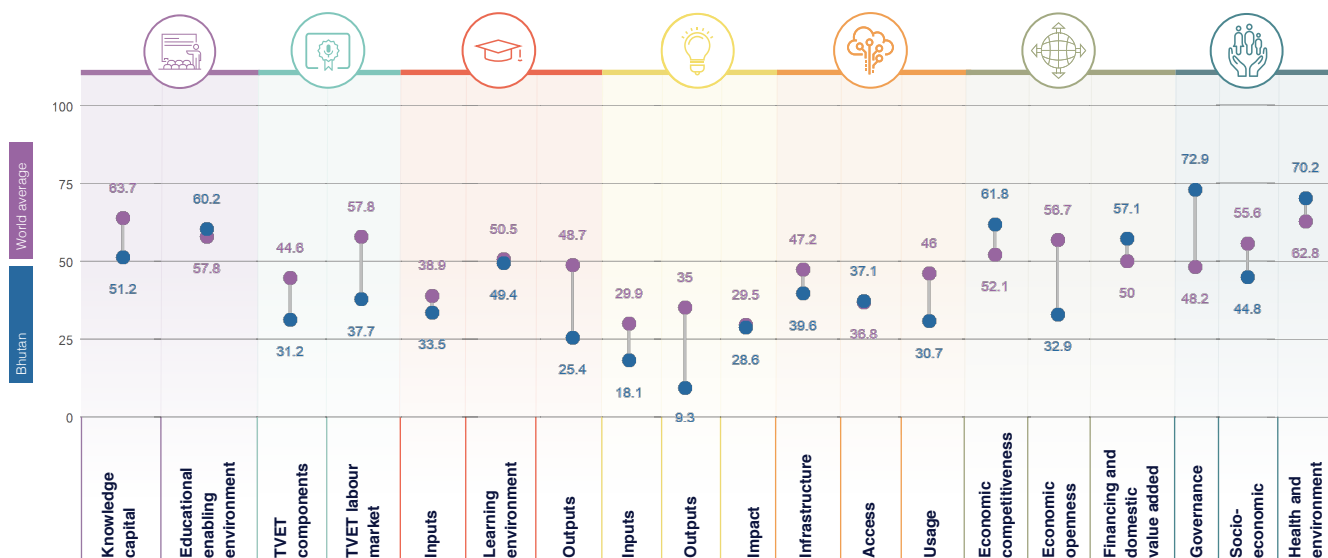
- Years of compulsory education in primary and secondary
- Labour force with short-cycle tertiary education (%)
- Government expenditure on vocational education (%)
- Mobile broadband Internet traffic per subscription
- Market concentration

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	104	55.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	144	34.5
HIGHER EDUCATION	123	36.1
RESEARCH, DEVELOPMENT AND INNOVATION	139	18.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	100	35.8
ECONOMY	79	50.6
ENABLING ENVIRONMENT	45	62.7



## GKI PILLARS







# BHUTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	112	81.2
Enrollment	37	81
Net enrolment rate in primary education	87	80.0
Net enrolment rate in lower secondary education	80	85.3
Net enrolment rate in upper secondary education	83	87.0
Completion	137	34.0
Years of compulsory education in primary and secondary	148	8
Completion rate in upper secondary education	80	85.7
Success rate rate in the last grade of lower secondary education	78	88.8
Completion	80	88.0
Assessment of Grade 6 students in math, science and reading	116	116
Learning-adjusted years of schooling	108	88.8
<b>Educational enabling environment</b>	78	88.8
Enrollment	27	40.0
Government expenditure on primary education (% GDP)	80	35
Government expenditure on secondary education (% GDP)	3	85.0
Government funding per primary student (% GDP per capita)	78	31.4
Government funding per secondary student (% GDP per capita)	81	53.6
Resources	71	71.8
Pupil-based teacher ratio in primary education	63	75.5
Pupil-based teacher ratio in secondary education	72	88.8
Schools with access to computers in primary education (%)	70	85.0
Schools with access to computers in secondary education (%)	45	86
Early learning	70	82.4
Class attendance rate in early childhood education	85	25.7
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	3	90
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	121	81.2
Commence training and learning	118	11.0
Firms offering formal training (%)	78	31.2
Labour force with short-cycle tertiary education (%)	85	3
Participation rate in formal and non-formal education and training	116	116
TVET resources	80	81.4
Government expenditure on vocational education (%)	78	8
Share of students enrolled in secondary vocational programmes	120	3.3
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	80	40.0
Extent of staff training	86	81.8
Quality of vocational training	116	116
Ratio of high-end TVET occupations earnings to average wage	43	31.3
Ratio of median-end TVET occupations earnings to average wage	40	47.0
<b>TVET labour market</b>	118	81.7
Efficiency of the labour market	86	87.0
Firms considered well-integrated educated workforce (%)	44	74.3
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	88	44.0
Unemployment rate with vocational education	40	81.0
High TVET unemployment	118	31.0
Share of TVET occupations	102	22.2
Manufacturing employment (%)	121	27.8
Quality and infrastructure	111	25.7
Enrollment in vocational education, gender parity	116	116
Useable employment rate	108	23.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	88	33.8
Expenditure	80	15.3
Government expenditure per tertiary student	61	15.4
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	80	8.8
Enrollment in bachelor's or equivalent level (%)	88	8.8
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	71	71.8
Ratios/teacher ratio in tertiary education	65	75.5
Research in higher education (%)	116	116
<b>Learning environment</b>	88	88.4
Timely and academic freedom	80	43.4
Teachers in tertiary education, gender parity	80	43.4
Labour mobility rate	116	116
Academic freedom	80	55.4
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	147	25.4
Attainment	80	10.1
Educational attainment rate, bachelor's or equivalent	88	28
Educational attainment rate, master's or equivalent	58	8
Educational attainment rate, doctoral or equivalent	61	0.4
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	80	38.0
University tertiary enrollment in R&D	85	38.0
CRIDE indicators per 100 personnel in higher education	116	116
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	122	18.1
Human capital resources	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality of innovation environment</b>	111	122
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	11.0
<b>Quality of innovation environment</b>	111	122
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	125	0.3
State of digital development	78	45
<b>Outputs</b>	104	8.3
Human capital resources	116	116
Average documents per researcher	116	116
Citations per document	102	3.8
Patent applications (per 100 billion GDP)	116	116
<b>Quality of innovation environment</b>	111	122
Intellectual property receipts (% total trade)	106	1.4
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	38	84.7



# BHUTAN

	Rank	Value
<b>Consumer electronics</b>	101	3.3
Treatment applications per 100 million GDP	106	106
Cultural goods exports (% exports)	128	128
Printing and publishing output (% manufactured output)	196	196
<b>Energy</b>	75	85.9
<b>Renewable</b>	100	100
Renewable installations percentage	196	196
Depth of innovative companies	196	196
ISO 9001 quality certificates (% GDP)	80	8.3
ISO 14001 environmental certificates (% GDP)	74	8
<b>Software</b>	0	0.00
CERD licensed from abroad (%)	196	196
Joint ventures per strategic industry deals (% GDP)	17	46.6
Computer software spending (% GDP)	196	196
<b>Government services</b>	106	10
New business density per thousand population	128	0.3
Firms with one or more employees (%)	79	81.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	188	22.3
<b>Infrastructure</b>	85	38.8
<b>Coverage</b>	106	31.4
3G/4G mobile network coverage (% population)	80	83.0
Secure Internet servers per 1 million population	74	4.8
Investment in telecommunication services (% GDP)	80	27.7
<b>Speed</b>	119	11
Mobile spread and download speeds	196	196
Fixed broadband upload and download speeds	196	196
Fixed broadband subscriptions (by speed) per hundred people	122	0.3
<b>Availability</b>	87	78
Fixed broadband basket (% GNI per capita)	77	24.3
Mobile broadband basket (% GNI per capita)	80	85.4
Internet and telephone competition	87	54.4
<b>Access</b>	77	27.5
<b>Subscribers</b>	80	11.1
Active mobile-broadband subscriptions per fixed-line inhabitants	87	30
International Internet bandwidth per user	118	26.1
Households with Internet access at home (%)	80	44.3
<b>Skills and employment</b>	106	106
Individuals with standard ICT skills (%)	196	196
Tertiary graduates from ICT programmes (%)	196	196
ICT employment (%)	196	196
<b>Usage</b>	118	20.7
<b>Services</b>	107	24.7
Government online services	71	85.2
Fixed broadband Internet traffic per subscriber	100	8
Mobile broadband Internet traffic per subscriber	128	8
Internet users (%)	100	34.0
<b>Commerce</b>	110	11.7
ICT/FIT patent applications (per 100,000 GDP)	196	196
E-participation	81	83.1
Internet activities by individuals (%)	196	196
Trade in digitally deliverable services (% total trade)	143	5.4
<b>ECONOMY</b>	74	83.8
<b>Economic complexity</b>	41	51.8
<b>Manufacturing</b>	27	11.1
Overhead capital formation (% GDP)	8	86.5
Logistics performance	128	28.2
Transport productive capacity	32	41.5
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	80	83.0
Ease of starting a business	85	85.4
Recovery recovery rate	196	196
Entrepreneurial employee activity rate	196	196
Growth of corporate transactions	89	42.0
<b>Employee openness</b>	118	32.0
<b>Trust and development</b>	141	41.7
Trade (% GDP)	80	34.5
High-technology trade (% total trade)	100	27.5
Market concentration	100	87
Market concentration	148	43.7
<b>Product openness</b>	196	11.2
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	144	35
Cost dynamics	196	196
<b>Financing and domestic value added</b>	43	57.1
<b>Financing and costs</b>	47	67.0
Domestic credit to private sector (% GDP)	85	25.0
IMRS financing gap (% GDP)	8	81.0
Tax and contribution rate (% profit)	89	72.2
Bank nonperforming loans (%)	86	64.8
<b>Unmet needs index</b>	41	61.7
Medium- and high-tech activities value added	106	106
Industry and services value added (% GDP)	100	56.4
Labour underutilization rate	13	89.0
Output per worker	80	0.2
<b>ENABLING ENVIRONMENT</b>	41	61.7
<b>Governance</b>	13	72.5
<b>Political environment</b>	34	83.3
Peace and stability	14	84.0
View and accountability	84	83.0
Quality of institutions	55	75.5
Rule of law	41	71.0
Control of corruption	15	82.0
Government effectiveness	22	85.0
<b>Socio-economic</b>	118	46.8
<b>Gender equity</b>	128	49.0
Female-to-male ratio in parliament	114	20.5
Female-to-male labour force participation	85	78.6
Female-to-male ratio in internal wage	196	196
<b>Gender equality</b>	141	31.7
Social protection coverage (% population)	105	5.2
Adult literacy rate	105	87
Youth not in employment, education or training (%)	120	44.1
<b>Standard of living</b>	81	83.0
Poverty headcount ratio (% population)	11	89.2
GDP per capita	80	9.4
<b>Health and environment</b>	18	70.2
<b>Health</b>	101	81.7
Universal health coverage	100	82
Healthy life expectancy (years)	80	81.1
Under-five mortality rate	100	77
<b>Environmental performance</b>	10	73.7
Renewable energy consumption (%)	12	84.1
Household footprint per capita	128	88.1
Natural hazard exposure	47	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 75/154

**GKI SCORE** 48.7

**WORLD AVERAGE** 48.4

# BOLIVIA

(PLURINATIONAL STATE OF)

## KEY INDICATORS

GDP US\$ billions **92.588**  
 Population **11,673,029**  
 HDI **0.718**

## COUNTRY PERFORMANCE SUMMARY

Bolivia (Plurinational State of) is a moderate performer in terms of its knowledge infrastructure. It ranks 75th out of 154 countries in the Global Knowledge Index 2021 and 17th out of the 39 countries with high human development.

### AREAS OF STRENGTH

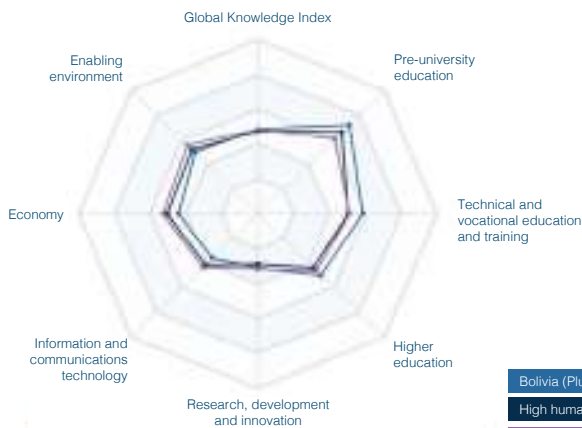
- + Share of students enrolled in secondary vocational programmes
- + Gross attendance ratio for tertiary education, gender parity
- + Citations per document
- + Female-to-male ratio in parliament
- + Investment in telecommunication services (% GDP)

### AREAS OF IMPROVEMENT

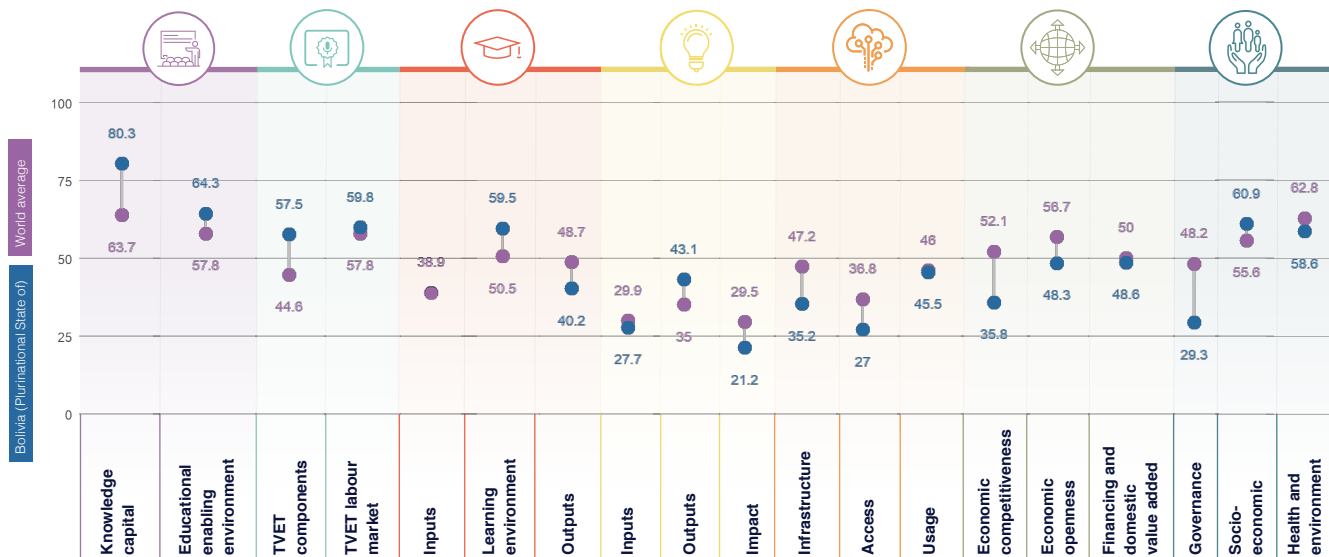
- Internet activities by individuals (%)
- Internet and telephony competition
- Growth of innovative companies
- Tax and contribution rate (% profit)
- Research institutions prominence

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	51	72.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	43	58.6
HIGHER EDUCATION	49	49.8
RESEARCH, DEVELOPMENT AND INNOVATION	75	30.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	99	35.9
ECONOMY	119	44.2
ENABLING ENVIRONMENT	97	49.6



## GKI PILLARS







# BOLIVIA (PLURINATIONAL STATE OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	38	80.3
Enrollment	81	82.0
Net enrolment rate in primary education	83	83.0
Net enrolment rate in lower secondary education	73	80.1
Net enrolment rate in upper secondary education	79	74.0
Completion	67	77.0
Years of compulsory education in primary and secondary	9	82.0
Completion rate in upper secondary education	80	50.0
Success rate rate in the last grade of lower secondary education	74	80.0
Completion	114	114
Assessment of 15-year-old students in math, science and reading	114	114
Learning-adjusted years of schooling	114	114
<b>Educational enabling environment</b>	<b>88</b>	<b>81.3</b>
Expenditure	114	114
Government expenditure on primary education (% GDP)	114	114
Government expenditure on secondary education (% GDP)	114	114
Government funding per primary student (% GDP per capita)	114	114
Government funding per secondary student (% GDP per capita)	114	114
Resources	102	81
Pupil-based teacher ratio in primary education	34	87.4
Pupil-based teacher ratio in secondary education	47	77.2
Schools with access to computers in primary education (%)	80	14.4
Schools with access to computers in secondary education (%)	85	25.1
Early learning	33	83.0
Class attendance rate in early childhood education	37	81.0
Proportion of children who are developmentally on track	114	114
Proportion of children with stimulating home learning environments	114	114
Pupil-based teacher ratio in preprimary education	83	89.7
Quality and infrastructure	64	75.2
Completion rate in upper secondary education, gender parity	22	87.1
Completion rate in upper secondary education, wealth parity	45	82.0
Completion rate in upper secondary education, location parity	83	84.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>59</b>	<b>81.8</b>
Companies training apprentices	110	14.0
Firms offering formal training (%)	25	82.1
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	88	7.1
TVET resources	1	109
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	1	109
Share of students enrolled in postsecondary vocational programmes	114	114
TVET quality and infrastructure	108	27.0
Extent of staff training	103	37
Quality of vocational training	100	43.0
Ratio of high-skill TVET occupations earnings to average wage	83	29.2
Ratio of medium-skill TVET occupations earnings to average wage	34	50.1
<b>TVET labour market</b>	<b>74</b>	<b>80.8</b>
Efficiency of the labour market	41	12.7
Firms considered with inequality educated workforce (%)	54	84.6
Employment educational mismatch (%)	81	83.0
Proportion of skilled production workers	31	71
Unemployment rate with vocational education	30	87
Real TVET unemployment	31	11.0
Share of TVET occupations	81	34
Manufacturing employment (%)	100	26.0
Quality and infrastructure	32	62.1
Enrollment in vocational education, gender parity	9	87.2
Useable employment rate	102	32.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>112</b>	<b>114</b>
Expenditure	114	114
Government expenditure per tertiary student	114	114
Teaching staff compensation (% tertiary expenditure)	114	114
Enrollment	114	114
Enrollment in bachelor's or equivalent level (%)	114	114
Enrollment in masters, doctoral or equivalent (%)	114	114
Resources	114	114
Pupil-teacher ratio in tertiary education	114	114
Research in higher education (%)	114	114
<b>Learning environment</b>	<b>88</b>	<b>84.5</b>
<b>Quality and academic freedom</b>	<b>31</b>	<b>83.0</b>
Teachers in tertiary education, gender parity	114	114
Labour mobility rate	114	114
Academic freedom	82	82.0
<b>Quality and infrastructure</b>	<b>32</b>	<b>62.1</b>
Class attendance rate in tertiary education, gender parity	9	88.1
Class attendance rate in tertiary education, wealth parity	58	25.0
Class attendance rate in tertiary education, location parity	117	25.0
<b>Outputs</b>	<b>114</b>	<b>80.2</b>
<b>Attainment</b>	<b>32</b>	<b>23.0</b>
Educational attainment rate, bachelor's or equivalent	30	60
Educational attainment rate, master's or equivalent	35	6.9
Educational attainment rate, doctoral or equivalent	52	0
<b>Employment</b>	<b>80</b>	<b>64.0</b>
Labour force participation rate with advanced education	47	77.5
Unemployment rate with advanced education	103	81.0
<b>Impact</b>	<b>102</b>	<b>21.2</b>
University tertiary enrollment in R&D	118	25.2
CRIDE indicators per 100 personnel in higher education	114	114
<b>INNOVATION, KNOWLEDGE AND SKILLS</b>		
<b>Inputs</b>	<b>102</b>	<b>21.2</b>
Government R&D expenditure	114	114
GDP (% GDP)	114	114
GERD per researcher	114	114
Researchers per thousand labour force	114	114
Tertiary graduates from STEM programmes (%)	114	114
<b>Quality of innovation environment</b>	<b>32</b>	<b>100.0</b>
GERD performed by business enterprises (%)	114	114
GERD financed by business enterprises (%)	114	114
Researchers in business enterprises (%)	114	114
Firms that spend on R&D (%)	28	31.0
<b>Quality of innovation environment</b>	<b>114</b>	<b>100.0</b>
High-skill employment (%)	43	26.1
Intellectual property payments (% total trade)	73	13.0
State of digital development	108	34.7
<b>Outputs</b>	<b>41</b>	<b>12.7</b>
<b>Quality of innovation environment</b>	<b>11</b>	<b>11.0</b>
Average documents per researcher	114	114
Citations per document	9	88.0
Patent applications (per 100 billion GDP)	74	45.8
<b>Quality of innovation environment</b>	<b>32</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	80	18.2
Research design applications (per 100 billion GDP)	100	0.8
PCT applications (per 100 billion GDP)	108	27.7
Firms producing new goods and services (%)	11	37.2



# BOLIVIA (PLURINATIONAL STATE OF)

	Rank	Value
<b>Consumer electronics</b>	81	25.3
Treatment applications per 100 million GDP	82	25.7
Cultural goods exports (% exports)	85	32.8
Printing and publishing output (% manufactured output)	88	24.4
<b>Finance</b>	111	45.3
<b>Trade</b>	108	32.5
Access to investors' protection	115	9
Depth of innovative companies	132	30.1
ISO 9001 quality certificates (% GDP)	85	5.8
ISO 14001 environmental certificates (% GDP)	89	5.7
<b>Logistics</b>	95	30.7
CERD freedom from abuse (%)	108	11.8
Cost of letters per storage distance mile (% GDP)	111	5.1
Computer software spending (% GDP)	43	23.7
<b>Government services</b>	86	30.0
New business density per thousand population	105	2.4
Firms with web presence (%)	45	31.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	88	22.9
<b>Infrastructure</b>	113	35.3
<b>Coverage</b>	98	54.5
3G/LTE mobile network coverage (% population)	108	55.9
Secure Internet servers per 1 million population	88	2.5
Investment in telecommunication services (% GDP)	9	80.0
<b>Quality</b>	108	3.8
Mobile speed and download speeds	114	11.8
Fixed broadband upload and download speeds	116	11.8
Fixed broadband subscriptions (y speed) per hundred people	108	2.8
<b>Availability</b>	108	46.3
Fixed broadband basket (% GNI per capita)	107	87.1
Mobile broadband basket (% GNI per capita)	100	49.4
Internet and telephone competition	143	33.3
<b>Access</b>	164	27
<b>Subscriptions</b>	88	11.8
Active mobile-broadband subscriptions per fixed-line inhabitants	75	36.7
International Internet bandwidth per user	88	25.8
Households with Internet access at home (%)	80	55.9
<b>Skills and employment</b>	117	12
Individuals with standard ICT skills (%)	114	11.8
Tertiary graduates from ICT programmes (%)	116	11.8
ICT employment (%)	76	12
<b>Usage</b>	82	46.3
<b>Services</b>	87	35.5
Government online services	81	55.2
Fixed broadband Internet traffic per subscription	114	11.8
Mobile broadband Internet traffic per subscription	116	11.8
Internet users (%)	80	82.7
<b>Commerce</b>	110	35.5
ICT/FIT patent applications (per 100,000 GDP)	114	11.8
E-participation	87	55.0
Internet activities by individuals (%)	88	56.2
Trade in digitally deliverable services (% total trade)	80	30.0
<b>ECONOMY</b>	115	47.2
<b>Economic complexity metrics</b>	143	33.3
<b>Manufacture innovation</b>	144	22.1
Overhead capital formation (% GDP)	118	40
Logistics performance	127	34
Transport productive capacity	115	19.0
Building quality control	138	46.7

	Rank	Value
<b>Business agility</b>	108	32.3
Cost of starting a business	145	89.4
Recovery recovery time	82	44.3
Entrepreneurial employee activity rate	77	3.8
Growth of corporate transactions	88	30.0
<b>Corporate openness</b>	107	46.3
<b>Trade and investment</b>	87	22.1
Trade (% GDP)	102	21.0
High-technology trade (% total trade)	94	41.1
Market concentration	111	89.8
Market concentration	88	82
Product diversity	107	41.0
Contract financial openness	78	48.8
Foreign direct investment, net inflows (% GDP)	105	31.0
Data dynamics	102	49.4
<b>Financing and domestic value added</b>	81	46.3
<b>Financing and credit</b>	10	26.7
Domestic credit to private sector (% GDP)	81	26.7
IMRS financing gap (% GDP)	10	80.7
Tax and contribution rate (% profit)	100	25
Bank nonperforming loans (%)	18	84.0
<b>Unmet needs index</b>	98	39.0
Medium- and high-tech activities value added	107	11
Industry and services value added (% GDP)	114	51.0
Labour underutilization rate	21	84.7
Output per worker	107	5.8
<b>ENABLING ENVIRONMENT</b>	87	49.8
<b>Governance</b>	118	25.3
<b>Political environment</b>	94	35.1
Peace and stability	100	25.0
View and accountability	88	43.0
Quality of institutions	107	22.4
Rule of law	145	12
Control of corruption	117	24.5
Government effectiveness	107	30.8
<b>Socio-economic</b>	88	60.8
<b>Gender equity</b>	9	83.0
Female-to-male ratio in parliament	9	85.7
Female-to-male labour force participation	71	77.1
Female-to-male ratio in internal wage	75	54.0
<b>Gender equality</b>	88	89.0
Social protection coverage (% population)	88	45.1
Adult literacy rate	88	80.0
Youth not in employment, education or training (%)	54	73.0
<b>Standard of living</b>	111	37.2
Poverty headcount ratio (% population)	87	47.0
GDP per capita	100	6.8
<b>Health and environment</b>	112	55.8
<b>Health</b>	88	51.0
Universal health coverage	85	88
Healthy life expectancy (years)	87	83.8
Under-five mortality rate	102	70.2
<b>Environmental performance</b>	111	88.0
Renewable energy consumption (%)	102	7.8
Household footprint per capita	88	79.7
Natural hazard exposure	88	55

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# BOSNIA AND HERZEGOVINA

KEY INDICATORS	
GDP US\$ billions	47,046
Population	3,280,815
HDI	0.78

**GKI RANK** 65/154

**GKI SCORE** 49.6  
**WORLD AVERAGE** 48.4

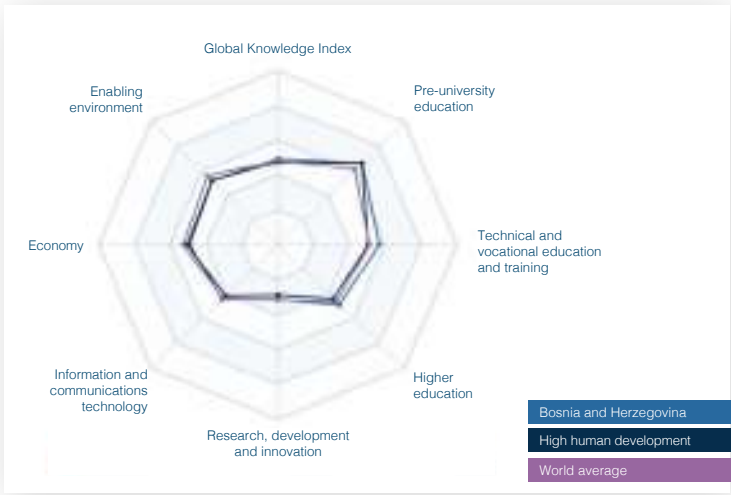
**COUNTRY PERFORMANCE SUMMARY**  
Bosnia and Herzegovina is a moderate performer in terms of its knowledge infrastructure. It ranks 65th out of 154 countries in the Global Knowledge Index 2021 and 8th out of the 39 countries with high human development.

- AREAS OF STRENGTH**
- + Proportion of children with stimulating home learning environment
  - + Proportion of children who are developmentally on track
  - + ISO 9001 quality certificates (% GDP)
  - + Completion rate in upper secondary education, gender parity
  - + Government funding per secondary student (% of GDP per capita)

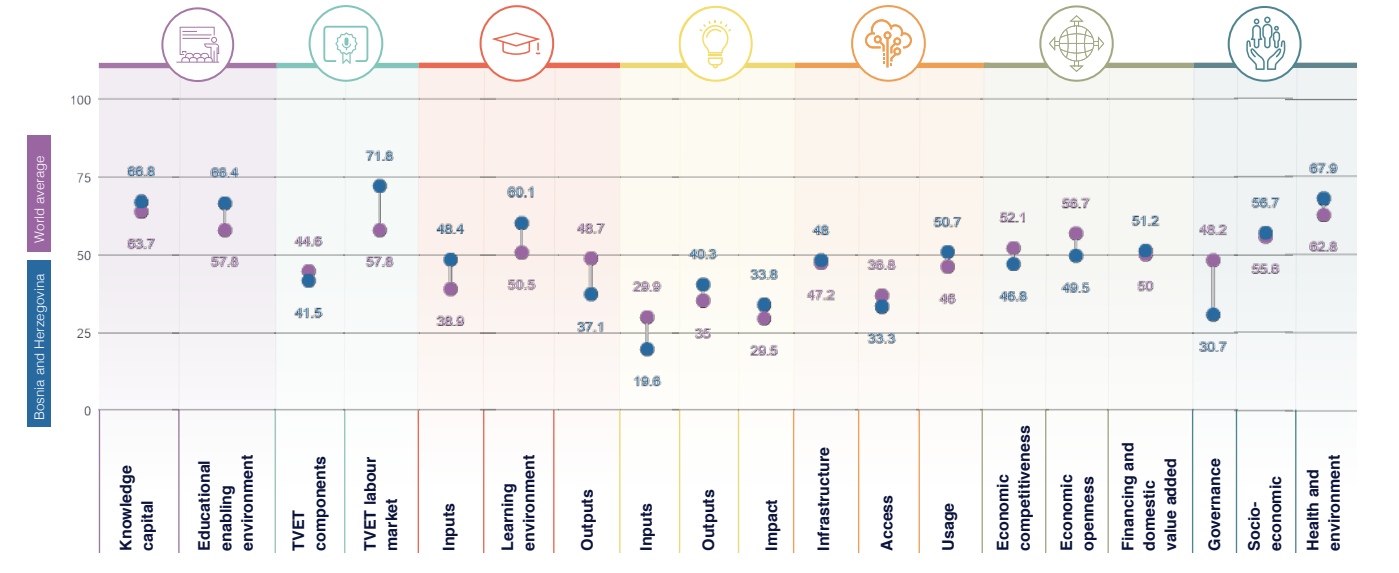
- AREAS OF IMPROVEMENT**
- Chinn-Ito financial openness
  - Quality of vocational training
  - University-industry collaboration in R&D
  - Government expenditure on primary education (% of GDP)
  - Ease of starting a business

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	76	66.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	48	56.7
HIGHER EDUCATION	60	48.5
RESEARCH, DEVELOPMENT AND INNOVATION	68	31.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	76	44
ECONOMY	89	49.2
ENABLING ENVIRONMENT	87	51.8



## GKI PILLARS





# BOSNIA AND HERZEGOVINA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>	<b>76</b>	<b>66.6</b>
Knowledge capital	83	66.8
Enrolment	99	76.0
Net enrolment rate in primary education	n/a	n/a
Net enrolment rate in lower secondary education	n/a	n/a
Net enrolment rate in upper secondary education	89	78.8
Completion	37	81.5
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	8	87.4
Gross intake ratio to the last grade of lower secondary education	49	77.9
Outcomes	99	40.4
Assessment of 15-year-old students in math, science and reading	61	20
Learning-adjusted years of schooling	85	52.8
<b>Educational enabling environment</b>	<b>63</b>	<b>66.4</b>
Expenditure	40	37.0
Government expenditure on primary education (% GDP)	125	13.4
Government expenditure on secondary education (% GDP)	12	48.4
Government funding per primary student (% GDP per capita)	89	30.3
Government funding per secondary student (% GDP per capita)	6	58.3
Resource	67	63.9
Pupil-trained teacher ratio in primary education	n/a	n/a
Pupil-trained teacher ratio in secondary education	n/a	n/a
Schools with access to computers in primary education (%)	73	27.9
Schools with access to computers in secondary education (%)	1	100
Early learning	41	71.5
Gross enrolment ratio in early childhood education	114	16.5
Proportion of children who are developmentally on track	2	98.8
Proportion of children with stimulating home learning environments	2	99.5
Pupil-trained teacher ratio in pre-primary education	n/a	n/a
Equity and inclusiveness	19	83.6
Completion rate in upper secondary education, gender parity	5	99.2
Completion rate in upper secondary education, wealth parity	20	84.7
Completion rate in upper secondary education, location parity	30	93.8
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>	<b>49</b>	<b>66.7</b>
<b>TVET components</b>	<b>30</b>	<b>41.3</b>
Comprehensive training and skilling	110	28.1
Firms offering formal training (%)	42	48.8
Labour force with short-cycle tertiary education (%)	n/a	n/a
Participation rate in formal and non-formal education and training	47	11.6
<b>TVET structure</b>	<b>26</b>	<b>50.7</b>
Government expenditure on vocational education (%)	n/a	n/a
Share of students enrolled in secondary vocational programmes	9	59.7
Share of students enrolled in post-secondary vocational programmes	n/a	n/a
<b>TVET quality and qualifications</b>	<b>137</b>	<b>33.9</b>
Extent of staff training	136	34.9
Quality of vocational training	132	35
Ratio of high-skill TVET occupations earnings to average wage	77	20.8
Ratio of medium-skill TVET occupations earnings to average wage	29	52.8
<b>TVET labour market</b>	<b>25</b>	<b>71.8</b>
Efficiency of the labour market	80	61.7
Firms constrained with inadequately educated workforce (%)	76	56
Employment educational mismatch (%)	18	83.7
Proportion of skilled production workers	83	50.5
Unemployment rate with vocational education	99	57.8
<b>Post-TVET employment</b>	<b>10</b>	<b>65.5</b>
Share of TVET occupations	29	70.5
Manufacturing employment (%)	12	86.6
Equity and inclusiveness	26	83.2
Enrolment in vocational education, gender parity	20	90.4
Vulnerable employment rate	57	79.9

	Rank	Value
<b>HIGHER EDUCATION</b>	<b>60</b>	<b>48.5</b>
<b>Inputs</b>	<b>39</b>	<b>48.4</b>
Expenditure	73	24.1
Government expenditure per tertiary student	65	13.9
Teaching staff compensation (% tertiary expenditure)	49	34.3
Enrolment	90	29.7
Enrolment in bachelor's or equivalent level (%)	73	21.8
Enrolment in master's, doctoral or equivalent (%)	42	37.5
Resources	5	91.9
Pupil-teacher ratio in tertiary education	12	92.4
Researchers in higher education (%)	8	90.7
<b>Learning environment</b>	<b>47</b>	<b>60.1</b>
Diversity and academic freedom	83	50.4
Teachers in tertiary education, gender parity	26	66.5
Labour mobility rate	43	23.2
Academic freedom	87	68.6
Equity and inclusiveness	11	80.8
Gross attendance ratio for tertiary education, gender parity	39	80.5
Gross attendance ratio for tertiary education, wealth parity	7	70
Gross attendance ratio for tertiary education, location parity	11	21.8
<b>Outputs</b>	<b>123</b>	<b>37.1</b>
Attainment	81	13.0
Educational attainment rate, bachelor's or equivalent	73	26
Educational attainment rate, master's or equivalent	66	5.8
Educational attainment rate, doctorate or equivalent	83	8.7
Employment	82	70.8
Labour force participation rate with advanced education	39	70.1
Unemployment rate with advanced education	103	62.4
Impact	116	27
University-industry collaboration in R&D	126	23.7
Citable documents per R&D personnel in higher education	58	30.2
<b>RESEARCH DEVELOPMENT AND INNOVATION</b>	<b>88</b>	<b>21.2</b>
<b>Inputs</b>	<b>116</b>	<b>18.6</b>
Spillover of R&D institutions	119	18.7
GERD (% GDP)	93	3.7
GERD per researcher	92	8.4
Researchers per thousand labour force	64	7.5
Tertiary graduates from STEM programmes (%)	54	43.1
<b>Spillover of R&amp;D to business enterprises</b>	<b>91</b>	<b>39</b>
GERD performed by business enterprises (%)	64	1.9
GERD financed by business enterprises (%)	59	35.8
Researchers in business enterprises (%)	60	9.9
Firms that spend on R&D (%)	47	29.4
<b>Spillover of R&amp;D to innovation</b>	<b>96</b>	<b>23.9</b>
High-skill employment (%)	28	45.9
Intellectual property payments (% total trade)	102	4.1
State of cluster development	127	30.8
<b>Outputs</b>	<b>92</b>	<b>40.3</b>
<b>Spillover of R&amp;D institutions</b>	<b>90</b>	<b>52.4</b>
Average documents per researcher	22	69.0
Citations per document	32	34.7
Patent applications (per 100 billion GDP)	81	52.6
<b>Spillover of R&amp;D to business enterprises</b>	<b>97</b>	<b>37.6</b>
Intellectual property receipts (% total trade)	90	14.8
Industrial design applications (per 100 billion GDP)	36	19.2
PCT applications (per 100 billion GDP)	84	54.3
Firms producing new goods and services (%)	32	62.3

# BOSNIA AND HERZEGOVINA

	Rank	Value		Rank	Value
<b>Degree of economic integration</b>	76	53.5	<b>Business agility</b>	110	44.3
Trademark applications (per 100 billion GDP)	91	12.2	Ease of starting a business	151	60
Cultural goods exports (% exports)	46	17	Insolvency recovery rate	89	43.1
Printing and publishing output (% manufactured output)	48	28.7	Entrepreneurial employee activity rate	84	2.7
<b>Impact</b>	58	55.8	Extent of corporate transparency	50	71.4
<b>Quality</b>	33	46	<b>Economic openness</b>	102	48.8
Research institutions prominence	86	8.6	Trade and diversification	55	62.2
Growth of innovative companies	124	39.8	Trade (% GDP)	57	34
ISO 9001 quality certificates (% GDP)	6	98.4	High-technology trade (% total trade)	111	36.6
ISO 14001 environmental certificates (% GDP)	20	49.5	Product concentration	24	89.9
<b>Life expectancy</b>	98	72.2	Market concentration	51	92.3
GERD financed from abroad (%)	21	38.8	<b>Financial openness</b>	115	25.7
Joint ventures per strategic alliance deals (% GDP)	86	9	China-to financial openness	98	18.4
Computer software spending (% GDP)	92	7	Foreign direct investment, net inflows (% GDP)	79	40.8
<b>Economic development</b>	95	31.3	Debt dynamics	82	50
New business density per thousand population	90	5.3	<b>Financing and domestic value added</b>	88	51.2
Firms with new products/service (%)	71	65.2	Financing and loans	39	67.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	70	44	Domestic credit to private sector (% GDP)	67	21.9
<b>Infrastructure</b>	70	48	MSME financing gap (% GDP)	9	91.2
<b>Coverage</b>	127	11.2	Tax and contribution rate (% profit)	24	64
3G/4G mobile network coverage (% population)	138	40.3	Bank non-performing loans (%)	84	74.5
Secure Internet servers per 1 million population	56	16.5	Domestic value added	106	34.6
Investment in telecommunication services (% GDP)	39	42.8	Medium- and high-tech activities value added	82	22.2
<b>Quality</b>	51	33.8	Industry and services value added (% GDP)	98	58.6
Mobile upload and download speeds	n/a	n/a	Labour underutilization rate	123	42.1
Fixed-broadband upload and download speeds	n/a	n/a	Output per worker	66	17.5
Fixed-broadband subscriptions by speed per hundred people	60	35.6	<b>ENABLING ENVIRONMENT</b>	87	51.8
<b>Affordability</b>	89	77.2	<b>Governance</b>	106	30.7
Fixed broadband basket (% GNI per capita)	63	77.8	Political environment	101	32.3
Mobile broadband basket (% GNI per capita)	76	61.5	Peace and stability	105	27.8
Internet and telephony competition	91	82.3	Voice and accountability	95	36.7
<b>Access</b>	88	52.2	Quality of institutions	115	20.2
<b>Subscriptions</b>	84	46	Rule of law	84	43.3
Active mobile-broadband subscriptions per hundred inhabitants	116	20	Control of corruption	109	28.8
International Internet bandwidth per user	63	42	Government effectiveness	136	15.4
Households with Internet access at home (%)	71	72.9	<b>Socio-economic</b>	75	56.7
<b>Skills and employment</b>	92	21.7	Gender equity	92	61.9
Individuals with standard ICT skills (%)	70	15.4	Female-to-male ratio in parliament	71	35.5
Tertiary graduates from ICT programmes (%)	58	33.5	Female-to-male labour force participation	115	61.2
ICT employment (%)	59	20.1	Female-to-male ratio in Internet usage	80	80.1
<b>Usage</b>	67	66.7	<b>Social inclusion</b>	80	62.6
<b>Services</b>	35	62.8	Social protection coverage (% population)	71	36.3
Government online services	100	53.5	Adult literacy rate	40	96.1
Fixed broadband Internet traffic per subscription	n/a	n/a	Youth not in employment, education or training (%)	100	56.3
Mobile broadband Internet traffic per subscription	n/a	n/a	Standard of living	50	44.8
Internet users (%)	71	71.7	Poverty headcount ratio (% population)	41	76.7
<b>Outcomes</b>	103	38.7	GDP per capita	78	12.4
ICT PCT patent applications (per 100 billion GDP)	79	37.9	<b>Health and environment</b>	37	67.9
E-participation	85	60.7	<b>Health</b>	72	75.2
Internet activities by individuals (%)	51	36.5	Universal health coverage	105	61
Trade in digitally deliverable services (% total trade)	124	19.9	Healthy life expectancy (years)	47	78.9
<b>ECONOMY</b>	89	49.2	Under-five mortality rate	40	96.6
Economic competitiveness	96	46.6	Environmental performance	56	57.7
Infrastructure investment	61	46.3	Renewable energy consumption (%)	53	38.7
Gross fixed capital formation (% GDP)	103	42.1	Ecological footprint per capita	93	76.3
Logistics performance	72	45.2	Natural hazard exposure	63	60
Transport productive capacity	90	23.1			
Building quality control	22	86.7			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BOTSWANA

**GKI RANK** 70/154

**GKI SCORE** 49

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Botswana is a moderate performer in terms of its knowledge infrastructure. It ranks 70th out of 154 countries in the Global Knowledge Index 2021 and 13th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + New business density per thousand population
- + GERD per researcher
- + Ratio of high-skill TVET occupations earnings to average wage
- + Peace and stability
- + Gross fixed capital formation (% GDP)

### AREAS OF IMPROVEMENT

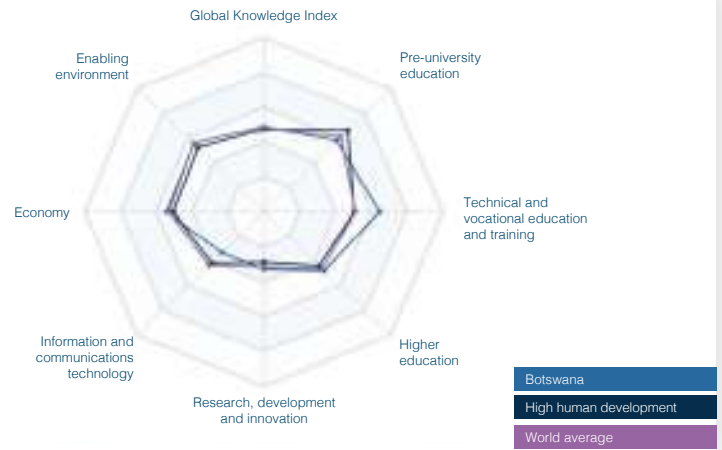
- Healthy life expectancy (years)
- Unemployment rate with advanced education
- Youth not in employment, education or training (%)
- Product concentration
- Years of compulsory education in primary and secondary

### KEY INDICATORS

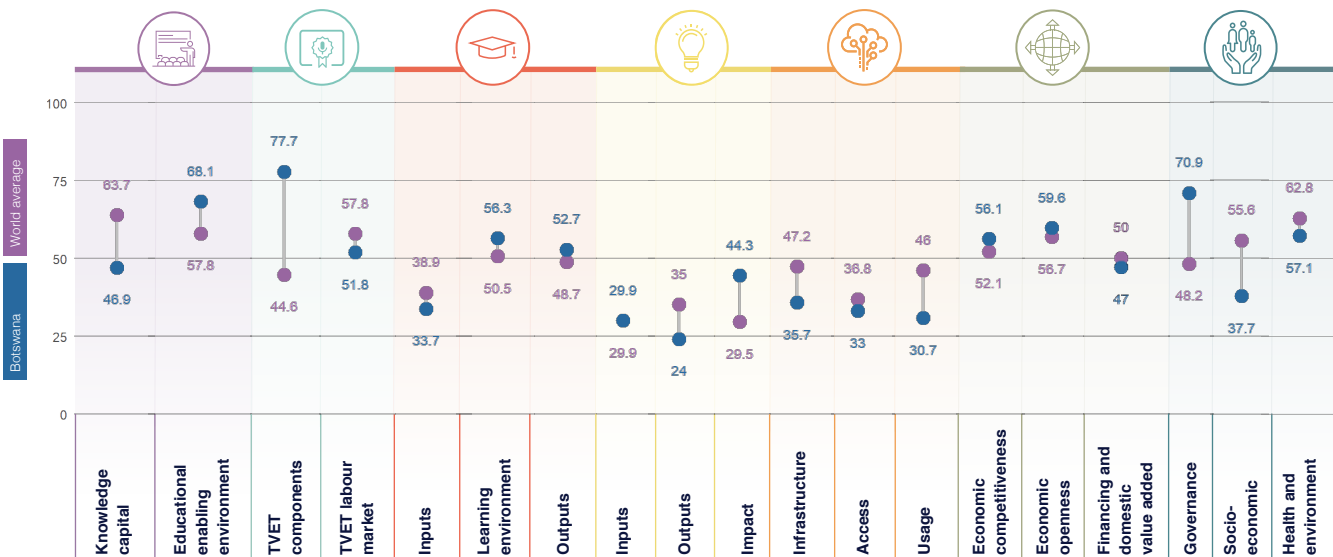
**GDP US\$ billions** 3772  
**Population** 2,351,625  
**HDI** 0.735

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	96	57.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	23	64.7
HIGHER EDUCATION	67	47.6
RESEARCH, DEVELOPMENT AND INNOVATION	59	32.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	104	33.1
ECONOMY	66	54.3
ENABLING ENVIRONMENT	69	55.2



## GKI PILLARS





# BOTSWANA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	120	86.8
Enrolment	111	60.4
Net enrolment rate in primary education	116	60.4
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	110	37
Years of compulsory education in primary and secondary	148	8
Completion rate in upper secondary education	60	64.0
Success rate rate in the last grade of lower secondary education	28	76.5
Completion	110	27.1
Assessment of Grade 6 students in math, science and reading	116	116
Learning-adjusted years of schooling	122	27.1
<b>Educational enabling environment</b>		
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	60	60
Pupil-based teacher ratio in primary education	40	60.0
Pupil-based teacher ratio in secondary education	78	60.0
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	60	75
Early learning	20	21.0
Class attendance rate in early childhood education	112	16.7
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	41	60.4
Quality and infrastructure	20	60.0
Completion rate in upper secondary education, gender parity	60	60.0
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	10	10.0
Firms offering formal training (%)	20	66.7
Labour force with short-cycle tertiary education (%)	12	65.7
Participation rate in formal and non-formal education and training	116	116
<b>TVET resources</b>		
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>		
Extent of staff training	66	66.1
Quality of vocational training	60	46.0
Ratio of high-skil TVET occupations earnings to average wage	1	100
Ratio of median-skil TVET occupations earnings to average wage	60	34.4
<b>TVET labour market</b>		
Efficiency of the labour market	116	61.0
Firms considered with inappropriately educated workforce (%)	67	29.6
Employment educational mismatch (%)	67	50.4
Proportion of skilled production workers	111	26.0
Unemployment rate with vocational education	106	45.1
Real TVET unemployment	116	31.0
Share of TVET occupations	34	47.0
Manufacturing employment (%)	118	22
<b>Quality and infrastructure</b>		
Enrolment in vocational education, gender parity	116	116
Useable employment rate	60	27.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	100	31
Enrolment in bachelor's or equivalent level (%)	60	12.6
Enrolment in masters, doctoral or equivalent (%)	111	6.1
Resources	60	60
Pupil-teacher ratio in tertiary education	66	25.3
Research in higher education (%)	61	42.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	21	31.1
Labour mobility rate	75	7.6
Academic freedom	42	68.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Research	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	60.7
Labour force participation rate with advanced education	53	75.0
Unemployment rate with advanced education	126	46.0
Impact	22	44.0
University tertiary enrollment in R&D	62	36.0
CRIDE students per 100 persons in higher education	28	52.0
<b>Government's contribution and economic role</b>		
<b>Inputs</b>		
Government expenditure	20	60.0
GDP (% GDP)	56	16.7
GERD per researcher	1	308
Researchers per thousand labour force	60	2.4
Tertiary graduates from STEM programmes (%)	67	36.0
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	61	2.8
GERD financed by business enterprises (%)	69	21.0
Researchers in business enterprises (%)	77	0.9
Firms that spend on R&D (%)	116	116
<b>Quality and infrastructure</b>		
High-skilled employment (%)	20	48.1
Intellectual property payments (% total trade)	30	27.0
State of cluster development	116	36.0
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	15	73.4
Citations per document	118	16.1
Patent applications (per 100 billion GDP)	114	26.4
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	52	4.9
Research design applications (per 100 billion GDP)	60	1.6
PCT applications (per 100 billion GDP)	111	35.5
Firms producing new goods and services (%)	116	116

# BOTSWANA

	Rank	Value
<b>Consumer Electronics</b>		
Treatment applications per 100 million GDP	82	11.8
Cultural goods exports (% exports)	118	2.5
Printing and publishing output (% manufactured output)	196	1.9
<b>Energy</b>	75	46.3
<b>Finance</b>	100	32.5
Access to venture capital	112	4.8
Depth of innovative companies	111	42.5
ISO 9001 quality certificates (% GDP)	143	0.8
ISO 14001 environmental certificates (% GDP)	118	2.1
<b>Infrastructure</b>	55	69.5
CERD received from abroad (%)	93	41.2
Cost savings per strategic alliance deals (% GDP)	89	31
Computer software spending (% GDP)	85	9.8
<b>Internationalization</b>	1	199
New business density per thousand population	1	199
Firms with new products/services (%)	196	19
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	184	22.5
<b>Infrastructure</b>	111	66.7
<b>Coverage</b>	65	33.3
3G/4G mobile network coverage (% population)	21	65.3
Secure Internet servers per 1 million population	94	2.8
Investment in telecommunication services (% GDP)	68	21.6
<b>Quality</b>	109	9.8
Mobile speed and download speeds	80	16.6
Fixed broadband upload and download speeds	100	3.1
Fixed broadband subscriptions (y speed) per hundred people	108	2.8
<b>Accessibility</b>	108	11.7
Fixed broadband bandwidth (% Gbps per capita)	89	66.2
Mobile broadband basket (% Gbps per capita)	87	80
Internet and telephony competition	135	30
<b>Access</b>	88	33
<b>Subscriptions</b>	71	41.1
Active mobile-broadband subscriptions per fixed-line inhabitants	43	40.8
International Internet bandwidth per user	138	22.1
Households with Internet access at home (%)	62	63.5
<b>Skills and employment</b>	66	23.5
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	45	35.6
ICT employment (%)	77	12
<b>Usage</b>	121	30.7
<b>Services</b>	116	23.8
Government online services	127	36.5
Fixed broadband Internet traffic per subscription	81	1
Mobile broadband Internet traffic per subscription	87	8.8
Internet users (%)	80	59.0
<b>Commerce</b>	110	31.5
ICT FDI parent applications (per 100 million GDP)	194	1.9
E-participation	123	36.0
Internet activities by individuals (%)	194	19
Trade in digitally deliverable services (% total trade)	80	34.1
<b>ECONOMY</b>	84	54.3
<b>Economic Competitiveness</b>	81	58.5
<b>Efficiency</b>	41	16.3
Overhead capital formation (% GDP)	12	72.3
Logistics performance	49	51.1
Transport productive capacity	87	23.8
Building quality control	86	20

	Rank	Value
<b>Business Agility</b>	80	36
Cost of starting a business	134	26.2
Recovery time	31	72
Entrepreneurial employee activity rate	54	12.5
Growth of corporate transactions	88	21.4
<b>Customer experience</b>	82	66.8
Trust and dissatisfaction	143	41.0
<b>Talent (% GDP)</b>	86	30.7
High-technology trade (% total trade)	114	23.5
Market concentration	188	12.1
Market concentration	107	85
Product diversity	15	11.5
Customer financial openness	1	188
Foreign direct investment, net inflows (% GDP)	107	35.4
Cost dynamics	1	188
<b>Financing and domestic value added</b>	82	47
<b>Financing and costs</b>	91	61.0
Domestic credit to private sector (% GDP)	86	13.5
MSME financing gap (% GDP)	88	65.1
Tax and contribution rate (% profit)	27	62.8
Bank nonperforming loans (%)	69	62.0
Unmet loan demand	113	31.1
Medium- and high-tech activities value added	111	9
Industry and services value added (% GDP)	43	87.5
Labour underutilization rate	122	31.4
Output per worker	80	45.4
<b>ENABLING ENVIRONMENT</b>	84	54.3
<b>Governance</b>	38	70.9
<b>Political environment</b>	81	35
Peace and stability	9	69.2
View and accountability	81	60.0
Quality of institutions	47	65.5
Rule of law	48	63.0
Control of corruption	39	72.1
Government effectiveness	38	62.5
<b>Socio-economic</b>	131	37.7
<b>Gender equity</b>	100	56.0
Female-to-male ratio in parliament	136	12.1
Female-to-male labour force participation	39	66.2
Female-to-male ratio in internal wage	88	65.5
Gender inequality	122	33.0
Social protection coverage (% population)	111	12.2
Adult literacy rate	77	83
Youth not in employment, education or training (%)	147	32.6
<b>Standard of living</b>	117	18
Poverty headcount ratio (% population)	196	19
GDP per capita	87	19
<b>Health and environment</b>	123	57.1
<b>Health</b>	116	66
Universal health coverage	105	81
Healthy life expectancy (years)	146	31.3
Under-five mortality rate	114	65.5
Environmental performance	41	61.3
Renewable energy consumption (%)	84	20.3
Household footprint per capita	79	60.5
Natural hazard exposure	32	72

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BRAZIL

**GKI RANK** 79/154

**GKI SCORE** 47.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Brazil is a moderate performer in terms of its knowledge infrastructure. It ranks 79th out of 154 countries in the Global Knowledge Index 2021 and 19th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Entrepreneurial employee activity rate
- + Teaching staff compensation (% tertiary expenditure)
- + Government expenditure on secondary education (% of GDP)
- + Trade in digitally deliverable services (% total trade)
- + Research institutions prominence

### AREAS OF IMPROVEMENT

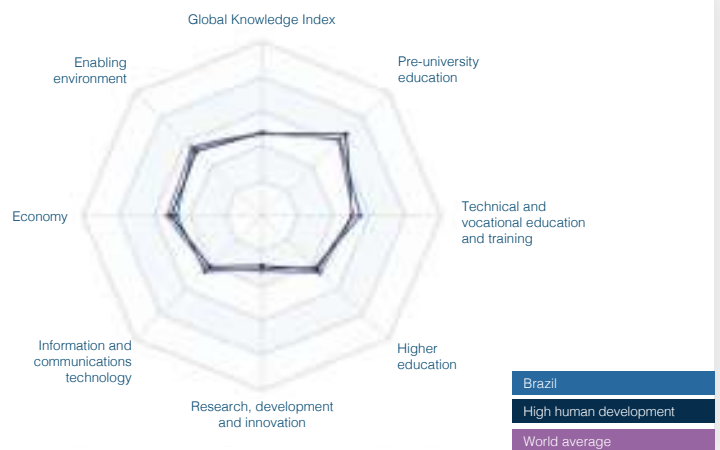
- Inbound mobility rate
- Trade (% GDP)
- Debt dynamics
- Chinn-Ito financial openness
- Tax and contribution rate (% profit)

### KEY INDICATORS

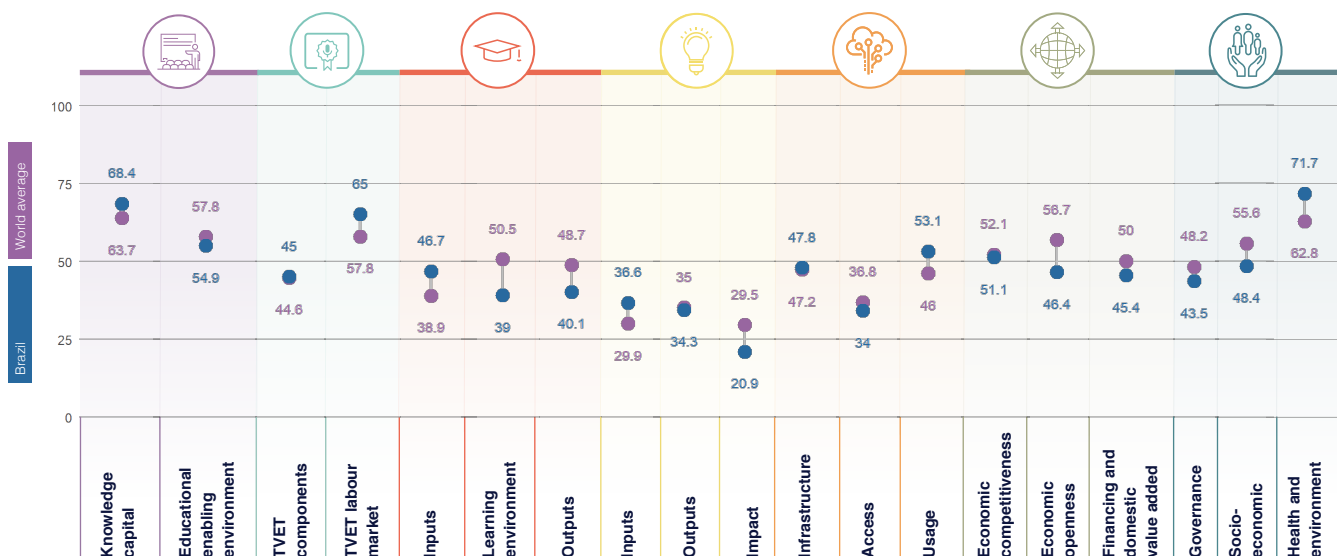
**GDP US\$ billions** 2,988.451  
**Population** 212,559,409  
**HDI** 0.765

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	90	61.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	56	55
HIGHER EDUCATION	91	42
RESEARCH, DEVELOPMENT AND INNOVATION	76	30.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	71	45
ECONOMY	98	47.6
ENABLING ENVIRONMENT	71	54.6



## GKI PILLARS







# BRAZIL

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	81	61.7
Enrollment	33	82.5
Net enrolment rate in primary education	28	88.3
Net enrolment rate in lower secondary education	42	86.7
Net enrolment rate in upper secondary education	69	82.7
Completion	77	72.5
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	69	60.7
Success rate rate in the last grade of lower secondary education	88	82.8
Completion	54	40.2
Assessment of 15-year-old students in math, science and reading	86	26.9
Learning-adjusted years of schooling	81	52.4
<b>Educational enabling environment</b>	<b>88</b>	<b>64.8</b>
Expenditure	34	42
Government expenditure on primary education (% GDP)	66	35.3
Government expenditure on secondary education (% GDP)	93	49.9
Government funding per primary student (% GDP per capita)	81	88.4
Government funding per secondary student (% GDP per capita)	47	34.3
Resources	81	81.1
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	63	53.5
Schools with access to computers in secondary education (%)	71	36.7
Early learning	100	46
Class attendance rate in early childhood education	62	86
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	33	66.4
Completion rate in upper secondary education, gender parity	76	65.5
Completion rate in upper secondary education, wealth parity	60	45.7
Completion rate in upper secondary education, location parity	66	67.9
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>19</b>	<b>89</b>
Communications training and learning	116	116
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	41	53.1
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	100	5.8
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	116	30.5
Extent of staff training	82	47.1
Quality of vocational training	126	30.0
Ratio of high-skill TVET occupations earnings to average wage	89	29.7
Ratio of medium-skill TVET occupations earnings to average wage	100	31.2
<b>TVET labour market</b>	<b>86</b>	<b>86</b>
Efficiency of the labour market	41	71.5
Firms considered well-integrated into workforce (%)	116	116
Employment educational mismatch (%)	46	71.2
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	116	116
Real TVET unemployment	36	69.1
Share of TVET occupations	65	80
Manufacturing employment (%)	62	35.7
Quality and infrastructure	76	75.7
Enrollment in vocational education, gender parity	67	77.4
Useable employment rate	76	70.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>48</b>	<b>46.7</b>
Expenditure	22	47.6
Government expenditure per tertiary student	56	11.9
Teaching staff compensation (% tertiary expenditure)	6	71.8
Enrollment	33	21.9
Enrollment in bachelor's or equivalent level (%)	24	35.5
Enrollment in masters, doctoral or equivalent (%)	94	5.8
Resources	44	12.7
Rapit teacher ratio in tertiary education	81	88.1
Research staff in higher education (%)	23	72.5
<b>Learning environment</b>	<b>128</b>	<b>39</b>
<b>Quality and academic freedom</b>	<b>100</b>	<b>43.7</b>
Teachers in tertiary education, gender parity	28	83.0
Labour mobility rate	113	0.9
Academic freedom	112	44.2
<b>Quality and infrastructure</b>	<b>68</b>	<b>34.5</b>
Class attendance rate in tertiary education, gender parity	67	31
Class attendance rate in tertiary education, wealth parity	96	25.9
Class attendance rate in tertiary education, location parity	88	7.4
<b>Outputs</b>	<b>119</b>	<b>40.1</b>
<b>Attainment</b>	<b>71</b>	<b>15.2</b>
Educational attainment rate, bachelor's or equivalent	54	42
Educational attainment rate, master's or equivalent	81	5.8
Educational attainment rate, doctoral or equivalent	52	12.5
<b>Employment</b>	<b>66</b>	<b>19.0</b>
Labour force participation rate with advanced education	81	74.4
Unemployment rate with advanced education	79	38.0
<b>Impact</b>	<b>127</b>	<b>34.0</b>
University tertiary enrollment in R&D	77	40
OECD indicators per 1000 personnel in higher education	63	9.2
<b>ENVIRONMENTAL QUALITY AND INFRASTRUCTURE</b>		
<b>Energy</b>	<b>22</b>	<b>18.4</b>
Access to electricity	11	100
CO2 emissions	11	100
CO2 emissions per worker	21	23.5
CO2 emissions per researcher	21	46.4
Researcher per thousand labour force	58	11.5
Tertiary graduates from STEM programmes (%)	86	35.2
<b>Quality of infrastructure</b>	<b>31</b>	<b>66</b>
CO2 emissions per business enterprise (%)	116	116
CO2 emissions by business enterprises (%)	37	53.8
Researcher in business enterprises (%)	45	32.2
Firms that spend on R&D (%)	116	116
<b>Quality of infrastructure</b>	<b>31</b>	<b>66</b>
High-skilled employment (%)	30	45.0
Intellectual property payments (% total trade)	27	45.1
State of digital development	58	48.7
<b>Quality</b>	<b>116</b>	<b>116</b>
<b>Quality of infrastructure</b>	<b>116</b>	<b>116</b>
Average documents per researcher	79	65.5
Citations per document	126	12.0
Patent applications (per 100 billion GDP)	41	65.1
<b>Quality of infrastructure</b>	<b>31</b>	<b>66</b>
Intellectual property receipts (% total trade)	39	20.1
Research design applications (per 100 billion GDP)	57	6.8
PCT applications (per 100 billion GDP)	52	39
Firms producing new goods and services (%)	116	116





# BRAZIL

	Rank	Value
<b>Consumer electronics</b>	87	81.1
Treatment applications per 100 million GDP	21	82.2
Cultural goods exports (% exports)	78	9.1
Printing and publishing output (% manufactured output)	80	10.2
<b>Energy</b>	114	25.0
<b>Finance</b>	95	98.0
Access to venture's provisions	13	88.1
Depth of innovative companies	57	82.0
ISO 9001 quality certificates (% GDP)	54	23.0
ISO 14001 environmental certificates (% GDP)	71	0.8
<b>Industry</b>	91	97.0
CERD forecast from abroad (%)	106	114
Joint ventures per strategic alliance deals (% GDP)	80	0.4
Computer software spending (% GDP)	20	3.1
<b>Government services</b>	100	0.0
New business density per thousand population	83	0.3
Firms with new products/services (%)	104	104
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>71</b>	<b>86</b>
<b>Infrastructure</b>	71	47.8
<b>Coverage</b>	88	44.0
3G/4G mobile network coverage (% population)	88	87.7
Secure Internet servers per 1 million population	80	10.4
Investment in telecommunication services (% GDP)	86	23.0
<b>Quality</b>	80	28
Mobile upload and download speeds	61	21.0
Fixed-broadband upload and download speeds	42	20.1
Fixed-broadband subscriptions (by speed) per hundred people	68	20.7
<b>Availability</b>	89	70.0
Fixed broadband bandwidth (% Gbps per capita)	67	16.4
Mobile broadband basket (% Gbps per capita)	79	80.1
Internet and telephony competition	1	100
<b>Access</b>	88	34
<b>Subscriptions</b>	88	41.7
Active mobile-broadband subscriptions per fixed-line inhabitants	60	20.0
International Internet bandwidth per user	100	20.6
Households with Internet access at home (%)	73	71.0
<b>Skills and employment</b>	88	20.0
Individuals with standard ICT skills (%)	67	14.1
Tertiary graduates from ICT programmes (%)	87	20.1
ICT employment (%)	20	21.0
<b>Usage</b>	57	20.1
<b>Services</b>	76	44.0
Government online services	20	87.1
Fixed broadband Internet traffic per subscription	66	10.0
Mobile broadband Internet traffic per subscription	80	8
Internet users (%)	70	72.0
<b>Commerce</b>	88	81.7
ICT/FIT patent applications (per 100,000 GDP)	88	34.0
E-participation	11	80.0
Internet activities by individuals (%)	40	51.0
Trade in digitally deliverable services (% total trade)	14	80
<b>ECONOMY</b>	<b>88</b>	<b>87.0</b>
<b>Economic complexity/structure</b>	78	81.0
<b>Infrastructure investment</b>	114	10.4
Overhead capital formation (% GDP)	108	20.0
Logistics performance	55	49.0
Transport productive capacity	100	14.0
Building quality control	108	80

	Rank	Value
<b>Business agility</b>	80	82.0
Cost of starting a business	100	81.0
Recovery recovery rate	108	19.0
Entrepreneurial employee activity rate	8	80.0
Growth of corporate transactions	13	80.7
<b>Corporate openness</b>	118	40.4
Trust and dissatisfaction	74	80.0
Tax (% GDP)	108	10.4
High-technology trade (% total trade)	30	20.0
Market concentration	40	87.0
Market concentration	80	87.0
Product diversity	104	27.0
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	44	40.4
Cost dynamics	108	20.0
<b>Financing and domestic value added</b>	<b>88</b>	<b>40.4</b>
<b>Financing and costs</b>	100	20
Domestic credit to private sector (% GDP)	82	20.0
IMRS financing gap (% GDP)	81	40.7
Tax and contribution rate (% profit)	100	47.0
Bank nonperforming loans (%)	37	81.0
Unmet loan demand	91	20.7
Medium- and high-tech activities value added	45	20.0
Industry and services value added (% GDP)	88	57.0
Labour underutilization rate	110	49.0
Output per worker	79	10.0
<b>ENABLING ENVIRONMENT</b>	<b>71</b>	<b>84.4</b>
<b>Governance</b>	81	40.0
Political environment	73	44.0
Peace and stability	80	32.1
View and accountability	28	20.0
Quality of institutions	88	42.0
Rule of law	76	44.1
Control of corruption	80	43.0
Government effectiveness	89	26.0
<b>Socio-economic</b>	100	40.4
Gender equity	89	82.0
Female-to-male ratio in parliament	100	17.0
Female-to-male labour force participation	80	31.7
Female-to-male ratio in internal wage	42	50.0
Gender inequality	61	70.0
Social protection coverage (% population)	45	80
Adult literacy rate	86	81.0
Youth not in employment, education or training (%)	100	50.0
Standard of living	101	10.0
Poverty headcount ratio (% population)	106	104
GDP per capita	72	72.0
<b>Health and environment</b>	<b>18</b>	<b>71.7</b>
Health	81	20.0
Universal health coverage	25	70
Healthy life expectancy (years)	76	70.0
Under-five mortality rate	74	80.0
Environmental performance	81	80.0
Renewable energy consumption (%)	41	40.0
Household footprint per capita	80	81.0
Natural hazard exposure	65	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BRUNEI DARUSSALAM

## KEY INDICATORS

GDP US\$ billions	27,231
Population	437,483
HDI	0.838

**GKI RANK** 59/154

**GKI SCORE** 51.3

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Brunei Darussalam is a strong performer in terms of its knowledge infrastructure. It ranks 59th out of 154 countries in the Global Knowledge Index 2021 and 55th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

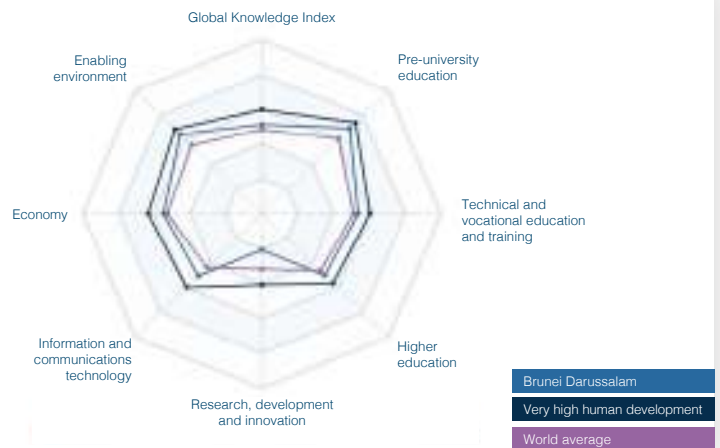
- + Enrolment in vocational education, gender parity
- + Tax and contribution rate (% profit)
- + Pupil-trained teacher ratio in secondary education
- + Gross fixed capital formation (% GDP)
- + Tertiary graduates from ICT programmes (%)

### AREAS OF IMPROVEMENT

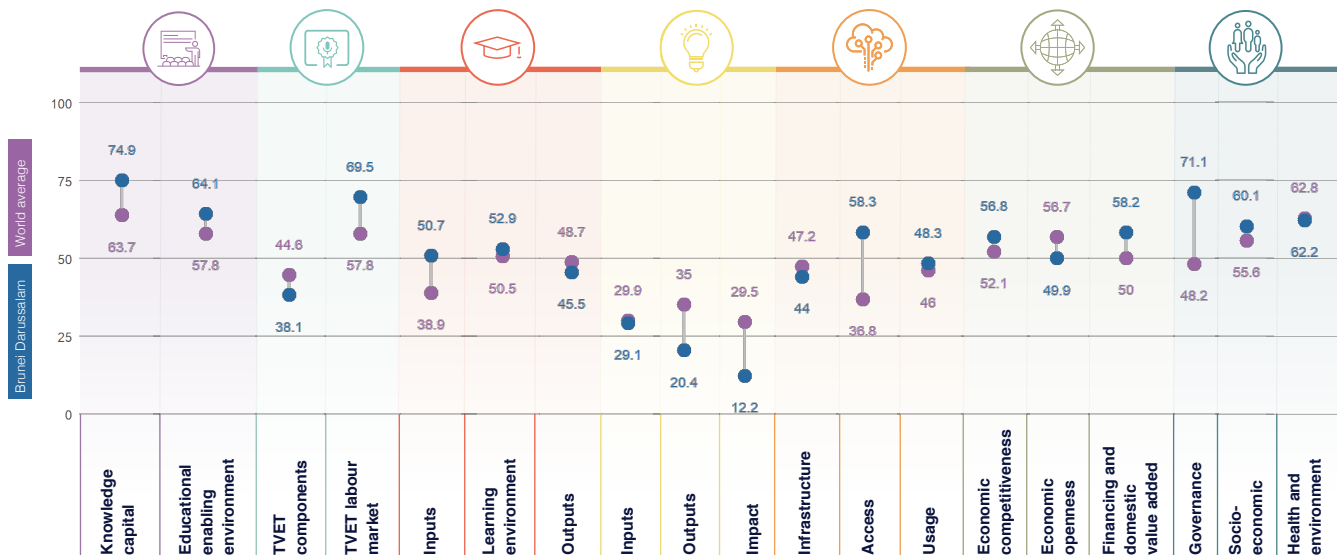
- Industrial design applications (per 100 billion GDP)
- GERD financed by business enterprises (%)
- Intellectual property receipts (% total trade)
- Extent of corporate transparency
- Renewable energy consumption (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	64	69.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	63	53.8
HIGHER EDUCATION	50	49.7
RESEARCH, DEVELOPMENT AND INNOVATION	127	20.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	56	50.2
ECONOMY	63	55
ENABLING ENVIRONMENT	42	64.5



## GKI PILLARS





# BRUNEI DARUSSALAM

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	87	78.8
Enrollment	88	81.7
Net enrolment rate in primary education	88	84.0
Net enrolment rate in lower secondary education	71	89.7
Net enrolment rate in upper secondary education	86	80.7
Completion	52	81.0
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	4	84.0
Completion	88	81.0
Assessment of "Oryzanol" students in math, science and reading	54	36.0
Learning-adjusted years of schooling	80	86.1
<b>Educational enabling environment</b>		
Expenditure	88	20.4
Government expenditure on primary education (% GDP)	112	19.2
Government expenditure on secondary education (% GDP)	31	35.4
Government funding per primary student (% GDP per capita)	100	31
Government funding per secondary student (% GDP per capita)	36	30
Resources	17	88.1
Pupil-based teacher ratio in primary education	4	87.4
Pupil-based teacher ratio in secondary education	2	100
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	1	100
Early learning	88	83.0
Class attendance rate in early childhood education	87	80.4
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	55	77.1
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	17	41.0
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	15	85.0
Participation rate in formal and non-formal education and training	80	1.8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	88	20.7
Share of students enrolled in secondary vocational programmes	88	16.0
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and infrastructure</b>		
Extent of staff training	81	80.8
Quality of vocational training	47	57.7
Ratio of high-skill TVET occupations earnings to average wage	20	83.0
Ratio of median-skill TVET occupations earnings to average wage	113	17.0
<b>TVET labour market</b>		
Efficiency of the labour market	38	71.7
Firms considered with inadequately educated workforce (%)	116	116
Employment educational mismatch (%)	88	87.8
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	81	81.0
Real TVET unemployment	100	71.0
Share of TVET occupations	50	82.1
Manufacturing employment (%)	108	12.4
Quality and infrastructure	8	86.7
Enrollment in vocational education, gender parity	1	89.0
Useable employment rate	12	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	14	88
Government expenditure per tertiary student	9	21.0
Teaching staff compensation (% tertiary expenditure)	42	38.6
Enrollment	88	11.1
Enrollment in bachelor's or equivalent level (%)	88	18.6
Enrollment in masters, doctoral or equivalent (%)	71	12.0
Resources	13	84.0
Rapiteacher ratio in tertiary education	37	84.0
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	15	80.0
Labour mobility rate	84	13.1
Academic freedom	116	116
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Retention	16	14.0
Educational attainment rate, bachelor's or equivalent	72	37.4
Educational attainment rate, master's or equivalent	81	7
Educational attainment rate, doctoral or equivalent	88	30
Employment	88	80.0
Labour force participation rate with advanced education	58	80.0
Unemployment rate with advanced education	88	82.0
Impact	14	80.0
University tertiary enrollment in R&D	81	88.4
CRIDE students per 100 personnel in higher education	116	116
<b>TECHNOLOGY, INNOVATION AND SERVICES</b>		
<b>Inputs</b>		
Government R&D expenditure	88	20.0
GDP (% GDP)	82	5.4
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	9	10.0
<b>Quality of innovation environment</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	0
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
Quality of innovation environment	88	100
High-skilled employment (%)	5	23.0
Intellectual property payments (% total trade)	88	4.6
State of cluster development	82	44.0
<b>Outputs</b>		
<b>Government R&amp;D expenditure</b>		
Average documents per researcher	116	116
Citations per document	57	28.0
Patent applications (per 100 billion GDP)	88	32.0
<b>Business R&amp;D expenditure and innovation</b>		
Intellectual property receipts (% total trade)	117	6
Research and development expenditure (per 100 billion GDP)	113	0.1
PCT applications (per 100 billion GDP)	80	39.1
Firms producing new goods and services (%)	116	116





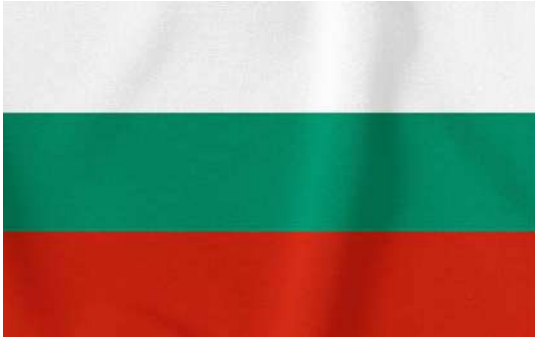
# BRUNEI DARUSSALAM

	Rank	Value
<b>Consumer Electronics</b>		
Treatment applications per 100 billion GDP	108	5.1
Cultural goods exports (% exports)	117	-2.1
Printing and publishing output (% manufactured output)	85	0.2
<b>Energy</b>	109	10.2
<b>Finance</b>	35	10.0
Access to investors' protection	84	8.8
Depth of innovative companies	100	43.5
ISO 9001 quality certificates (% GDP)	87	11.2
ISO 14001 environmental certificates (% GDP)	82	5.8
<b>Infrastructure</b>	108	11.1
CERD freedom from abuse (%)	83	0.1
Cost of finance per strategic finance deals (% GDP)	85	16.1
Computer software spending (% GDP)	106	10.4
<b>Government Services</b>	107	11.1
New business density per thousand population	55	11.7
Firms with new products/services (%)	106	10.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	88	50.2
<b>Infrastructure</b>	84	4.4
<b>Coverage</b>	89	21.2
30MHz mobile network coverage (% population)	75	35
Secure Internet servers per 1 million population	35	23.7
Investment in telecommunication services (% GDP)	83	21.7
<b>Quality</b>	110	11.8
Mobile internet and download speeds	106	10.4
Fixed broadband upload and download speeds	106	10.6
Fixed broadband subscriptions (y speed) per hundred people	89	7.8
<b>Accessibility</b>	115	10.7
Fixed broadband bandwidth (% Gbps per capita)	27	88.8
Mobile broadband basket (% Gbps per capita)	5	81.2
Internet and telephone competition	105	30
<b>Access</b>	29	26.2
<b>Subscriptions</b>	105	11
Active mobile broadband subscriptions per fixed-line inhabitants	98	82
International Internet bandwidth per user	18	85.4
Households with Internet access at home (%)	82	53.6
<b>Skills and employment</b>	5	50.0
Individuals with standard ICT skills (%)	27	56.1
Tertiary graduates from ICT programmes (%)	1	100
ICT employment (%)	44	21.6
<b>Usage</b>	74	46.2
<b>Services</b>	45	14.1
Government online services	83	83.5
Fixed broadband internet traffic per subscriber	85	4
Mobile broadband internet traffic per subscriber	106	10.4
Internet users (%)	12	84.7
<b>Commerce</b>	105	11.5
ICT FDI parent applications (per 100 billion GDP)	62	43.4
E-participation	90	54.0
Internet activities by individuals (%)	57	30.4
Trade in digitally deliverable services (% total trade)	87	41.5
<b>ECONOMY</b>	83	23
<b>Economic Competitiveness</b>	85	55.5
<b>Infrastructure Investment</b>	11	100.0
Overhead capital formation (% GDP)	3	80.8
Logistics performance	85	43.7
Transport productive capacity	24	43.4
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	101	44.7
Cost of starting a business	14	84.0
Recovery recovery time	46	51.2
Entrepreneurial employee activity rate	106	10.4
Growth of corporate transactions	118	9
<b>Corporate openness</b>	88	46.3
<b>Trade and Investment</b>	112	21.2
Trade (% GDP)	31	48.5
High-technology trade (% total trade)	100	20.3
Market concentration	104	50.3
Market concentration	115	82.0
<b>Product Openness</b>	105	11.5
Charitable financial openness	108	10.4
Foreign direct investment, net inflows (% GDP)	80	43.5
Data dynamics	88	49.0
<b>Financing and domestic value added</b>	38	56.2
<b>Financing and credit</b>	35	61.2
Domestic credit to private sector (% GDP)	89	14.5
MSME financing gap (% GDP)	106	10.4
Tax and contribution rate (% profit)	1	100
Bank nonperforming loans (%)	84	84.0
<b>Unmet needs index</b>	41	51.1
Medium- and high-tech activities value added	128	3.4
Industry and services value added (% GDP)	5	85.8
Labour underutilization rate	101	88.0
Output per worker	4	84.8
<b>ENABLING ENVIRONMENT</b>	42	44.5
<b>Governance</b>	27	71.1
<b>Political environment</b>	107	50.4
Peace and stability	6	50.8
View and accountability	101	22.4
Quality of institutions	22	83.0
Rule of law	21	86.0
Control of corruption	22	81
Government effectiveness	14	80.4
<b>Socio-economic</b>	84	60.1
<b>Gender equity</b>	95	61.7
Female-to-male ratio in parliament	140	30
Female-to-male labour force participation	74	75
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	85	81.0
Social protection coverage (% population)	85	32.2
Adult literacy rate	35	86.8
Youth not in employment, education or training (%)	99	59.0
<b>Standard of living</b>	105	50.2
Poverty headcount ratio (% population)	106	10.4
GDP per capita	8	86.2
<b>Health and environment</b>	89	62.2
<b>Health</b>	105	81.5
Universal health coverage	21	81
Healthy life expectancy (years)	14	71.7
Under-five mortality rate	85	81.5
<b>Environmental performance</b>	121	22.0
Renewable energy consumption (%)	100	9
Household footprint per capita	104	85.8
Natural hazard exposure	31	73

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# BULGARIA

KEY INDICATORS	
GDP US\$ billions	155.059
Population	6,948,445
HDI	0.816

**GKI RANK** 42/154

**GKI SCORE** 55.8  
**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Bulgaria is a strong performer in terms of its knowledge infrastructure. It ranks 42nd out of 154 countries in the Global Knowledge Index 2021 and 41st out of the 61 countries with very high human development.

### AREAS OF STRENGTH

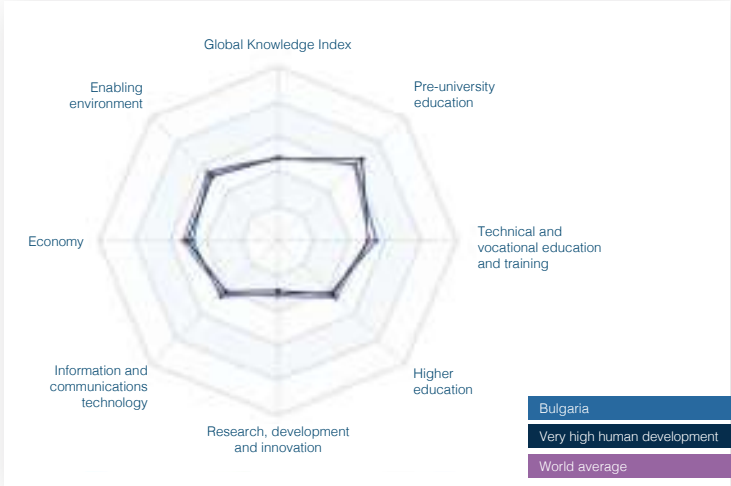
- + ISO 9001 quality certificates (% GDP)
- + ISO 14001 environmental certificates (% GDP)
- + Teachers in tertiary education, gender parity
- + Employment educational mismatch (%)
- + Mobile upload and download speeds

### AREAS OF IMPROVEMENT

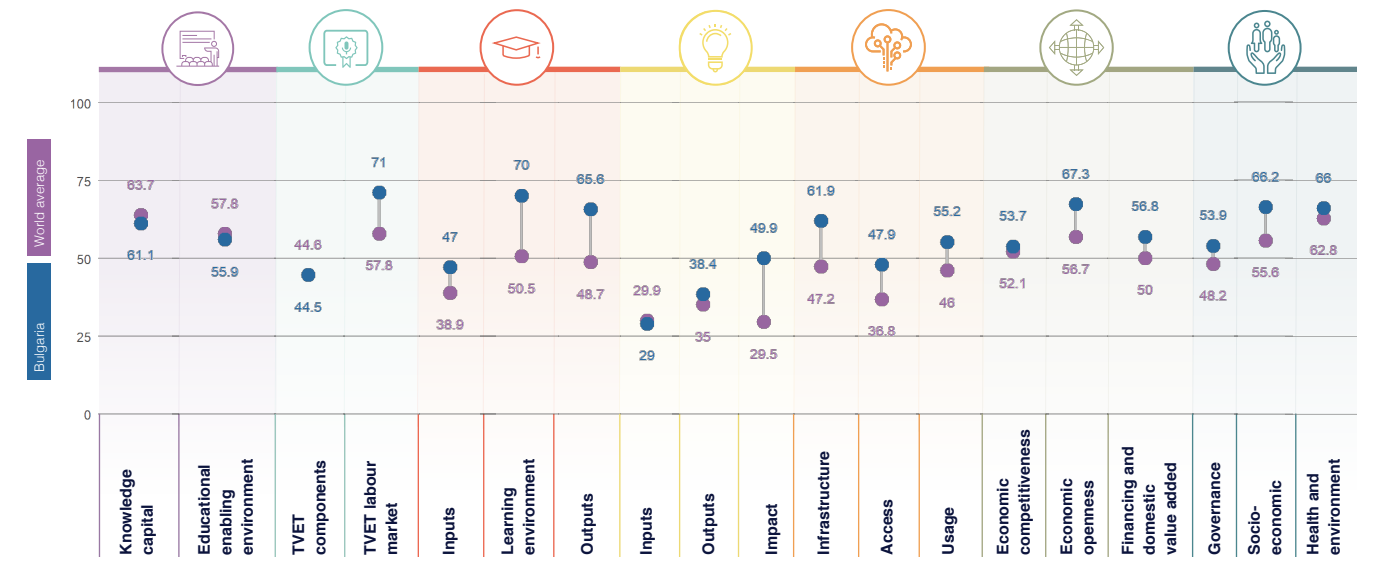
- Firms with new product/service (%)
- Researchers in higher education (%)
- Government expenditure on primary education (% of GDP)
- Ratio of medium-skill TVET occupations earnings to average wage
- Entrepreneurial employee activity rate

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	93	58.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	45	57.8
HIGHER EDUCATION	22	60.9
RESEARCH, DEVELOPMENT AND INNOVATION	34	39.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	44	55
ECONOMY	50	59.2
ENABLING ENVIRONMENT	46	62.1



## GKI PILLARS





# BULGARIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	81.5
Enrolment	105	22.4
Net enrolment rate in primary education	100	50.6
Net enrolment rate in lower secondary education	86	73.7
Net enrolment rate in upper secondary education	62	82
Completion	102	81.3
Years of compulsory education in primary and secondary	67	63.2
Completion rate in upper secondary education	49	83.4
Success rate rate in the last grade of lower secondary education	129	21.4
Completion	27	43.4
Assessment of 15-year-old students in math, science and reading	89	37.6
Learning-adjusted years of schooling	62	81.3
<b>Educational spending environment</b>	<b>34</b>	<b>88.8</b>
Expenditure	72	32.1
Government expenditure on primary education (% GDP)	119	16.7
Government expenditure on secondary education (% GDP)	67	27.3
Government funding per primary student (% GDP per capita)	23	30
Government funding per secondary student (% GDP per capita)	45	34.3
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	33	83.3
Class attendance rate in early childhood education	28	83.8
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	60	83.3
Completion rate in upper secondary education, gender parity	67	80.6
Completion rate in upper secondary education, wealth parity	65	41
Completion rate in upper secondary education, location parity	53	36.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET competitiveness</b>	<b>65</b>	<b>40.3</b>
Companies training apprentices	101	33.3
Firms offering formal training (%)	99	21.4
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	37	33.2
TVET resources	116	33.3
Government expenditure on vocational education (%)	15	80.8
Share of students enrolled in secondary vocational programmes	25	51.5
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	100	33.3
Extent of staff training	85	37
Quality of vocational training	31	46.7
Ratio of high-skil TVET occupations earnings to average wage	67	26.3
Ratio of medium-skill TVET occupations earnings to average wage	106	31.2
<b>TVET labour market</b>	<b>66</b>	<b>75</b>
Efficiency of the labour market	70	81.1
Firms considered with inappropriately educated workforce (%)	83	43.5
Employment educational mismatch (%)	6	90.1
Proportion of skilled production workers	80	43.4
Unemployment rate with vocational education	31	86.7
Real TVET unemployment	17	81.6
Share of TVET occupations	37	86
Manufacturing employment (%)	89	83.1
Quality and infrastructure	61	81.4
Enrolment in vocational education, gender parity	83	68.2
Useable employment rate	62	62.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>46</b>	<b>47</b>
Expenditure	61	24.7
Government expenditure per tertiary student	55	16.1
Teaching staff compensation (% tertiary expenditure)	28	61.8
Enrolment	11	81.1
Enrolment in bachelor's or equivalent level (%)	26	37.1
Enrolment in masters, doctoral or equivalent (%)	19	63.2
Resources	107	83.2
Rapiteacher ratio in tertiary education	21	87.6
Researchers in higher education (%)	54	22.7
<b>Learning environment</b>	<b>21</b>	<b>70</b>
<b>Quality and academic freedom</b>	<b>23</b>	<b>71</b>
Teachers in tertiary education, gender parity	4	90
Labour mobility rate	30	25.3
Academic freedom	54	63.6
<b>Quality and infrastructure</b>	<b>116</b>	<b>116</b>
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>18</b>	<b>63.8</b>
Retention	11	67.2
Educational attainment rate, bachelor's or equivalent	24	67.6
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	21	63.7
Labour force participation rate with advanced education	88	72.6
Unemployment rate with advanced education	12	84.7
Impact	60	45.7
University tertiary enrolment in R&D	88	42.9
OECD students per 100 persons in higher education	31	49.1
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>62</b>	<b>33</b>
Access to credit resources	116	100
GDP (% GDP)	46	15.1
GERD per researcher	68	11
Researchers per thousand labour force	25	21.8
Tertiary graduates from STEM programmes (%)	77	36.6
<b>Quality and infrastructure</b>	<b>116</b>	<b>33.3</b>
GERD performed by business enterprises (%)	95	14.9
GERD financed by business enterprises (%)	38	53.2
Researchers in business enterprises (%)	23	89.1
Firms that spend on R&D (%)	69	9.5
Quality of financial institutions	116	33.3
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	65	16.2
State of cluster development	41	62.8
<b>Outputs</b>	<b>67</b>	<b>38.4</b>
Access to credit resources	116	111
Average documents per researcher	81	45.3
Citations per document	84	22.4
Patent applications (per 100 billion GDP)	36	68.8
<b>Quality and infrastructure</b>	<b>116</b>	<b>116</b>
Intellectual property receipts (% total trade)	28	23.4
Research design applications (per 100 billion GDP)	20	33.3
PCT applications (per 100 billion GDP)	43	63
Firms producing new goods and services (%)	100	18.8



# BULGARIA

	Rank	Value
<b>Business environment</b>		
Treatment applications per 100 million GDP	21	81.1
Cultural goods exports (% exports)	86	11.9
Printing and publishing output (% manufactured output)	47	27.1
<b>Energy</b>		
Renewable	1	100
Renewable or investment progressive	23	17.3
Depth of innovative companies	89	52.3
ISO 9001 quality certificates (% GDP)	1	100
ISO 14001 environmental certificates (% GDP)	1	100
<b>Environment</b>		
CERO reduced from abroad (%)	63	81.2
Cost reduction per strategic alliance deals (% GDP)	49	16.9
Computer software spending (% GDP)	87	16.1
<b>Government efficiency</b>		
New business density per thousand population	12	50.2
Firms with new products/services (%)	100	31
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>		
<b>Infrastructure</b>		
Coverage	22	52.5
3G/4G mobile network coverage (% population)	15	80.0
Secure Internet servers per 1 million population	85	41.5
Investment in telecommunication services (% GDP)	87	25.9
<b>Quality</b>		
Mobile upload and download speeds	6	83.5
Fixed broadband upload and download speeds	33	34
Fixed broadband subscriptions (by speed) per hundred people	28	86.5
<b>Accessibility</b>		
Fixed broadband basket (% GNI per capita)	94	81.2
Mobile broadband basket (% GNI per capita)	72	80
Internet and telephony competition	90	80.0
<b>Access</b>		
Mobile	47	87.8
<b>Connectivity</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	33	46.7
International Internet bandwidth per user	8	85.6
Households with Internet access at home (%)	64	70
<b>Skills and employment</b>		
Individuals with advanced ICT skills (%)	81	19.1
Tertiary graduates from ICT programmes (%)	75	29.2
ICT employment (%)	29	80
<b>Usage</b>		
Services	49	85.2
<b>Government</b>		
Government online services	49	77.1
Fixed broadband Internet traffic per subscription	13	43.0
Mobile broadband Internet traffic per subscription	75	10.2
Internet users (%)	70	80.5
<b>Commerce</b>		
eTPU/T purchase applications (per 100 million GDP)	35	57.5
E-participation	22	85.0
Internet activities by individuals (%)	48	44.8
Trade in digitally deliverable services (% total trade)	45	51.2
<b>ECONOMY</b>		
Economic competitiveness	73	53.7
<b>Infrastructure investment</b>		
Overhead capital formation (% GDP)	117	37.1
Logistics performance	30	50.6
Transport productive capacity	100	20.1
Building quality control	8	80.0

	Rank	Value
<b>Business agility</b>		
Ease of starting a business	86	85.4
Recovery recovery rate	74	40.9
Entrepreneurial employee activity rate	80	1.8
Growth of corporate transactions	1	100
<b>Corporate openness</b>		
Trust and dissemination	20	70.0
Trade (% GDP)	29	48.7
High-technology trade (% total trade)	25	42.5
Market concentration	19	87.5
Market concentration	22	84.0
<b>Product innovation</b>		
Product innovation	16	84
Charitable financial openness	75	88.8
Foreign direct investment, net inflows (% GDP)	87	43.2
Cost dynamics	41	80
<b>Financing and domestic value added</b>		
Financing and costs	27	62.4
Domestic credit to private sector (% GDP)	75	19.5
MSME financing gap (% GDP)	38	75.0
Tax and contribution rate (% profit)	34	79.5
Bank nonperforming loans (%)	81	35.0
<b>Unproductive value added</b>		
Medium- and high-tech activities value added	44	37.9
Industry and services value added (% GDP)	81	81.1
Labour underutilization rate	19	85.4
Output per worker	50	19.0
<b>ENABLING ENVIRONMENT</b>		
<b>Governance</b>		
Political environment	76	59.4
Peace and stability	45	80.0
View and accountability	28	80
Quality of institutions	75	44.4
Rule of law	70	67.4
Control of corruption	79	46.2
Government effectiveness	79	80.0
<b>Socio-economic</b>		
Gender equity	88	80.0
Female-to-male ratio in parliament	77	32.0
Female-to-male labour force participation	68	77.3
Female-to-male ratio in internal wage	70	80
<b>Government</b>		
Social protection coverage (% population)	32	80
Adult literacy rate	81	87.0
Youth not in employment, education or training (%)	23	74.3
<b>Standard of living</b>		
Poverty headcount ratio (% population)	70	80.0
GDP per capita	34	78.8
<b>Health and environment</b>		
Health	66	73.0
Universal health coverage	50	80
Healthy life expectancy (years)	81	73.0
Under-five mortality rate	44	85.0
<b>Environmental performance</b>		
Renewable energy consumption (%)	88	20.3
Household footprint per capita	86	75.2
Natural hazard exposure	47	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 144/154

**GKI SCORE** 30.9

**WORLD AVERAGE** 48.4

# BURKINA FASO

## KEY INDICATORS

**GDP** US\$ billions ..... 45.162  
**Population** ..... 20,903,278  
**HDI** ..... 0.452

## COUNTRY PERFORMANCE SUMMARY

Burkina Faso is a weak performer in terms of its knowledge infrastructure. It ranks 144th out of 154 countries in the Global Knowledge Index 2021 and 18th out of the 27 countries with low human development.

### AREAS OF STRENGTH

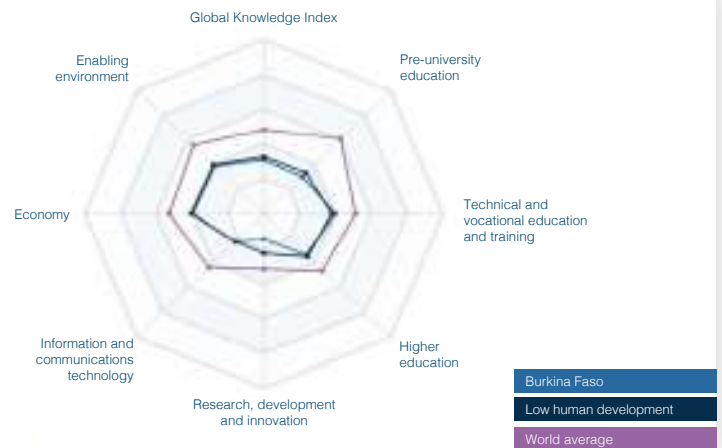
- + Government expenditure on primary education (% of GDP)
- + Renewable energy consumption (%)
- + Ecological footprint per capita
- + Investment in telecommunication services (% GDP)
- + Manufacturing employment (%)

### AREAS OF IMPROVEMENT

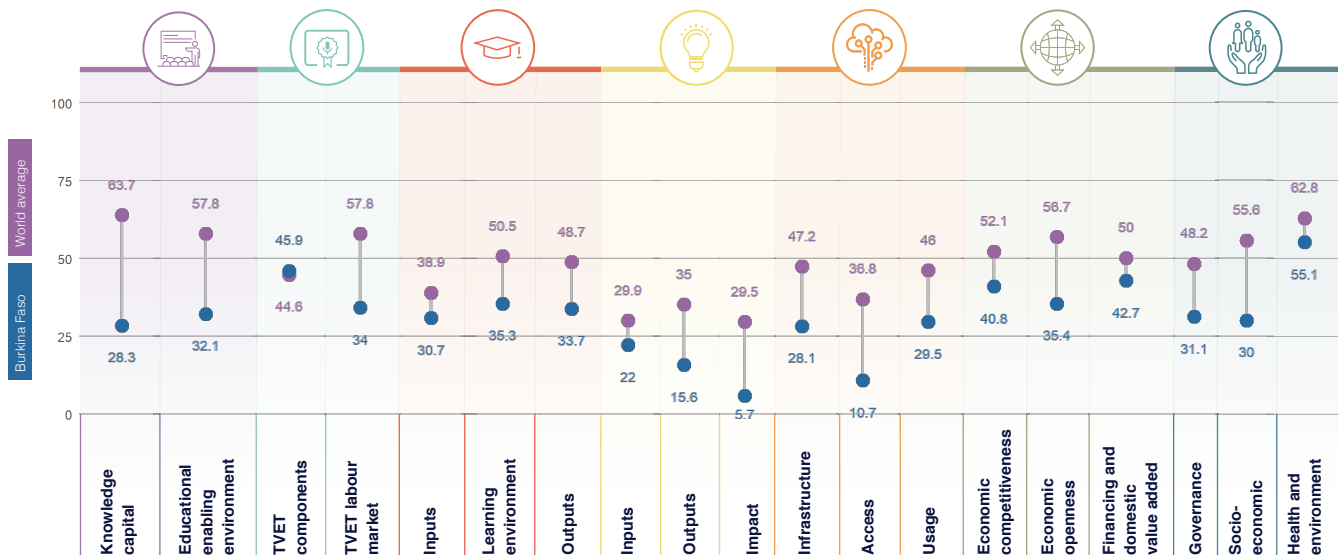
- Completion rate in upper secondary education
- Extent of staff training
- Share of TVET occupations
- Employment educational mismatch (%)
- Research institutions prominence

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	147	30.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	128	40
HIGHER EDUCATION	133	33.2
RESEARCH, DEVELOPMENT AND INNOVATION	152	14.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	139	22.7
ECONOMY	133	39.6
ENABLING ENVIRONMENT	141	38.7



## GKI PILLARS







# BURKINA FASO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	147	30.2
Enrollment	147	28.3
Net enrolment rate in primary education	127	25.4
Net enrolment rate in lower secondary education	124	33.0
Net enrolment rate in upper secondary education	126	22.9
Completion	130	33.0
Years of compulsory education in primary and secondary	42	35.0
Completion rate in upper secondary education	104	4
Success rate rate in the last grade of lower secondary education	128	23.0
Completion	130	21.0
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	132	21.0
<b>Educational enabling environment</b>		
Expenditure	72	20.4
Government expenditure on primary education (% GDP)	17	54.1
Government expenditure on secondary education (% GDP)	113	11.8
Government funding per primary student (% GDP per capita)	71	23.8
Government funding per secondary student (% GDP per capita)	81	22.2
Resources	112	21.5
Pupil-based teacher ratio in primary education	73	82.4
Pupil-based teacher ratio in secondary education	89	82.8
Schools with access to computers in primary education (%)	87	4.3
Schools with access to computers in secondary education (%)	87	3.3
Early learning	125	24.0
Class attendance rate in early childhood education	128	8.8
Proportion of children who are developmentally on track	116	116
Presence of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	85	84.0
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	43	88
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	74	30
Participation rate in formal and non-formal education and training	116	116
TVET resources	70	43.0
Government expenditure on vocational education (%)	43	24.0
Share of students enrolled in secondary vocational programmes	113	4.3
Share of students enrolled in postsecondary vocational programmes	1	104
TVET quality and infrastructure	116	30.2
Extent of staff training	143	30
Quality of vocational training	87	47.0
Ratio of high-skill TVET occupations earnings to average wage	63	29
Ratio of medium-skill TVET occupations earnings to average wage	62	27.0
<b>TVET labour market</b>		
Efficiency of the labour market	141	20.1
Firms considered well-integrated with workforce (%)	116	116
Employment educational mismatch (%)	115	8
Presence of skilled production workers	116	116
Unemployment rate with vocational education	80	72.2
Real TVET unemployment	130	10.0
Share of TVET occupations	101	5.8
Manufacturing employment (%)	38	83.1
Quality and infrastructure	130	31.0
Enrollment in vocational education, gender parity	80	83.4
Useable employment rate	148	0.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	87	21.7
Government expenditure per tertiary student	45	21.7
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	119	4.3
Enrollment in bachelor's or equivalent level (%)	118	8.4
Enrollment in masters, doctoral or equivalent (%)	100	5.2
Resources	80	80
Ratio teacher ratio in tertiary education	88	80
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	118	9.8
Labour mobility rate	85	7.2
Academic freedom	28	80
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Attainment	86	3.1
Educational attainment rate, bachelor's or equivalent	90	3.3
Educational attainment rate, master's or equivalent	74	4.9
Educational attainment rate, doctoral or equivalent	75	2.9
Employment	80	87.2
Labour force participation rate with advanced education	85	85.0
Unemployment rate with advanced education	83	87.4
Impact	107	32.2
University tertiary enrollment in FTE	119	32.2
UNITE indicators per FTE personnel in higher education	116	116
<b>International comparisons and performance</b>		
<b>Inputs</b>		
Classroom expenditure	111	22
Classroom expenditure	111	22
GDP (% GDP)	52	12.0
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	73	37.6
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
<b>Quality and infrastructure</b>		
High-skill employment (%)	58	15.0
Intellectual property payments (% total trade)	128	0.2
State of digital development	138	26.7
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	116	116
Citations per document	128	12.0
Patent applications (per 100 billion GDP)	80	34.4
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	80	5.1
Research design applications (per 100 billion GDP)	81	1.8
PCT applications (per 100 billion GDP)	118	33.0
Firms producing new goods and services (%)	116	116

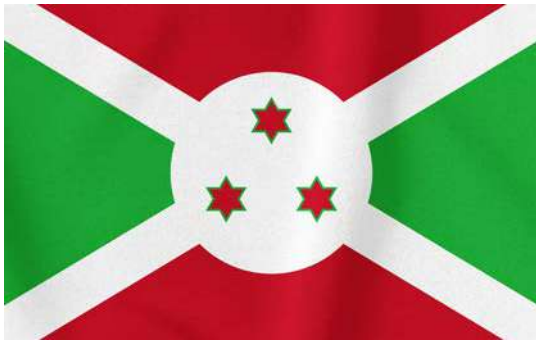


# BURKINA FASO

	Rank	Value
<b>Business environment</b>	100	52.2
Treatment applications (per 100 million GDP)	111	5.8
Cultural goods exports (% exports)	129	0.8
Printing and publishing output (% manufactured output)	196	1.9
<b>Energy</b>	130	36.5
Renewable energy production	115	8
Depth of innovative companies	128	40.3
ISO 9001 quality certificates (% GDP)	128	2.2
ISO 14001 environmental certificates (% GDP)	133	0.8
<b>Finance</b>	133	51.8
CERD received from abroad (%)	70	0.2
Joint ventures per strategic industry deals (% GDP)	121	2.7
Computer software spending (% GDP)	119	2
<b>Government effectiveness</b>	133	51.8
New business density per thousand population	115	1.5
Firms with new products/services (%)	106	1.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	136	22.2
<b>Infrastructure</b>	132	26.5
<b>Coverage</b>	136	23.5
3G/4G mobile network coverage (% population)	145	25.9
Secure Internet servers per 1 million population	148	0.2
Investment in telecommunication services (% GDP)	21	47.3
<b>Quality</b>	117	51.8
Mobile upload and download speeds	75	16.8
Fixed broadband upload and download speeds	104	3.1
Fixed broadband subscriptions (y speed) per hundred people	120	0.1
<b>Availability</b>	125	52.3
Fixed broadband bandwidth (% Gbps per capita)	128	4.9
Mobile broadband basket (% Gbps per capita)	144	2.1
Internet and telephony competition	89	82.9
<b>Access</b>	143	16.7
<b>Subscribers</b>	122	15.5
Active mobile-broadband subscriptions per fixed-line inhabitants	119	22.2
International Internet bandwidth per user	128	25.1
Households with Internet access at home (%)	104	12.7
<b>Skills and employment</b>	138	2.1
Individuals with standard ICT skills (%)	116	1.8
Tertiary graduates from ICT programmes (%)	118	1
ICT employment (%)	113	0.1
<b>Usage</b>	123	25.3
<b>Services</b>	138	11.1
Government online services	115	40.5
Fixed broadband internet traffic per subscriber	80	6.8
Mobile broadband internet traffic per subscriber	115	1.8
Internet users (%)	142	13.5
<b>Commerce</b>	80	41.5
ICT/FIT patent applications (per 100,000 GDP)	116	1.9
E-participation	100	51.2
Internet activities by individuals (%)	106	1.9
Trade in digitally deliverable services (% total trade)	80	32.0
<b>ECONOMY</b>	131	33.6
<b>Economic complexity/structure</b>	121	46.8
Manufacture innovation	113	42.0
Overhead capital formation (% GDP)	89	43.8
Logistics performance	80	40.5
Transport productive capacity	148	7.2
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	100	52.2
Ease of starting a business	75	85.2
Recovery recovery rate	115	33.6
Entrepreneurial employee activity rate	54	12.5
Growth of corporate transactions	88	26.0
<b>Business openness</b>	147	26.4
Trade and investment	121	21.7
Trade (% GDP)	100	21.7
High-technology trade (% total trade)	112	26.5
Market concentration	145	29.8
Market concentration	143	83.3
<b>Product innovation</b>	128	21
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	128	32.5
Data dynamics	80	59
<b>Financing and domestic value added</b>	118	42.2
<b>Financing and credit</b>	111	40.1
Domestic credit to private sector (% GDP)	108	10.2
MSME financing gap (% GDP)	43	32.0
Tax and contribution rate (% profit)	87	88.1
Bank nonperforming loans (%)	106	1.9
Unmet loan demand	100	50.7
Medium- and high-tech activities value added	119	1.9
Industry and services value added (% GDP)	128	45.0
Labour underutilization rate	88	26.7
Output per worker	127	1.8
<b>ENABLING ENVIRONMENT</b>	141	38.7
<b>Governance</b>	108	31.5
Political environment	118	23.0
Peace and stability	141	5.5
View and accountability	81	26.1
Quality of institutions	82	56.5
Rule of law	86	36.5
Control of corruption	70	51.4
Government effectiveness	118	26.9
<b>Socio-economic</b>	148	30
Gender equity	128	41.5
Female-to-male ratio in parliament	144	6.7
Female-to-male labour force participation	73	36.3
Female-to-male ratio in internal wage	119	1.9
Gender inequality	119	21
Social protection coverage (% population)	125	4.8
Adult literacy rate	121	21.0
Youth not in employment, education or training (%)	100	54.2
Standard of living	101	21.8
Poverty headcount ratio (% population)	100	41.5
GDP per capita	128	1.3
<b>Health and environment</b>	126	55.1
Health	113	23.8
Universal health coverage	145	40
Healthy life expectancy (years)	128	23.8
Under-five mortality rate	148	25.7
Environmental performance	18	30.1
Renewable energy consumption (%)	24	80.5
Household footprint per capita	27	85.8
Natural hazard exposure	21	84

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# BURUNDI

**GKI RANK** 141/154

**GKI SCORE** 31.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Burundi is a weak performer in terms of its knowledge infrastructure. It ranks 141st out of 154 countries in the Global Knowledge Index 2021 and 15th out of the 27 countries with low human development.

### KEY INDICATORS

**GDP US\$ billions** 8.693  
**Population** 11,890,781  
**HDI** 0.433

### AREAS OF STRENGTH

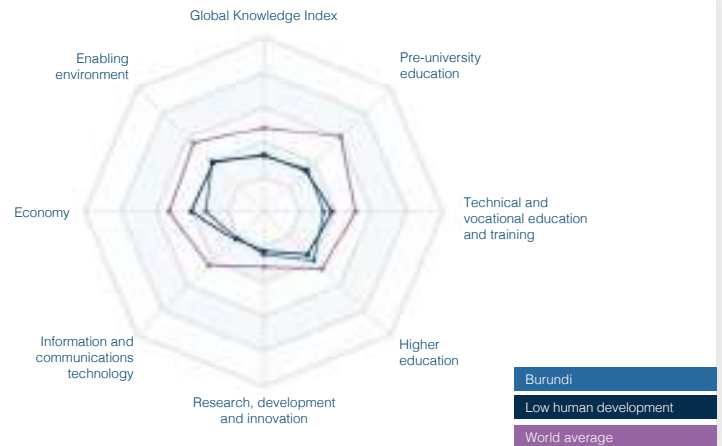
- + Youth not in employment, education or training (%)
- + Ecological footprint per capita
- + Female-to-male labour force participation
- + Enrolment in vocational education, gender parity
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

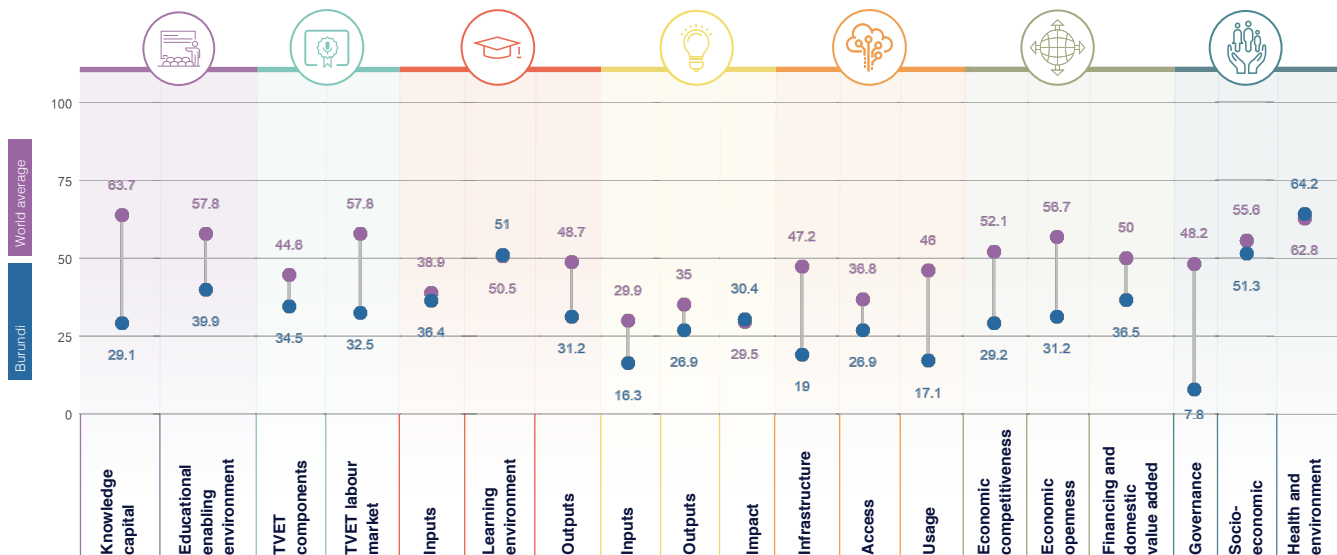
- Share of TVET occupations
- Educational attainment rate, bachelor's or equivalent
- GERD financed from abroad (%)
- Internet users (%)
- Output per worker

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	139	34.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	147	33.5
HIGHER EDUCATION	105	39.5
RESEARCH, DEVELOPMENT AND INNOVATION	111	24.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	147	21
ECONOMY	150	32.3
ENABLING ENVIRONMENT	133	41.1



## GKI PILLARS







# BURUNDI

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	142	26.5
Enrollment	123	52.1
Net enrolment rate in primary education	108	80.0
Net enrolment rate in lower secondary education	111	85.7
Net enrolment rate in upper secondary education	121	54.0
Completion	150	7.3
Years of compulsory education in primary and secondary	148	8
Completion rate in upper secondary education	106	7.3
Success rate rate in the last grade of lower secondary education	108	14.7
Completion	117	27.0
Assessment of 15-year-old students in math, science and reading	106	104
Learning-adjusted years of schooling	121	27.0
<b>Educational enabling environment</b>		
Expenditure	20	41.7
Government expenditure on primary education (% GDP)	71	84.4
Government expenditure on secondary education (% GDP)	81	20.7
Government funding per primary student (% GDP per capita)	82	30.6
Government funding per secondary student (% GDP per capita)	9	54.3
Resources	111	11.5
Pupil-based teacher ratio in primary education	79	80.0
Pupil-based teacher ratio in secondary education	88	86.8
Schools with access to computers in primary education (%)	85	8
Schools with access to computers in secondary education (%)	88	1.7
Early learning	128	12.7
Class attendance rate in early childhood education	103	12.7
Proportion of children who are developmentally on track	84	9
Proportion of children with stimulating home learning environments	87	52.9
Pupil-based teacher ratio in preprimary education	84	89.1
Quality and infrastructure	81	40.0
Completion rate in upper secondary education, gender parity	87	77.0
Completion rate in upper secondary education, wealth parity	104	104
Completion rate in upper secondary education, location parity	112	54.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	11	40.1
Firms offering formal training (%)	58	38.8
Labour force with short-cycle tertiary education (%)	14	85.0
Participation rate in formal and non-formal education and training	87	1.8
TVET resources	104	41.0
Government expenditure on vocational education (%)	104	104
Share of students enrolled in secondary vocational programmes	81	14.2
Share of students enrolled in postsecondary vocational programmes	104	104
TVET quality and infrastructure	80	47.0
Extent of staff training	117	47
Quality of vocational training	71	52.0
Ratio of high-skil TVET occupations earnings to average wage	104	104
Ratio of medium-skil TVET occupations earnings to average wage	104	104
<b>TVET labour market</b>		
Efficiency of the labour market	108	41.7
Firms considered with inappropriately educated workforce (%)	78	85.2
Employment educational mismatch (%)	108	108
Proportion of skilled production workers	118	7.4
Unemployment rate with vocational education	113	32.0
Real TVET unemployment	104	1.1
Share of TVET occupations	100	8
Manufacturing employment (%)	102	2.7
Quality and infrastructure	111	54.0
Enrollment in vocational education, gender parity	3	88.0
Useable employment rate	147	10.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	88	29.4
Government expenditure per tertiary student	70	12.1
Teaching staff compensation (% tertiary expenditure)	80	48.7
Enrollment	100	10.1
Enrollment in bachelor's or equivalent level (%)	100	1.8
Enrollment in masters, doctoral or equivalent (%)	128	8
Resources	21	33.0
Rpiprofteacher ratio in tertiary education	38	84.1
Research staff in higher education (%)	22	73.8
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	117	16.0
Internal mobility rate	54	18.0
Academic freedom	124	16.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	21	83.0
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	84	104
<b>Outputs</b>		
Retention	111	2.0
Educational attainment rate, bachelor's or equivalent	108	9
Educational attainment rate, master's or equivalent	88	0.4
Educational attainment rate, doctoral or equivalent	104	104
Employment	100	81.0
Labour force participation rate with advanced education	83	74
Unemployment rate with advanced education	117	83.0
Impact	117	25.0
University tertiary enrollment in FTE	88	41.4
UNITE indicators per 100 personnel in higher education	88	11.0
<b>Government expenditure and financing data</b>		
Income	111	16.1
Government expenditure	118	11.1
GDP (% GDP)	82	4.1
GERD per researcher	87	18.0
Researchers per thousand labour force	100	0.2
Tertiary graduate from STEM programmes (%)	78	26.0
<b>Government expenditure and financing data</b>		
GERD performed by business enterprises (%)	80	0.8
GERD financed by business enterprises (%)	78	10.8
Researchers in business enterprises (%)	74	1.8
Firms that spend on R&D (%)	7	84.0
Quality of research environment	100	10.1
High-skilled employment (%)	104	104
Intellectual property payments (% total trade)	100	8
State of cluster development	101	45.7
<b>Outputs</b>		
<b>Government expenditure and financing data</b>		
Average documents per researcher	82	45.1
Citations per document	103	7.2
Patent applications (per 100 billion GDP)	104	104
<b>Government expenditure and financing data</b>		
Intellectual property receipts (% total trade)	112	0.8
Research and development expenditure (per 100 billion GDP)	104	104
PCT applications (per 100 billion GDP)	51	59.4
Firms producing new goods and services (%)	38	87.0





# BURUNDI

	Rank	Value
<b>Business environment</b>	108	37.7
Treatment applications (per 100 billion GDP)	109	104
Cultural goods exports (% exports)	113	3.4
Printing and publishing output (% manufactured output)	85	23.4
<b>Energy</b>	171	36.3
<b>Trade</b>	109	32.3
Access to institutions' provisions	115	8
Depth of innovative companies	108	42.7
ISO 9001 quality certificates (% GDP)	120	1
ISO 14001 environmental certificates (% GDP)	100	2.8
<b>Integrity</b>	101	0
CERD freedom from abuse (%)	100	8
Cost savings per strategic alliance deals (% GDP)	114	114
Computer software spending (% GDP)	116	114
<b>Government efficiency</b>	9	100.0
New business density per thousand population	114	114
Firms with new products/services (%)	89	38.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	147	21
<b>Infrastructure</b>	180	38
<b>Coverage</b>	144	33.3
3G/4G mobile network coverage (% population)	144	20.2
Secure Internet servers per 1 million population	144	0.3
Investment in telecommunication services (% GDP)	128	16
<b>Speed</b>	123	8.1
Mobile upload and download speeds	85	12.6
Fixed broadband upload and download speeds	109	0.8
Fixed broadband subscriptions (by speed) per hundred people	128	8
<b>Availability</b>	149	36.3
Fixed broadband latency (% QM per capita)	147	8
Mobile broadband basket (% QM per capita)	145	14.2
Internet and telephony competition	82	84.1
<b>Access</b>	164	26.8
<b>Subscribers</b>	115	8.1
Active mobile-broadband subscriptions per fixed-line inhabitants	121	2.8
International Internet bandwidth per user	122	21.4
Households with Internet access at home (%)	124	8
<b>Skills and employment</b>	81	45.5
Individuals with standard ICT skills (%)	114	114
Tertiary graduates from ICT programmes (%)	27	45.2
ICT employment (%)	114	114
<b>Usage</b>	182	17.1
<b>Services</b>	116	32.3
Government online services	123	35.3
Fixed broadband Internet traffic per subscriber	70	11.7
Mobile broadband Internet traffic per subscriber	100	0.4
Internet users (%)	163	8
<b>Commerce</b>	113	21.5
ICT FDI parent applications (per 100 billion GDP)	114	114
E-participation	106	33.3
Internet activities by individuals (%)	114	114
Trade in digitally deliverable services (% total trade)	143	0.8
<b>ECONOMY</b>	158	32.3
<b>Economic competitiveness</b>	181	25.2
<b>REGISTRATION</b>	122	16.1
Overhead capital formation (% GDP)	108	21
Logistics performance	143	36.6
Transport productive capacity	118	81
Building quality control	147	32.3

	Rank	Value
<b>Business agility</b>	140	32.3
Cost of starting a business	41	82.0
Recovery recovery rate	142	8.1
Entrepreneurial employee activity rate	116	114
Growth of corporate transactions	118	8
<b>Executive opinions</b>	181	31.2
Trust and dissatisfaction	142	42.3
Taxes (% GDP)	137	10.7
High-technology trade (% total trade)	107	38.3
Market concentration	132	82.5
Market concentration	145	80.5
Product diversification	101	21.3
Charitable financial openness	124	8
Foreign direct investment, net inflows (% GDP)	143	35.2
Cost dynamics	121	27.4
<b>Financing and domestic value added</b>	122	36.5
<b>Financing and costs</b>	122	42.3
Domestic credit to private sector (% GDP)	123	7.8
MSME financing gap (% GDP)	80	70.2
Tax and contribution rate (% profit)	86	88.2
Bank nonperforming loans (%)	100	39.4
Unmet loan demand	109	17.1
Medium- and high-tech activities value added	122	2.3
Industry and services value added (% GDP)	148	25.8
Labour underutilization rate	29	80
Output per worker	100	8
<b>ENABLING ENVIRONMENT</b>	123	41.1
<b>Governance</b>	108	7.8
<b>Political environment</b>	121	8.1
Peace and stability	127	10.4
View and accountability	148	8.3
Quality of institutions	148	7.2
Rule of law	148	6.7
Control of corruption	101	4.8
Government effectiveness	108	10.1
<b>Socio-economic</b>	84	31.3
<b>Gender equity</b>	28	21.3
Female-to-male ratio in parliament	34	81.8
Female-to-male labour force participation	1	100
Female-to-male ratio in internal wage	110	52.1
<b>Government</b>	41	70.4
Social protection coverage (% population)	114	114
Adult literacy rate	102	89.8
Youth not in employment, education or training (%)	2	87.8
<b>Standard of living</b>	101	8.1
Poverty headcount ratio (% population)	128	6.3
GDP per capita	122	8
<b>Health and environment</b>	71	64.2
<b>Health</b>	122	80.2
Universal health coverage	128	42
Healthy life expectancy (years)	122	38
Under-five mortality rate	100	52.7
<b>Environmental performance</b>	8	83.2
Renewable energy consumption (%)	6	85.7
Household footprint per capita	2	89.8
Natural hazard exposure	21	84

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# CABO VERDE

## KEY INDICATORS

GDP US\$ billions	3.361
Population	555,988
HDI	0.665

**GKI RANK** 93/154

**GKI SCORE** 44.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Cabo Verde is a modest performer in terms of its knowledge infrastructure. It ranks 93rd out of 154 countries in the Global Knowledge Index 2021 and 3rd out of the 27 countries with medium human development.

### AREAS OF STRENGTH

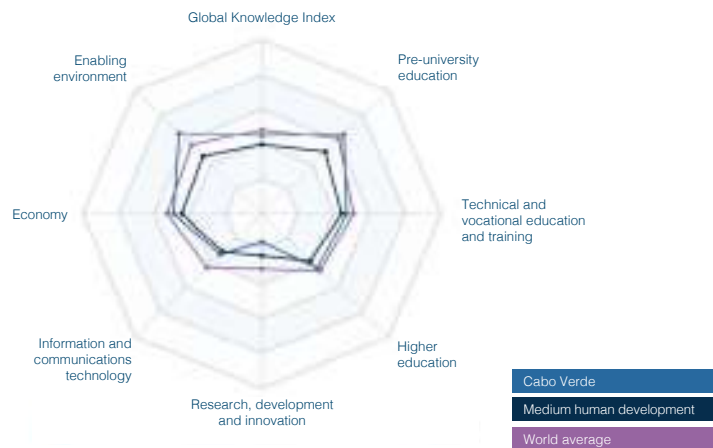
- + Teaching staff compensation (% tertiary expenditure)
- + Pupil-teacher ratio in tertiary education
- + Gross fixed capital formation (% GDP)
- + Investment in telecommunication services (% GDP)
- + Natural hazard exposure

### AREAS OF IMPROVEMENT

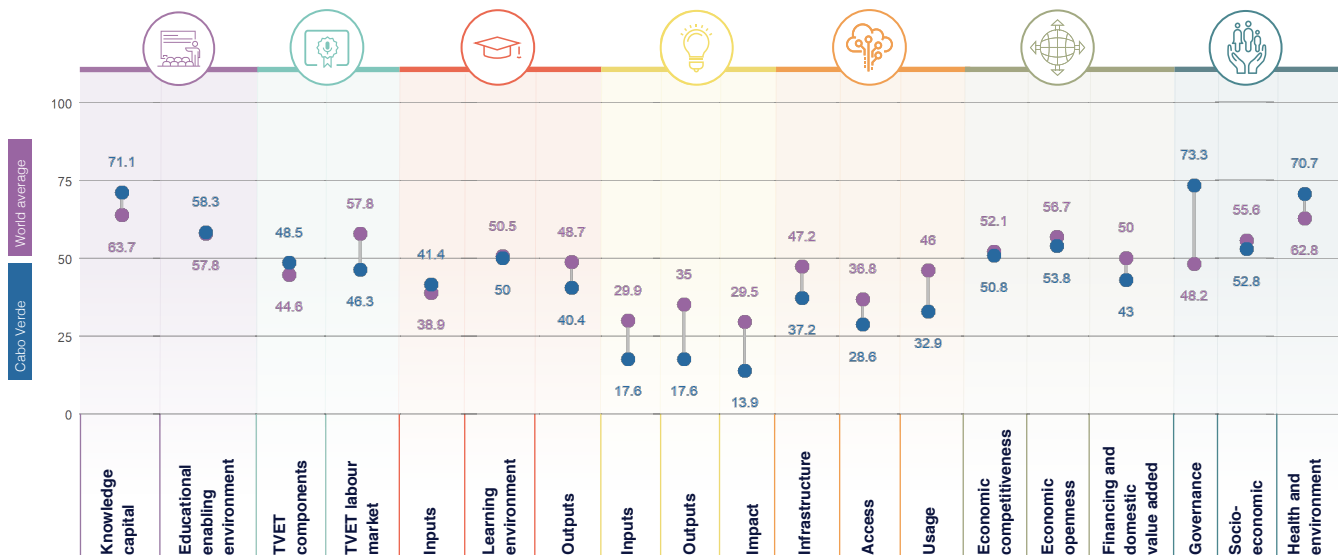
- Unemployment rate with vocational education
- Cultural goods exports (% exports)
- Research institutions prominence
- Joint ventures per strategic alliance deals (% GDP)
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	84	64.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	93	47.4
HIGHER EDUCATION	82	43.9
RESEARCH, DEVELOPMENT AND INNOVATION	148	16.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	105	32.9
ECONOMY	88	49.2
ENABLING ENVIRONMENT	38	65.6



## GKI PILLARS





# CABO VERDE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	74	71.5
Enrolment	88	75.1
Net enrolment rate in primary education	100	76.5
Net enrolment rate in lower secondary education	88	82.8
Net enrolment rate in upper secondary education	83	89.2
Completion	97	85.1
Years of compulsory education in primary and secondary	42	79.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	100	85.3
Outcomes	116	116
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	116	116
<b>Educational enabling environment</b>	<b>83</b>	<b>88.3</b>
Expenditure	41	40
Government expenditure on primary education (% GDP)	23	49.4
Government expenditure on secondary education (% GDP)	37	36.5
Government funding per primary student (% GDP per capita)	28	52.7
Government funding per secondary student (% GDP per capita)	83	21.4
Resources	81	76.3
Pupil-based teacher ratio in primary education	37	86.5
Pupil-based teacher ratio in secondary education	30	81
Schools with access to computers in primary education (%)	67	44.4
Schools with access to computers in secondary education (%)	1	100
Early learning	21	22.0
Class attendance rate in early childhood education	41	89.5
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	74	52.1
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>89</b>	<b>88.3</b>
Communications training and learning	116	116
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	56	51.7
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	117	3.4
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	75	42.0
Extent of staff training	118	41.8
Quality of vocational training	75	50.4
Ratio of high-skill TVET occupations earnings to average wage	80	32.8
Ratio of median-skill TVET occupations earnings to average wage	22	80
<b>TVET labour market</b>	<b>108</b>	<b>88.3</b>
Efficiency of the labour market	111	57.7
Firms considered with inappropriately educated workforce (%)	116	116
Employment educational mismatch (%)	77	55.3
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	117	8
Real TVET unemployment	90	51.4
Share of TVET occupations	80	50.7
Manufacturing employment (%)	87	37.2
Quality and infrastructure	50	45.0
Enrolment in vocational education, gender parity	82	68.9
Useable employment rate	74	31

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>88</b>	<b>81.4</b>
Expenditure	88	47.9
Government expenditure per tertiary student	84	9.4
Teaching staff compensation (% tertiary expenditure)	8	86.8
Enrolment	88	74.4
Enrolment in bachelor's or equivalent level (%)	87	76.2
Enrolment in masters, doctoral or equivalent (%)	113	2.8
Resources	88	88.3
Ratios/teacher ratio in tertiary education	8	83.3
Researchers in higher education (%)	82	43.4
<b>Learning environment</b>	<b>77</b>	<b>89</b>
Timely and academic freedom	91	81
Teachers in tertiary education, gender parity	86	84.2
Labour mobility rate	88	6.1
Academic freedom	85	80.0
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>112</b>	<b>80.4</b>
Attainment	82	7.4
Educational attainment rate, bachelor's or equivalent	87	16.2
Educational attainment rate, master's or equivalent	73	5.3
Educational attainment rate, doctoral or equivalent	76	3
Employment	76	33.0
Labour force participation rate with advanced education	88	85
Unemployment rate with advanced education	78	78.0
Impact	71	43.7
University tertiary enrollment in FTE	84	37.0
OECD indicators per FTE personnel in higher education	44	43.5
<b>ENVIRONMENTAL QUALITY AND INFRASTRUCTURE</b>		
<b>Energy</b>	<b>108</b>	<b>57.2</b>
Access to electricity	114	100
CO2E (% GDP)	112	1.3
GERD per researcher	78	38
Researchers per thousand labour force	84	1.7
Tertiary graduates from STEM programmes (%)	88	28.8
<b>Science, Technology and Innovation</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
High-skill employment (%)	43	29.0
Intellectual property payments (% total trade)	78	13.2
State of digital development	97	42.9
<b>Statistics</b>	<b>142</b>	<b>100</b>
Access to electricity	114	100
Average documents per researcher	80	80.2
Citations per document	143	7.2
Patent applications (per 100 billion GDP)	116	116
<b>Infrastructure and connectivity</b>		
Intellectual property receipts (% total trade)	90	2.9
Internet bandwidth capacity (per 100 million GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	116	116





# CABO VERDE

	Rank	Value
<b>Business environment</b>	100	22.0
Trademark applications per 100 million GDP	106	108
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	106	108
<b>Energy</b>	144	10.0
<b>Finance</b>	111	20.0
Access to venture capital	113	8
Depth of innovative companies	100	44
ISO 9001 quality certificates (% GDP)	21	30.0
ISO 14001 environmental certificates (% GDP)	27	3
<b>Infrastructure</b>	100	22.0
CERD forecast from abroad (%)	106	108
Cost of internet per storage of data deals (% GDP)	103	8
Computer software spending (% GDP)	106	108
<b>Government efficiency</b>	100	22.0
New business density per thousand population	37	19.0
Firms with new products/services (%)	106	108
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	106	22.0
<b>Infrastructure</b>	100	22.0
<b>Coverage</b>	82	24.0
3G/LTE mobile network coverage (% population)	82	24.0
Secure Internet servers per 1 million population	100	2.3
Investment in telecommunication services (% GDP)	13	26.0
<b>Speed</b>	102	8.8
Mobile internet and download speeds	106	108
Fixed broadband upload and download speeds	106	108
Fixed broadband subscriptions (by speed) per hundred people	100	8.8
<b>Availability</b>	106	22.0
Fixed broadband basket (% GNI per capita)	70	70
Mobile broadband basket (% GNI per capita)	106	47.4
Internet and telephony competition	143	33.3
<b>Access</b>	101	26.8
<b>Subscriptions</b>	82	24.0
Active mobile-broadband subscriptions per fixed-line inhabitants	82	22.0
International Internet bandwidth per user	80	17.1
Households with Internet access at home (%)	78	67
<b>Skills and employment</b>	110	11.5
Individuals with standard ICT skills (%)	76	5.8
Tertiary graduates from ICT programmes (%)	110	12.7
ICT employment (%)	86	16.0
<b>Usage</b>	110	22.0
<b>Services</b>	100	24.1
Government online services	109	80
Fixed broadband internet traffic per subscription	83	10
Mobile broadband internet traffic per subscription	72	10.8
Internet users (%)	80	80.0
<b>Commerce</b>	107	11.7
ICT FDI parent applications (per 100 million GDP)	106	108
E-participation	110	41.7
Internet activities by individuals (%)	106	108
Trade in digitally deliverable services (% total trade)	107	21.7
<b>ECONOMY</b>	84	60.2
<b>Economic competitiveness</b>	81	55.0
<b>Infrastructure investment</b>	111	11.0
Overhead capital formation (% GDP)	11	70
Logistics performance	106	108
Transport productive capacity	77	25.0
Building quality control	75	73.3

	Rank	Value
<b>Business agility</b>	110	41.0
Cost of starting a business	104	84.5
Recovery recovery time	106	108
Entrepreneurial employee activity rate	106	108
Growth of corporate transactions	118	8
<b>Business openness</b>	81	53.8
Trade and investment	104	40.1
Trade (% GDP)	81	26.7
High-technology trade (% total trade)	21	51.1
Market concentration	108	46.4
Market concentration	147	52.4
Product diversity	10	61.0
Contract financial openness	52	86
Foreign direct investment, net inflows (% GDP)	22	85.0
Cost dynamics	110	40
<b>Financing and domestic value added</b>	114	40
<b>Financing and costs</b>	10	24.1
Domestic credit to private sector (% GDP)	45	27.4
MSME financing gap (% GDP)	81	85.0
Tax and contribution rate (% profit)	82	70
Bank nonperforming loans (%)	106	108
Unmet loan demand	102	31.0
Medium- and high-tech activities value added	58	31.7
Industry and services value added (% GDP)	85	50.0
Labour underutilization rate	140	29
Output per worker	106	7.1
<b>ENABLING ENVIRONMENT</b>	38	46.4
<b>Governance</b>	32	75.3
Political environment	24	73.0
Peace and stability	23	77.4
View and accountability	21	76.0
Quality of institutions	41	80.7
Rule of law	47	83.0
Control of corruption	20	80.0
Government effectiveness	28	82
<b>Socio-economic</b>	87	52.8
Gender equity	10	76.0
Female-to-male ratio in parliament	32	83.0
Female-to-male labour force participation	68	77.4
Female-to-male ratio in internal wage	60	80.0
Gender inequality	112	81.0
Social protection coverage (% population)	73	37.4
Adult literacy rate	76	83
Youth not in employment, education or training (%)	130	33
Standard of living	110	27.0
Poverty headcount ratio (% population)	94	80.0
GDP per capita	130	4.8
<b>Health and environment</b>	22	70.7
Health	80	73.0
Universal health coverage	79	69
Healthy life expectancy (years)	81	89.0
Under-five mortality rate	80	85.0
Environmental performance	99	83.0
Renewable energy consumption (%)	80	23.0
Household footprint per capita	80	80.0
Natural hazard exposure	11	83

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# CAMBODIA

**GKI RANK** 112/154

**GKI SCORE** 40.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Cambodia is a modest performer in terms of its knowledge infrastructure. It ranks 112th out of 154 countries in the Global Knowledge Index 2021 and 12th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Labour underutilization rate
- + Unemployment rate with advanced education
- + Unemployment rate with vocational education
- + GERD financed from abroad (%)
- + Foreign direct investment, net inflows (% GDP)

### AREAS OF IMPROVEMENT

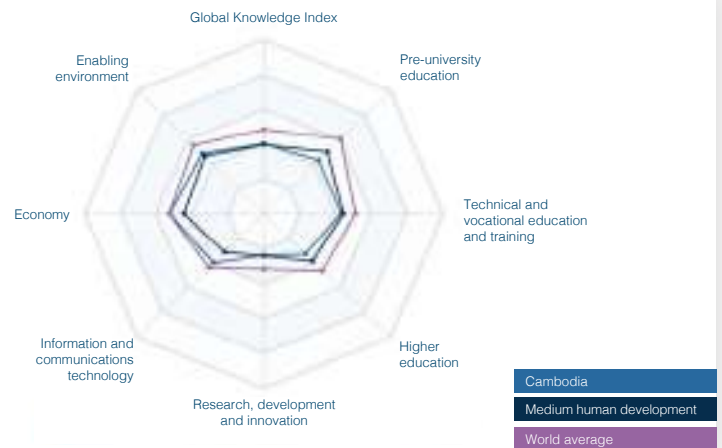
- Years of compulsory education in primary and secondary
- Research institutions prominence
- Ease of starting a business
- Extent of corporate transparency
- Medium- and high-tech activities value added

### KEY INDICATORS

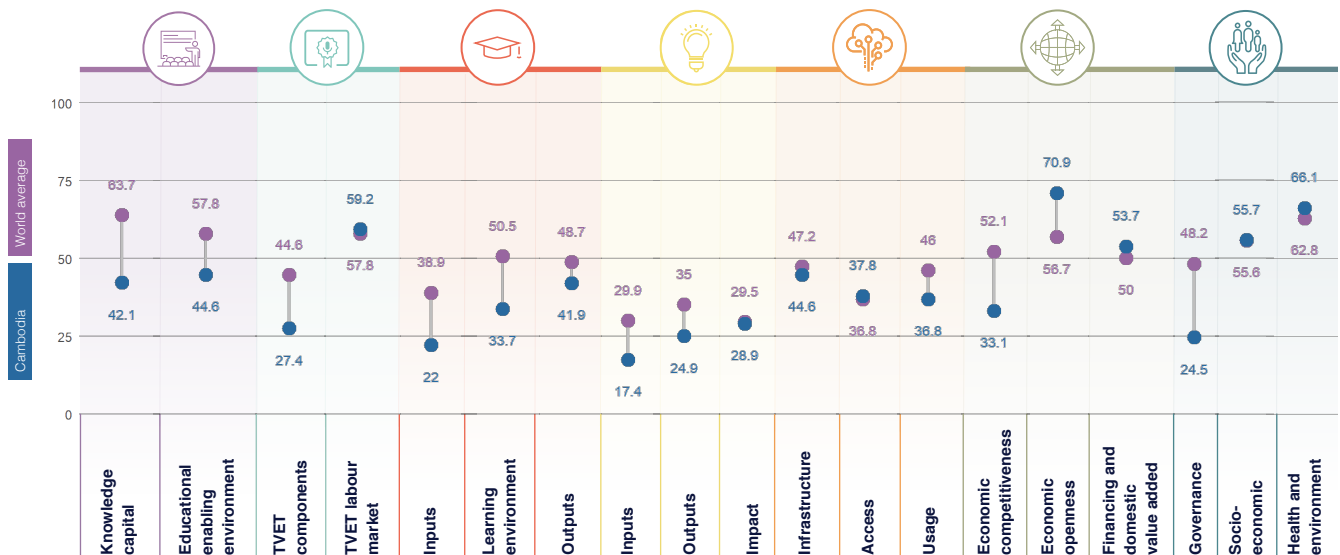
**GDP** US\$ billions ..... **70.083**  
**Population** ..... **16,718,971**  
**HDI** ..... **0.594**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	123	43.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	116	43.3
HIGHER EDUCATION	138	32.5
RESEARCH, DEVELOPMENT AND INNOVATION	114	23.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	87	39.7
ECONOMY	69	52.5
ENABLING ENVIRONMENT	99	48.8



## GKI PILLARS





# CAMBODIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	127	42.1
Enrollment	115	60.0
Net enrolment rate in primary education	112	47
Net enrolment rate in lower secondary education	87	75.6
Net enrolment rate in upper secondary education	114	24.1
Completion	101	27.5
Years of compulsory education in primary and secondary	144	8
Completion rate in upper secondary education	111	22.5
Success rate rate in the last grade of lower secondary education	112	42.4
Completion	81	47.7
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	86	43.7
<b>Educational enabling environment</b>		
Expenditure	121	41.5
Government expenditure on primary education (% GDP)	108	29.1
Government expenditure on secondary education (% GDP)	113	11.2
Government funding per primary student (% GDP per capita)	123	12.3
Government funding per secondary student (% GDP per capita)	104	104
Resources	78	69.6
Pupil-based teacher ratio in primary education	75	81.5
Pupil-based teacher ratio in secondary education	44	73.3
Schools with access to computers in primary education (%)	104	104
Schools with access to computers in secondary education (%)	104	104
Early learning	81	49.0
Class attendance rate in early childhood education	118	13.3
Proportion of children who are developmentally on track	35	58.2
Proportion of children with stimulating home learning environments	35	54.5
Pupil-based teacher ratio in preprimary education	80	73.4
Quality and infrastructure	81	49.0
Completion rate in upper secondary education, gender parity	25	80.0
Completion rate in upper secondary education, wealth parity	85	6.8
Completion rate in upper secondary education, location parity	108	31
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	99	37
Firms offering formal training (%)	87	26.3
Labour force with short-cycle tertiary education (%)	47	77.2
Participation rate in formal and non-formal education and training	84	1.4
<b>TVET resources</b>		
Government expenditure on vocational education (%)	104	104
Share of students enrolled in secondary vocational programmes	153	1
Share of students enrolled in postsecondary vocational programmes	104	104
<b>TVET quality and infrastructure</b>		
Extent of staff training	74	44.4
Quality of vocational training	111	42.1
Ratio of high-skil TVET occupations earnings to average wage	42	31.5
Ratio of medium-skil TVET occupations earnings to average wage	42	62.0
<b>TVET labour market</b>		
Efficiency of the labour market	81	62.1
Firms considered well educated workforce (%)	99	80
Employment educational mismatch (%)	85	45.0
Proportion of skilled production workers	81	84.0
Unemployment rate with vocational education	5	84
High TVET unemployment	37	81
Share of TVET occupations	80	59.0
Manufacturing employment (%)	25	85.5
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	104	104
Useable employment rate	100	50.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	127	0.6
Government expenditure per tertiary student	123	0.6
Teaching staff compensation (% tertiary expenditure)	104	104
Enrollment	100	61.1
Enrollment in bachelor's or equivalent level (%)	108	18
Enrollment in masters, doctoral or equivalent (%)	88	5.5
<b>Resources</b>		
Rp/teacher ratio in tertiary education	44	83.4
Researchers in higher education (%)	85	37.4
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	108	25.7
Labour mobility rate	104	104
Academic freedom	114	24.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	18	80.4
Class attendance rate in tertiary education, wealth parity	72	17.2
Class attendance rate in tertiary education, location parity	84	1.1
<b>Outputs</b>		
Attainment	100	3.1
Educational attainment rate, bachelor's or equivalent	104	104
Educational attainment rate, master's or equivalent	88	2.1
Educational attainment rate, doctoral or equivalent	89	4.1
Employment	81	64.1
Labour force participation rate with advanced education	85	85.5
Unemployment rate with advanced education	2	84.0
Impact	77	35.4
University tertiary enrollment in R&D	84	34.7
OECD indicators per 100 personnel in higher education	46	45.0
<b>Government's contribution and economic role</b>		
<b>Inputs</b>		
Government expenditure	101	17.4
Government expenditure	81	11.1
GDP (% GDP)	104	2.2
GERD per researcher	81	25.7
Researchers per thousand labour force	104	0.2
Tertiary graduates from RTOs programmes (%)	85	42.0
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	82	0.4
GERD financed by business enterprises (%)	85	24.1
Researchers in business enterprises (%)	75	4.9
Firms that spend on R&D (%)	88	24.3
<b>Quality and infrastructure</b>		
High-skilled employment (%)	75	11.1
Intellectual property payments (% total trade)	108	2.4
State of double development	62	48.1
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	23	66
Citations per document	74	24.3
Patent applications (per 100 billion GDP)	126	8
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	77	9
Research and development expenditure (per 100 billion GDP)	84	1.6
PCT applications (per 100 billion GDP)	123	28.0
Firms producing new goods and services (%)	71	45.7



# CAMBODIA

	Rank	Value
<b>Consumer &amp; business credit</b>	100	100
Treatment applications per 100 million GDP	80	25.7
Cultural goods exports (% exports)	119	2.3
Printing and publishing output (% manufactured output)	196	1.9
<b>Exports</b>	75	25.0
<b>Imports</b>	100	100
Risks of institutions' provisions	115	9
Depth of innovative companies	44	55.0
ISO 9001 quality certificates (% GDP)	100	4.5
ISO 14001 environmental certificates (% GDP)	100	0.1
<b>Investment</b>	97	16.1
CERD received from abroad (%)	5	69.5
Joint ventures per strategic industry deals (% GDP)	81	16.5
Computer software spending (% GDP)	100	2.1
<b>Government expenditure</b>	95	100
New business density per thousand population	37	3.2
Firms with new products/services (%)	11	81.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	87	32.7
<b>Infrastructure</b>	81	40.8
<b>Coverage</b>	94	100
3G/4G mobile network coverage (% population)	100	60.5
Secure Internet servers per 1 million population	100	2.4
Investment in telecommunication services (% GDP)	12	77.2
<b>Quality</b>	100	100
Mobile internet and download speeds	59	15.5
Fixed broadband upload and download speeds	64	10.2
Fixed broadband subscriptions (y speed) per hundred people	108	2.2
<b>Availability</b>	97	71.7
Fixed broadband latency (% QM per capita)	123	90.2
Mobile broadband basket (% QM per capita)	84	57.7
Internet and telephony competition	1	100
<b>Access</b>	74	37.8
<b>Subscriptions</b>	99	61.7
Active mobile-broadband subscriptions per hundred inhabitants	43	42.3
International Internet bandwidth per user	100	35.1
Households with Internet access at home (%)	70	73.7
<b>Skills and employment</b>	99	25.7
Individuals with standard ICT skills (%)	79	4.8
Tertiary graduates from ICT programmes (%)	1	70.3
ICT employment (%)	112	2.8
<b>Usage</b>	89	36.8
<b>Services</b>	99	61.1
Government online services	118	45.5
Fixed broadband internet traffic per subscription	194	7.8
Mobile broadband internet traffic per subscription	80	15.2
Internet users (%)	54	77.6
<b>Commerce</b>	100	21.5
ICT FDI parent applications (per 100 million GDP)	194	7.8
E-participation	118	47.7
Internet activities by individuals (%)	194	7.8
Trade in digitally deliverable services (% total trade)	104	13.5
<b>ECONOMY</b>	84	52.5
<b>Economic Competitiveness</b>	143	35.7
Infrastructure Investment	111	41.4
Overhead capital formation (% GDP)	47	54.1
Logistics performance	67	54.5
Transport productive capacity	71	26.5
Building quality control	126	23.0

	Rank	Value
<b>Business agility</b>	100	100
Time of starting a business	100	52.4
Recovery recovery time	125	15.9
Entrepreneurial employee activity rate	196	1.9
Growth of corporate transactions	118	9
<b>Business openness</b>	38	70.0
Trade and investment	91	60.0
Trade (% GDP)	31	54
High-technology trade (% total trade)	108	22.1
Market concentration	75	78.9
Market concentration	49	82.7
Product diversity	11	80.0
Contract financial openness	1	100
Foreign direct investment, net inflows (% GDP)	6	82.7
Cost dynamics	84	49.0
<b>Financing and domestic value added</b>	87	32.7
<b>Financing and costs</b>	12	70.1
Domestic credit to private sector (% GDP)	22	43.5
MSME financing gap (% GDP)	74	81.3
Tax and contribution rate (% profit)	25	84.8
Bank nonperforming loans (%)	88	62.0
Unmet loan demand	91	30.7
Medium- and high-tech activities value added	138	9
Industry and services value added (% GDP)	137	41.0
Labour underutilization rate	2	89.0
Output per worker	102	2.8
<b>ENABLING ENVIRONMENT</b>	84	40.8
<b>Governance</b>	124	24.5
Political environment	117	20.0
Peace and stability	83	41
View and accountability	138	12.8
Quality of institutions	129	22.5
Rule of law	121	17.9
Control of corruption	143	11.1
Government effectiveness	86	38
<b>Socio-economic</b>	81	55.7
Gender equity	52	71.4
Female-to-male ratio in parliament	89	27.5
Female-to-male labour force participation	31	88.8
Female-to-male ratio in internal wage	52	100
Gender inequality	81	20.3
Social protection coverage (% population)	103	5.8
Adult literacy rate	86	75.0
Youth not in employment, education or training (%)	16	90.5
Standard of living	74	33.8
Poverty headcount ratio (% population)	47	75.0
GDP per capita	123	3.2
<b>Health and environment</b>	58	66.1
Health	100	63.0
Universal health coverage	110	60
Healthy life expectancy (years)	100	67.0
Under-five mortality rate	100	75.5
Environmental performance	91	60.0
Renewable energy consumption (%)	29	84.2
Household footprint per capita	31	84.1
Natural hazard exposure	119	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 135/154

**GKI SCORE** 34.1

**WORLD AVERAGE** 48.4

# CAMEROON

## KEY INDICATORS

**GDP** US\$ billions ..... **94.937**  
**Population** ..... **26,545,864**  
**HDI** ..... **0.563**

## COUNTRY PERFORMANCE SUMMARY

Cameroon is a weak performer in terms of its knowledge infrastructure. It ranks 135th out of 154 countries in the Global Knowledge Index 2021 and 24th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

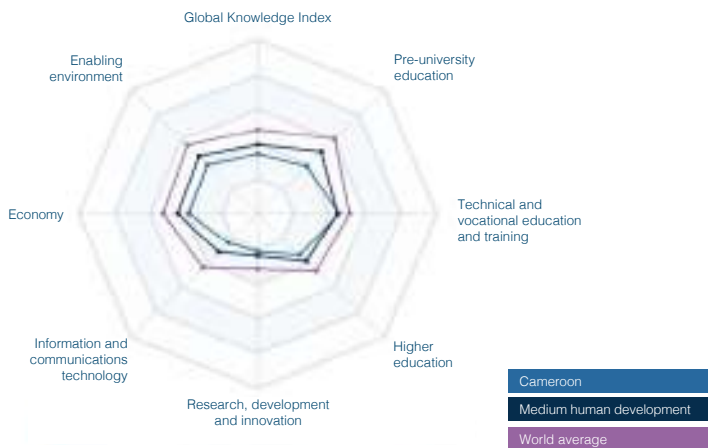
- + Investment in telecommunication services (% GDP)
- + Renewable energy consumption (%)
- + Government expenditure on vocational education (%)
- + Mobile broadband Internet traffic per subscription
- + Proportion of skilled production workers

### AREAS OF IMPROVEMENT

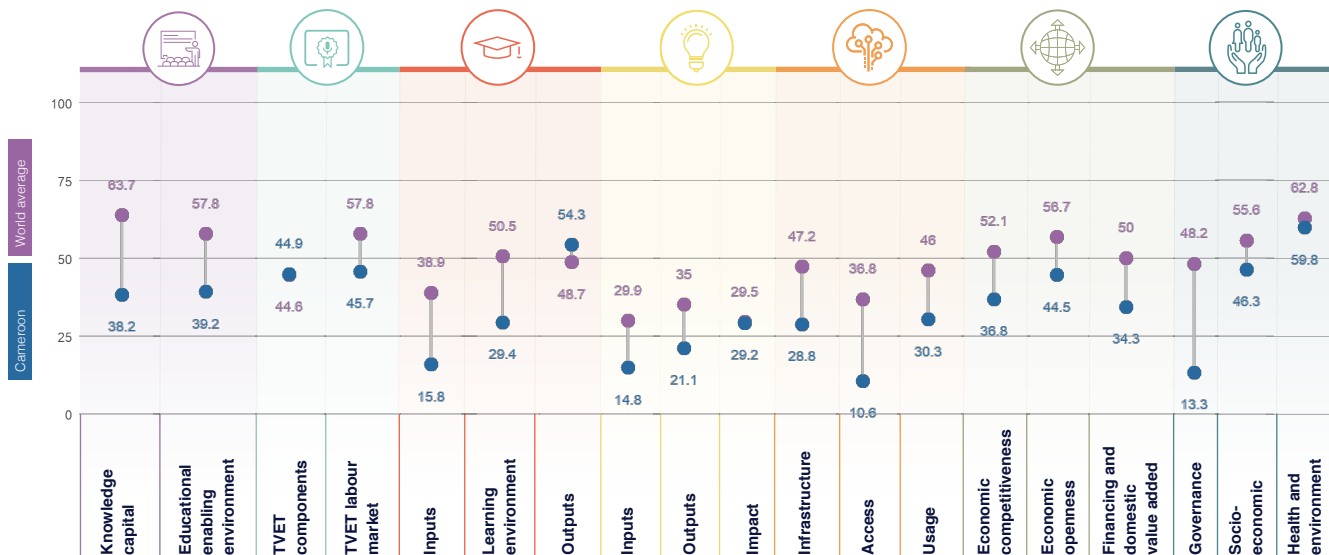
- Pupil-teacher ratio in tertiary education
- International Internet bandwidth per user
- Share of students enrolled in post-secondary vocational programmes
- 3G/4G mobile network coverage (% population)
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	130	38.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	105	45.3
HIGHER EDUCATION	135	33.2
RESEARCH, DEVELOPMENT AND INNOVATION	125	21.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	135	23.3
ECONOMY	138	38.5
ENABLING ENVIRONMENT	138	39.8



## GKI PILLARS







# CAMEROON

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	136	36.7
Enrollment	136	38.3
Enrollment rate in primary education	103	34.7
Enrollment rate in lower secondary education	119	45.8
Enrollment rate in upper secondary education	112	57.3
Completion	101	37.3
Years of compulsory education in primary and secondary	132	46.2
Completion rate in upper secondary education	119	17.2
Success rate rate in the last grade of lower secondary education	123	31.6
Completion	113	23
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	128	20
<b>Educational enabling environment</b>		
Expenditure	106	21.2
Government expenditure on primary education (% GDP)	100	20.0
Government expenditure on secondary education (% GDP)	76	24.5
Government funding per primary student (% GDP per capita)	120	12.6
Government funding per secondary student (% GDP per capita)	69	26.6
Resources	96	17.1
Pupil-based teacher ratio in primary education	85	47.1
Pupil-based teacher ratio in secondary education	76	47.3
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	70	76.9
Early learning	100	41.4
Class attendance rate in early childhood education	60	26.1
Proportion of children who are developmentally on track	53	37.5
Proportion of children with stimulating home learning environments	60	31.4
Pupil-based teacher ratio in preprimary education	59	36.7
Quality and infrastructure	116	31.1
Completion rate in upper secondary education, gender parity	87	79.3
Completion rate in upper secondary education, wealth parity	115	3.4
Completion rate in upper secondary education, location parity	111	29.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	41	10.2
Firms offering formal training (%)	41	46.2
Labour force with short-cycle tertiary education (%)	57	72.3
Participation rate in formal and non-formal education and training	116	116
TVET resources	67	51.1
Government expenditure on vocational education (%)	11	63.0
Share of students enrolled in secondary vocational programmes	25	34.4
Share of students enrolled in postsecondary vocational programmes	61	11.1
TVET quality and infrastructure	121	38.0
Extent of staff training	102	41.7
Quality of vocational training	74	51.4
Ratio of high-skill TVET occupations earnings to average wage	62	23.7
Ratio of medium-skill TVET occupations earnings to average wage	69	36.5
<b>TVET labour market</b>		
Efficiency of the labour market	60	51.4
Firms considered with inappropriately educated workforce (%)	67	62.6
Employment educational mismatch (%)	67	37.2
Proportion of skilled production workers	25	33.0
Unemployment rate with vocational education	62	36.0
Real TVET unemployment	116	31
Share of TVET occupations	122	30.0
Manufacturing employment (%)	76	25.5
Quality and infrastructure	127	44.2
Enrollment in vocational education, gender parity	96	57.3
Useable employment rate	128	24.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	71	24.1
Government expenditure per tertiary student	113	2.3
Teaching staff compensation (% tertiary expenditure)	37	43.0
Enrollment	60	31.1
Enrollment in bachelor's or equivalent level (%)	111	6.9
Enrollment in masters, doctoral or equivalent (%)	68	13.4
Resources	140	13.7
Rapit teacher ratio in tertiary education	127	13.7
Research staff in higher education (%)	116	116
<b>Learning environment</b>		
Directly paid academic freedom	118	24.1
Teachers in tertiary education, gender parity	100	30.0
Labour mobility rate	74	9.8
Academic freedom	124	21.7
Quality and infrastructure	60	32.7
Class attendance rate in tertiary education, gender parity	26	69.7
Class attendance rate in tertiary education, wealth parity	79	13.0
Class attendance rate in tertiary education, location parity	73	13.6
<b>Outputs</b>		
Skilled labour	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Skilled labour	60	60.1
Labour force participation rate with advanced education	54	75.0
Unemployment rate with advanced education	107	69.4
Impact	73	42.0
University tertiary enrollment in FTE	74	43.0
OECD indicators per FTE personnel in higher education	116	116
<b>Government's contribution to economic growth</b>		
Impact	127	14.2
Quality and infrastructure	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	68	15.1
Quality and infrastructure	116	116
High-skill employment (%)	62	17.0
Intellectual property payments (% total trade)	118	0.8
State of cluster development	101	41
<b>Outputs</b>		
Quality and infrastructure	116	116
Average documents per researcher	116	116
Citations per document	100	16.2
Patent applications (per 100 billion GDP)	78	43.1
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	60	7.3
Research and development expenditure (per 100 billion GDP)	67	1.7
PCT applications (per 100 billion GDP)	118	35.1
Firms producing new goods and services (%)	60	60.0



# CAMEROON

	Rank	Value
<b>Consumer electronics</b>	106	3.1
Treatment applications per 100 million GDP	111	3.7
Cultural goods exports (% exports)	138	0.6
Printing and publishing output (% manufactured output)	196	1.9
<b>Energy</b>	75	35.3
<b>Energy</b>	100	10.0
Renewable installations' proportion	70	11.3
Depth of innovative companies	107	35.0
ISO 9001 quality certificates (% GDP)	105	2.8
ISO 14001 environmental certificates (% GDP)	128	1.4
<b>Finance</b>	111	7.9
CERD received from abroad (%)	106	1.9
Joint ventures per strategic industry deals (% GDP)	108	3.8
Computer software spending (% GDP)	81	11.0
<b>Government services</b>	75	41.1
New business density per thousand population	196	1.9
Firms with one or more employees (%)	89	86.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	138	22.3
<b>Infrastructure</b>	132	26.5
<b>Coverage</b>	138	32.3
30MHz mobile network coverage (% population)	100	0.1
Secure Internet servers per 1 million population	158	0.8
Investment in telecommunication services (% GDP)	9	82.1
<b>Quality</b>	100	8.7
Mobile upload and download speeds	88	10.9
Fixed broadband upload and download speeds	119	2.1
Fixed broadband subscriptions (y-speed) per hundred people	111	1.4
<b>Availability</b>	108	49.0
Fixed broadband latency (% QM per capita)	108	86.3
Mobile broadband basket (% QM per capita)	108	40.7
Internet and telephony competition	122	55.0
<b>Access</b>	143	60.8
<b>Subscribers</b>	101	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	147	5.7
International Internet bandwidth per user	188	8.3
Households with Internet access at home (%)	118	21.0
<b>Skills and employment</b>	100	0.0
Individuals with standard ICT skills (%)	196	1.9
Tertiary graduates from ICT programmes (%)	196	1.9
ICT employment (%)	83	0.4
<b>Usage</b>	129	36.3
<b>Services</b>	111	21.0
Government online services	116	47.1
Fixed broadband Internet traffic per subscriber	89	0.3
Mobile broadband Internet traffic per subscriber	81	33.3
Internet users (%)	116	29.0
<b>Commerce</b>	100	0.0
ICT/FIT patent applications (per 100,000 GDP)	86	29.0
E-participation	119	41.7
Internet activities by individuals (%)	196	1.9
Trade in digitally deliverable services (% total trade)	100	27.0
<b>ECONOMY</b>	138	36.3
<b>Economic complexity indexes</b>	138	36.3
RESEARCH AND INNOVATION	100	41.0
Overhead capital formation (% GDP)	79	47.0
Logistics performance	86	36.0
Transport productive capacity	144	8.3
Building quality control	20	86.7

	Rank	Value
<b>Business agility</b>	196	12.1
Ease of starting a business	81	86.5
Recovery recovery rate	152	17.2
Entrepreneurial employee activity rate	85	0.8
Growth of corporate transactions	118	9
<b>Business openness</b>	124	46.8
Trade and investment	100	10.1
Trade (% GDP)	109	12.4
High-technology trade (% total trade)	80	41.0
Market concentration	100	89.0
Market concentration	20	83.0
Product diversity	111	31.2
Contract financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	85	33.0
Cost dynamics	88	45.0
<b>Financing and domestic value added</b>	140	34.3
Financing and costs	141	21.0
Domestic credit to private sector (% GDP)	104	4.1
IMRS financing gap (% GDP)	80	43.0
Tax and contribution rate (% profit)	107	40.4
Bank nonperforming loans (%)	100	45.4
Unmet loan demand	111	21.0
Medium- and high-tech activities value added	115	6.3
Industry and services value added (% GDP)	100	52.7
Labour underutilization rate	79	89.0
Output per worker	109	2.8
<b>ENABLING ENVIRONMENT</b>	138	26.8
<b>Governance</b>	144	15.3
Political environment	144	12.0
Peace and stability	142	9
View and accountability	104	10.0
Quality of institutions	143	14.4
Rule of law	140	12.0
Control of corruption	147	12.0
Government effectiveness	100	18.0
<b>Socio-economic</b>	107	46.3
Gender equity	81	83.4
Female-to-male ratio in parliament	42	51.5
Female-to-male labour force participation	28	89.0
Female-to-male ratio in internal wage	90	70.1
Gender inequality	107	46.0
Social protection coverage (% population)	155	4.1
Adult literacy rate	88	75.0
Youth not in employment, education or training (%)	81	50.0
Standard of living	119	20
Poverty headcount ratio (% population)	86	47.4
GDP per capita	109	2.8
<b>Health and environment</b>	100	50.8
Health	100	51.1
Universal health coverage	100	40
Healthy life expectancy (years)	140	34.8
Under-five mortality rate	140	35.0
Environmental performance	0	81.1
Renewable energy consumption (%)	13	85.7
Household footprint per capita	31	86.8
Natural hazard exposure	55	63

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# CHAD

**GKI RANK** 154/154

**GKI SCORE** 24.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Chad is a weak performer in terms of its knowledge infrastructure. It ranks 154th out of 154 countries in the Global Knowledge Index 2021 and 27th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Proportion of skilled production workers
- + Renewable energy consumption (%)
- + Unemployment rate with vocational education
- + Firms with new product/service (%)
- + Researchers in higher education (%)

### AREAS OF IMPROVEMENT

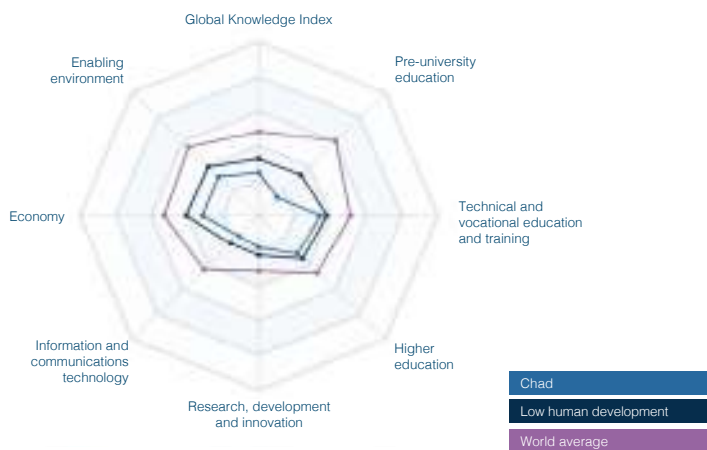
- Pupil-trained teacher ratio in primary education
- Trademark applications (per 100 billion GDP)
- Insolvency recovery rate
- Product concentration
- Universal health coverage

### KEY INDICATORS

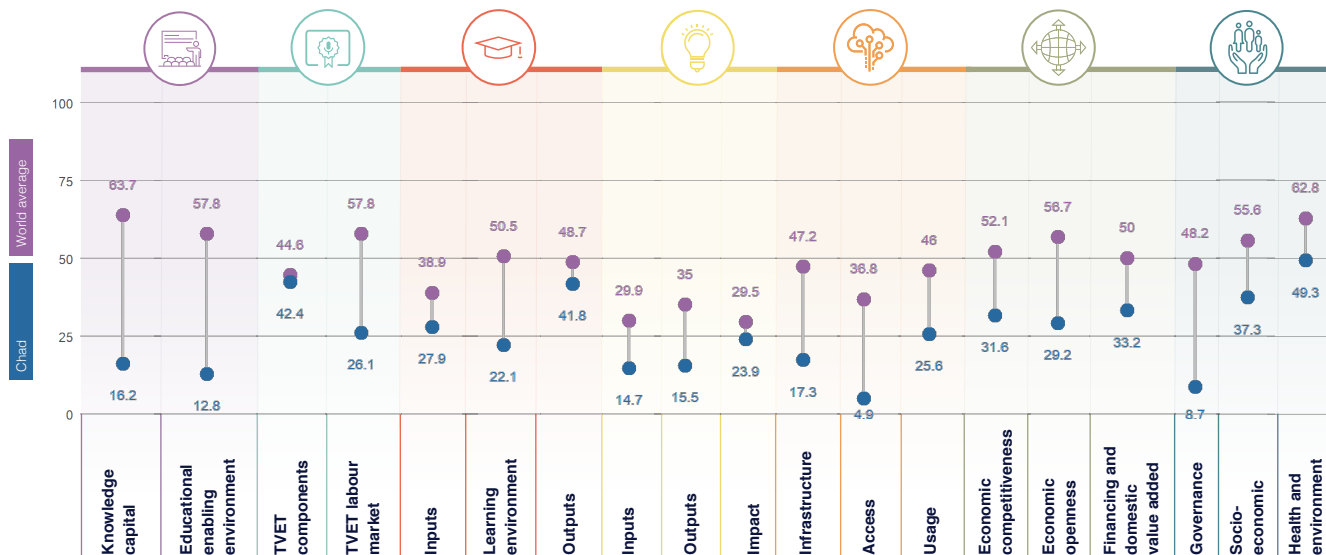
**GDP** US\$ billions ..... 24.966  
**Population** ..... 16,425,859  
**HDI** ..... 0.398

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	153	14.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	146	34.3
HIGHER EDUCATION	143	30.6
RESEARCH, DEVELOPMENT AND INNOVATION	142	18
INFORMATION AND COMMUNICATIONS TECHNOLOGY	153	15.9
ECONOMY	152	31.4
ENABLING ENVIRONMENT	152	31.8



## GKI PILLARS





	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	183	16.2
Enrollment	145	14.0
Net enrolment rate in primary education	108	20.4
Net enrolment rate in lower secondary education	108	15.3
Net enrolment rate in upper secondary education	108	9.8
Completion	142	20.4
Years of compulsory education in primary and secondary	42	26.0
Completion rate in upper secondary education	123	0.2
Success rate rate in the last grade of lower secondary education	143	8
Completion	143	5.0
Assessment of 15-year-old students in math, science and reading	116	114
Learning-adjusted years of schooling	148	2.8
<b>Educational enabling environment</b>		
Expenditure	119	10.0
Government expenditure on primary education (% GDP)	89	26
Government expenditure on secondary education (% GDP)	124	5.8
Government funding per primary student (% GDP per capita)	115	10.4
Government funding per secondary student (% GDP per capita)	94	17.0
Resources	103	0.1
Pupil-based teacher ratio in primary education	90	8
Pupil-based teacher ratio in secondary education	85	3.4
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	95	0.8
Early learning	142	11.0
Class attendance rate in early childhood education	102	0.3
Proportion of children who are developmentally on track	63	0.2
Proportion of children with stimulating home learning environments	49	35.1
Pupil-based teacher ratio in preprimary education	85	8
Quality and infrastructure	105	10.0
Completion rate in upper secondary education, gender parity	125	20.1
Completion rate in upper secondary education, wealth parity	100	0.2
Completion rate in upper secondary education, location parity	118	5.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Domestic training expenditure	90	43.0
Firms offering formal training (%)	85	27.2
Labour force with short-cycle tertiary education (%)	54	71.7
Participation rate in formal and non-formal education and training	116	116
TVET resources	90	50.4
Government expenditure on vocational education (%)	79	8
Share of students enrolled in secondary vocational programmes	125	2.2
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	90	40.0
Extent of staff training	118	33.9
Quality of vocational training	121	20.0
Ratio of high-skill TVET occupations earnings to average wage	29	47.2
Ratio of medium-skill TVET occupations earnings to average wage	20	54.0
<b>TVET labour market</b>		
Efficiency of the labour market	47	10.0
Firms considered with inappropriately educated workforce (%)	27	82.0
Employment educational mismatch (%)	109	10.0
Proportion of skilled production workers	2	86.0
Unemployment rate with vocational education	93	21.2
Real TVET unemployment	100	0.1
Share of TVET occupations	148	10.0
Manufacturing employment (%)	104	8
Quality and infrastructure	100	2.1
Enrollment in vocational education, gender parity	116	116
Useable employment rate	102	2.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	86	14.7
Government expenditure per tertiary student	34	11.0
Teaching staff compensation (% tertiary expenditure)	72	17.9
Enrollment	108	0.0
Enrollment in bachelor's or equivalent level (%)	102	0.8
Enrollment in masters, doctoral or equivalent (%)	127	0.2
Resources	90	49.0
Pupil-teacher ratio in tertiary education	112	50.9
Researcher in higher education (%)	14	84.7
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	124	0.5
Labour mobility rate	90	14.2
Academic freedom	94	28.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	97	42.0
Class attendance rate in tertiary education, wealth parity	80	0.3
Class attendance rate in tertiary education, location parity	58	0.5
<b>Outputs</b>		
Research	114	114
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	104	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	89	10.0
Labour force participation rate with advanced education	95	82.2
Unemployment rate with advanced education	78	28.0
Impact	118	11.0
University tertiary enrollment in FTE	102	20.4
UNITE documents per FTE personnel in higher education	104	6
<b>International comparisons and performance</b>		
<b>Inputs</b>		
Government expenditure	108	14.2
Government expenditure	100	0.0
GDP (% GDP)	70	0.8
GERD per researcher	88	18.0
Researchers per thousand labour force	94	0.8
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	104	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	21	25.0
<b>Quality and infrastructure</b>		
High-skill employment (%)	97	0.2
Intellectual property payments (% total trade)	116	116
State of cluster development	108	20.1
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	112	0.7
Citations per document	128	0.3
Patent applications (per 100 billion GDP)	97	33.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	116	116
Research design applications (per 100 billion GDP)	90	1.1
PCT applications (per 100 billion GDP)	92	45.0
Firms producing new goods and services (%)	80	46.2



	Rank	Value
<b>Consumer electronics</b>		
Television applications per 100 million GDP	124	8
Cultural goods exports (% exports)	194	198
Printing and publishing output (% manufactured output)	196	198
<b>Energy</b>	<b>95</b>	<b>100</b>
<b>Renewable</b>	107	111
Renewable installations productive	113	8
Depth of innovative companies	138	23.7
ISO 9001 quality certificates (% GDP)	145	0.7
ISO 14001 environmental certificates (% GDP)	148	0.8
<b>Energy efficiency</b>	150	11.9
CERO reduced from abroad (%)	159	198
Joint ventures per strategic industry deals (% GDP)	194	198
Computer software spending (% GDP)	196	198
<b>Government efficiency</b>	91	96
New business density per thousand population	125	0.5
Firms with new products/services (%)	93	36.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>183</b>	<b>18.9</b>
<b>Infrastructure</b>	183	17.3
<b>Coverage</b>	188	14.3
3G/4G mobile network coverage (% population)	198	26
Secure Internet servers per 1 million population	154	8
Investment in telecommunication services (% GDP)	114	18.6
<b>Speed</b>	119	6
Mobile upload and download speeds	194	198
Fixed broadband upload and download speeds	196	198
Fixed broadband subscriptions (y speed) per hundred people	141	8
<b>Availability</b>	146	17.1
Fixed broadband latency (% QM per capita)	196	198
Mobile broadband basket (% QM per capita)	189	11.7
Internet and telephone competition	115	82.5
<b>Access</b>	<b>182</b>	<b>8.8</b>
<b>Subscriptions</b>	181	1.7
Active mobile-broadband subscriptions per fixed-line inhabitants	154	8
International Internet bandwidth per user	122	28
Households with Internet access at home (%)	148	3.2
<b>Skills and employment</b>	143	9
Individuals with standard ICT skills (%)	194	198
Tertiary graduates from ICT programmes (%)	196	198
ICT employment (%)	127	8
<b>Usage</b>	<b>121</b>	<b>20.8</b>
<b>Services</b>	152	6.4
Government online services	148	20
Fixed broadband Internet traffic per subscription	107	8
Mobile broadband Internet traffic per subscription	84	8
Internet users (%)	188	5.8
<b>Commerce</b>	91	41.5
ICT FDI positive applications (per 100 million GDP)	194	198
E-participation	142	26.2
Internet activities by individuals (%)	194	198
Trade in digitally deliverable services (% total trade)	25	50.0
<b>ECONOMY</b>	<b>182</b>	<b>31.8</b>
<b>Economic complexity/structure</b>	149	31.8
<b>Infrastructure investment</b>	160	41.0
Overhead capital formation (% GDP)	75	46.7
Logistics performance	129	35.4
Transport productive capacity	89	22.3
Building quality control	74	36.7

	Rank	Value
<b>Business agility</b>	154	41.1
Ease of starting a business	152	82.8
Recovery recovery rate	144	8
Entrepreneurial employee activity rate	196	198
Growth of corporate transactions	118	8
<b>Employee openness</b>	<b>182</b>	<b>28.3</b>
Trust and dissatisfaction	124	10.0
Tax (% GDP)	72	29
High-technology trade (% total trade)	194	198
Market concentration	194	100.0
Market concentration	194	198
Product diversity	108	10.0
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	37	45.1
Cost dynamics	88	59
<b>Financing and domestic value added</b>	<b>141</b>	<b>21.2</b>
<b>Financing and costs</b>	142	22.1
Domestic credit to private sector (% GDP)	142	2.4
IMRS financing gap (% GDP)	24	80.0
Tax and contribution rate (% profit)	144	43.8
Bank nonperforming loans (%)	115	1.3
Unmet loan demand	109	11.3
Medium- and high-tech activities value added	198	198
Industry and services value added (% GDP)	142	30
Labour underutilization rate	88	86.1
Output per worker	148	1.1
<b>ENABLING ENVIRONMENT</b>	<b>142</b>	<b>31.8</b>
<b>Governance</b>	148	8.7
<b>Political environment</b>	147	10.7
Peace and stability	100	10.0
View and accountability	146	10.0
Quality of institutions	180	6.7
Rule of law	148	7.2
Control of corruption	149	5.8
Government effectiveness	149	1.2
<b>Socio-economic</b>	<b>133</b>	<b>37.3</b>
<b>Gender equity</b>	88	86.4
Female-to-male ratio in parliament	48	47.8
Female-to-male labour force participation	58	81.2
Female-to-male ratio in internal wage	198	198
<b>Government</b>	100	20.0
Social protection coverage (% population)	198	198
Adult literacy rate	105	8
Youth not in employment, education or training (%)	104	53.7
<b>Standard of living</b>	108	20.8
Poverty headcount ratio (% population)	100	40.0
GDP per capita	145	17
<b>Health and environment</b>	<b>128</b>	<b>40.3</b>
<b>Health</b>	102	96
Universal health coverage	151	20
Healthy life expectancy (years)	149	26.1
Under-five mortality rate	151	5
<b>Environmental performance</b>	11	38.0
Renewable energy consumption (%)	7	89.0
Household footprint per capita	86	81.3
Natural hazard exposure	72	59

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# CHILE

**GKI RANK** 47/154

**GKI SCORE** 54.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Chile is a strong performer in terms of its knowledge infrastructure. It ranks 47th out of 154 countries in the Global Knowledge Index 2021 and 44th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Gross attendance ratio for tertiary education, location parity
- + Firms that spend on R&D (%)
- + MSME financing gap (% GDP)
- + Computer software spending (% GDP)
- + Average documents per researcher

### AREAS OF IMPROVEMENT

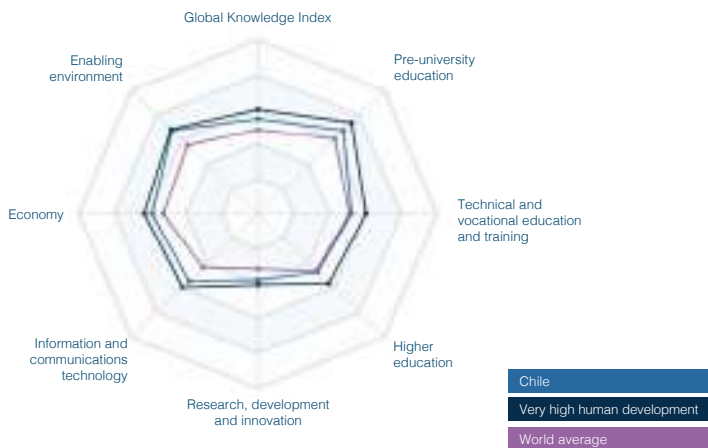
- Ratio of medium-skill TVET occupations earnings to average wage
- Natural hazard exposure
- Industrial design applications (per 100 billion GDP)
- Firms constrained with inadequately educated workforce (%)
- Proportion of skilled production workers

### KEY INDICATORS

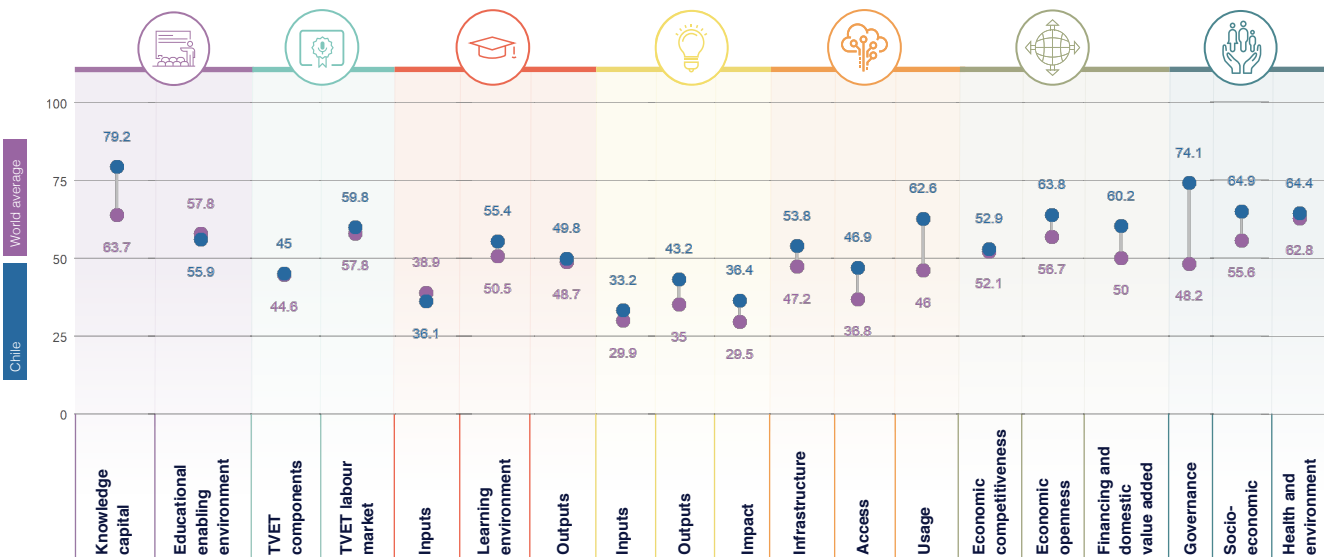
**GDP US\$ billions** 445.893  
**Population** 19,116,209  
**HDI** 0.851

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	70	67.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	75	52.4
HIGHER EDUCATION	69	47.1
RESEARCH, DEVELOPMENT AND INNOVATION	37	37.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	46	54.4
ECONOMY	51	59
ENABLING ENVIRONMENT	32	67.8



## GKI PILLARS





# CHILE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	42	75.2
Enrollment	33	31
Net enrolment rate in primary education	24	99.6
Net enrolment rate in lower secondary education	87	98.8
Net enrolment rate in upper secondary education	26	94.7
Completion	11	85.5
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	29	89.5
Success rate rate in the last grade of lower secondary education	48	77.9
Completion	33	51.1
Assessment of 15-year-old students in math, science and reading	44	47.3
Learning-adjusted years of schooling	48	87.0
<b>Educational enabling environment</b>	<b>82</b>	<b>88.8</b>
Expenditure	51	53.5
Government expenditure on primary education (% GDP)	65	23.8
Government expenditure on secondary education (% GDP)	89	25.2
Government funding per primary student (% GDP per capita)	48	44.3
Government funding per secondary student (% GDP per capita)	83	30
Resources	106	106
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	106	106
Schools with access to computers in secondary education (%)	106	106
Early learning	100	41.0
Class attendance rate in early childhood education	62	44.9
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	17	81.1
Completion rate in upper secondary education, gender parity	40	84.4
Completion rate in upper secondary education, wealth parity	25	82
Completion rate in upper secondary education, location parity	36	81
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>78</b>	<b>48</b>
Companies training apprentices	35	81.5
Firms offering formal training (%)	12	71.8
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	21	63.7
TVET enrolment	114	22.5
Government expenditure on vocational education (%)	43	27.5
Share of students enrolled in secondary vocational programmes	67	16.4
Share of students enrolling in postsecondary vocational programmes	106	106
TVET quality and infrastructure	31	44.5
Extent of staff training	88	87.1
Quality of vocational training	92	85.5
Ratio of high-skil TVET occupations earnings to average wage	88	27.5
Ratio of medium-skil TVET occupations earnings to average wage	101	32.5
<b>TVET labour market</b>	<b>73</b>	<b>88.8</b>
Efficiency of the labour market	36	41.2
Firms considered with inappropriately educated workforce (%)	117	25
Employment educational mismatch (%)	43	25.7
Proportion of skilled production workers	118	13.5
Unemployment rate with vocational education	80	80
Real TVET unemployment	31	34.5
Share of TVET occupations	50	62.5
Manufacturing employment (%)	88	23.7
Quality and infrastructure	31	31.5
Enrollment in vocational education, gender parity	14	85.5
Useable employment rate	64	75.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>47</b>	<b>34.1</b>
Expenditure	75	23.8
Government expenditure per tertiary student	54	16.1
Teaching staff compensation (% tertiary expenditure)	58	28.0
Enrollment	41	34.0
Enrollment in bachelor's or equivalent level (%)	11	44.8
Enrollment in masters, doctoral or equivalent (%)	52	24.7
Resources	114	44.7
Rapiteacher ratio in tertiary education	106	106
Researchers in higher education (%)	47	48.7
<b>Learning environment</b>	<b>87</b>	<b>88.4</b>
<b>Quality and academic freedom</b>	<b>88</b>	<b>44.5</b>
Teachers in tertiary education, gender parity	106	106
Labour mobility rate	101	2
Academic freedom	12	84.5
Quality and infrastructure	7	42.5
Class attendance rate in tertiary education, gender parity	25	81.0
Class attendance rate in tertiary education, wealth parity	18	85
Class attendance rate in tertiary education, location parity	3	41
<b>Outputs</b>	<b>88</b>	<b>49.8</b>
<b>Efficiency</b>	<b>88</b>	<b>27.5</b>
Educational attainment rate, bachelor's or equivalent	81	36.0
Educational attainment rate, master's or equivalent	88	5.8
Educational attainment rate, doctoral or equivalent	106	106
Employment	32	76.4
Labour force participation rate with advanced education	55	78.0
Unemployment rate with advanced education	88	72.0
Impact	37	81.7
University tertiary enrollment in R&D	88	41.0
OECD students per 100 personnel in higher education	17	62.1
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>38</b>	<b>22.2</b>
Access to credit resources	38	78.0
GDP (% GDP)	73	1
GERD per researcher	48	27.8
Researchers per thousand labour force	68	6.2
Tertiary graduates from STEM programmes (%)	70	38
<b>Quality of the innovation environment</b>	<b>31</b>	<b>44.5</b>
GERD performed by business enterprises (%)	86	3.4
GERD financed by business enterprises (%)	54	38.0
Researchers in business enterprises (%)	41	35.1
Firms that spend on R&D (%)	3	87
<b>Quality of business environment</b>	<b>88</b>	<b>49.8</b>
High-skilled employment (%)	13	52.0
Intellectual property payments (% total trade)	14	83.0
State of startup development	78	45.0
<b>Outputs</b>	<b>88</b>	<b>52.2</b>
Access to credit resources	31	37.1
Average documents per researcher	7	81.5
Citations per document	30	26.0
Patent applications (per 100 billion GDP)	67	80
<b>Quality of business environment</b>	<b>31</b>	<b>44.5</b>
Intellectual property receipts (% total trade)	71	8
Research design applications (per 100 billion GDP)	103	0.8
PCT applications (per 100 billion GDP)	35	85.4
Firms producing new goods and services (%)	12	17.1





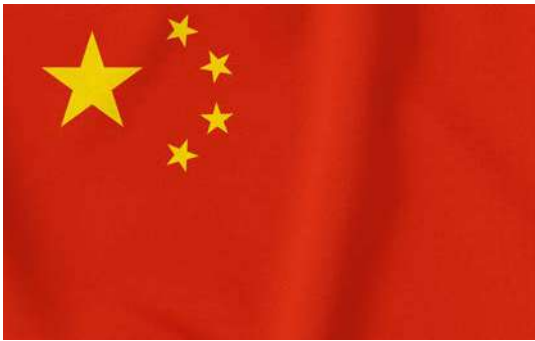
# CHILE

	Rank	Value
<b>Consumer &amp; business credit</b>	32	89.9
Treatment applications per 100 million GDP	32	74.9
Cultural goods exports (% exports)	123	1.3
Printing and publishing output (% manufactured output)	85	13.5
<b>Energy</b>	45	65.5
<b>Finance</b>	35	77.1
Ratio of institutions' provisions	31	32.4
Depth of innovative companies	33	35
ISO 9001 quality certificates (% GDP)	46	27.1
ISO 14001 environmental certificates (% GDP)	44	19.8
<b>Logistics</b>	17	122.5
CERD forecast from abroad (%)	73	8.8
Cost volume per storage volume deals (% GDP)	62	70.1
Computer software spending (% GDP)	6	45.2
<b>Manufacturing</b>	39	79.8
New business density per thousand population	43	57.3
Firms with new products/services (%)	62	54.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	41	54.4
<b>Infrastructure</b>	88	62.8
<b>Coverage</b>	38	44.5
30MHz mobile network coverage (% population)	88	62.8
Secure Internet servers per 1 million population	42	21.4
Investment in telecommunication services (% GDP)	49	34.3
<b>Quality</b>	85	63.8
Mobile speed and download speeds	72	17.6
Fixed broadband upload and download speeds	21	34
Fixed broadband subscriptions (y speed) per hundred people	53	40
<b>Availability</b>	10	81.3
Fixed broadband bandwidth (% Gbps per capita)	67	76.4
Mobile broadband basket (% Gbps per capita)	30	73.5
Internet and telephone competition	62	54.1
<b>Access</b>	28	66.8
<b>Connectivity</b>	31	65.1
Active mobile-broadband subscriptions per fixed-line inhabitants	32	44.4
International Internet bandwidth per user	38	48.2
Households with Internet access at home (%)	37	67.7
<b>Skills and employment</b>	51	71.5
Individuals with standard ICT skills (%)	29	52.6
Tertiary graduates from ICT programmes (%)	99	21.5
ICT employment (%)	48	27.3
<b>Usage</b>	29	62.8
<b>Services</b>	27	64.6
Government online services	24	85.2
Fixed broadband Internet traffic per subscription	7	57.3
Mobile broadband Internet traffic per subscription	14	35.1
Internet users (%)	41	61.4
<b>Commerce</b>	44	63.4
ICT/FIT patent applications (per 100,000 GDP)	65	42.3
E-participation	25	85.7
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	42	55.1
<b>ECONOMY</b>	21	89
<b>Economic &amp; property records</b>	74	52.3
<b>REGISTRATION &amp; INVESTMENT</b>	11	121.4
Overhead capital formation (% GDP)	52	44.5
Logistics performance	31	57.6
Transport productive capacity	85	24.1
Building quality control	22	86.7

	Rank	Value
<b>Business agility</b>	74	62.2
Time of starting a business	65	87.4
Recovery recovery time	57	45.5
Entrepreneurial employee activity rate	22	44.8
Growth of corporate transactions	86	26.6
<b>Customer experience</b>	51	63.8
<b>Trust and development</b>	10	76.4
Trade (% GDP)	99	22.2
High-technology trade (% total trade)	41	52.9
Market concentration	112	66.6
Market concentration	108	64.0
Product diversity	42	71.2
Climate financial openness	62	76
Foreign direct investment, net inflows (% GDP)	55	43.4
Cost dynamics	1	109
<b>Financing and domestic value added</b>	23	60.2
<b>Financing and costs</b>	9	77.2
Domestic credit to private sector (% GDP)	79	47.5
IMRS financing gap (% GDP)	3	82.8
Tax and contribution rate (% profit)	99	75.8
Bank nonperforming loans (%)	19	84.3
Unsecured loans volume	71	41.1
Medium- and high-tech activities value added	86	21.7
Industry and services value added (% GDP)	41	87.3
Labour underutilization rate	88	60.4
Output per worker	54	21
<b>ENABLING ENVIRONMENT</b>	32	67.8
<b>Governance</b>	33	74.1
<b>Political environment</b>	43	62.1
Peace and stability	67	43.1
View and accountability	24	81.2
Quality of institutions	25	81
Rule of law	28	84.1
Control of corruption	26	84.1
Government effectiveness	31	80.8
<b>Socio-economic</b>	43	64.3
<b>Gender equity</b>	55	64.4
Female-to-male ratio in parliament	86	29.2
Female-to-male labour force participation	107	87.6
Female-to-male ratio in internal wage	66	66.1
<b>Government</b>	49	71.1
Social protection coverage (% population)	44	85.3
Adult literacy rate	44	84.4
Youth not in employment, education or training (%)	67	87.5
<b>Standard of living</b>	48	55
Poverty headcount ratio (% population)	17	85.4
GDP per capita	28	29.6
<b>Health and environment</b>	63	64.4
<b>Health</b>	54	64
Universal health coverage	75	70
Healthy life expectancy (years)	31	80.8
Under-five mortality rate	45	85.7
<b>Environmental performance</b>	102	64.0
Renewable energy consumption (%)	70	26.4
Household footprint per capita	107	88.9
Natural hazard exposure	108	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# CHINA

**GKI RANK** 35/154

**GKI SCORE** 59.2

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

China is a strong performer in terms of its knowledge infrastructure. It ranks 35th out of 154 countries in the Global Knowledge Index 2021 and 1st out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Assessment of 15-year-old students in math, science and reading
- + Firms offering formal training (%)
- + Poverty headcount ratio (% population)
- + Fixed broadband basket (% GNI per capita)
- + Gross fixed capital formation (% GDP)

### AREAS OF IMPROVEMENT

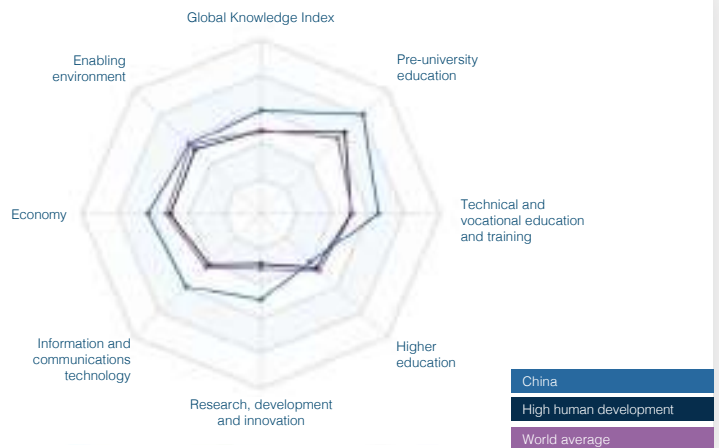
- Natural hazard exposure
- Voice and accountability
- Researchers in higher education (%)
- Proportion of skilled production workers
- Entrepreneurial employee activity rate

### KEY INDICATORS

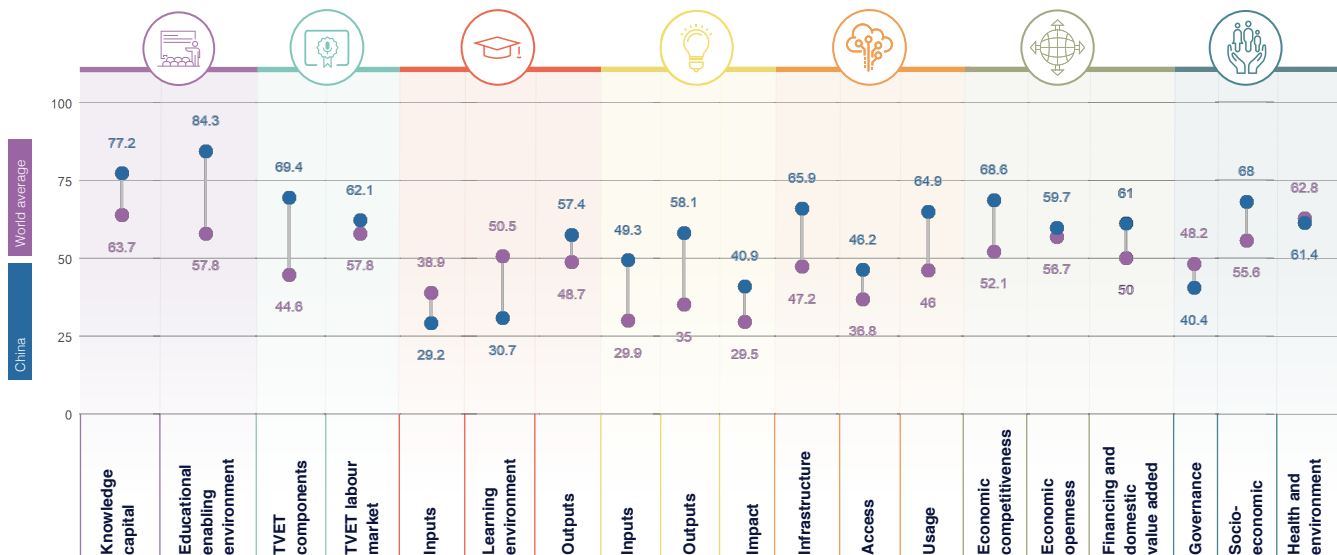
GDP US\$ billions ..... 23,009,777  
 Population ..... 1,439,323,774  
 HDI ..... 0.761

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	7	80.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	20	65.7
HIGHER EDUCATION	108	39.1
RESEARCH, DEVELOPMENT AND INNOVATION	12	49.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	33	59
ECONOMY	37	63.1
ENABLING ENVIRONMENT	65	56.6



## GKI PILLARS





# CHINA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	81	77.2
Enrollment	106	116
Net enrolment rate in primary education	106	116
Net enrolment rate in lower secondary education	106	116
Net enrolment rate in upper secondary education	106	116
Completion	81	71.1
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	74	81.1
Success rate rate in the last grade of lower secondary education	27	82.1
Completion	4	83.0
Assessment of Grade 5 students in math, science and reading	1	100
Learning-adjusted years of schooling	40	60.0
<b>Educational enabling environment</b>		
Enrollment	106	116
Government expenditure on primary education (% GDP)	106	116
Government expenditure on secondary education (% GDP)	106	116
Government funding per primary student (% GDP per capita)	106	116
Government funding per secondary student (% GDP per capita)	106	116
Resources	21	88.3
Pupil-based teacher ratio in primary education	106	116
Pupil-based teacher ratio in secondary education	106	116
Schools with access to computers in primary education (%)	37	60.0
Schools with access to computers in secondary education (%)	40	80
Early learning	37	52.1
Class attendance rate in early childhood education	17	72.1
Proportion of children who are developmentally on track	106	116
Proportion of children with stimulating home learning environments	106	116
Pupil-based teacher ratio in preprimary education	106	116
Quality and infrastructure	41	82.0
Completion rate in upper secondary education, gender parity	17	87.7
Completion rate in upper secondary education, wealth parity	30	75.4
Completion rate in upper secondary education, location parity	57	70.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication occupations	1	100
Firms offering formal training (%)	1	100
Labour force with short-cycle tertiary education (%)	106	116
Participation rate in formal and non-formal education and training	106	116
TVET resources	30	40.0
Government expenditure on vocational education (%)	106	116
Share of students enrolled in secondary vocational programmes	40	20.4
Share of students enrolled in postsecondary vocational programmes	70	20.0
TVET quality and infrastructure	30	60.0
Extent of staff training	80	60.0
Quality of vocational training	30	50.0
Ratio of high-skil TVET occupations earnings to average wage	106	116
Ratio of medium-skil TVET occupations earnings to average wage	106	116
<b>TVET labour market</b>		
Efficiency of the labour market	106	110.0
Firms considered with inequality educated workforce (%)	0	87.0
Employment educational mismatch (%)	106	116
Proportion of skilled production workers	118	7.4
Unemployment rate with vocational education	106	116
Real TVET unemployment	20	80
Share of TVET occupations	77	50.0
Manufacturing employment (%)	80	60.7
Quality and infrastructure	70	71.7
Enrollment in vocational education, gender parity	30	60.0
Useable employment rate	60	80

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrollment	106	116
Government expenditure per tertiary student	106	116
Teaching staff compensation (% tertiary expenditure)	106	116
Enrollment	81	110.0
Enrollment in bachelor's or equivalent level (%)	70	21.0
Enrollment in master's, doctoral or equivalent (%)	70	2.0
Resources	100	40.0
Ratios/teacher ratio in tertiary education	80	67.7
Research in higher education (%)	104	17.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	20	60.0
Labour mobility rate	100	1.0
Academic freedom	140	2.0
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	106	116
Class attendance rate in tertiary education, wealth parity	106	116
Class attendance rate in tertiary education, location parity	106	116
<b>Outputs</b>		
Enrollment	106	116
Educational attainment rate, bachelor's or equivalent	106	116
Educational attainment rate, master's or equivalent	106	116
Educational attainment rate, doctoral or equivalent	106	116
Employment	106	116
Labour force participation rate with advanced education	106	116
Unemployment rate with advanced education	106	116
Impact	27	87.0
University tertiary enrollment in R&D	20	60.0
OECD indicators per 100 personnel in higher education	10	50.0
<b>Government's role in research and innovation</b>		
Research	10	10.0
Share of R&D expenditure	30	10.0
GDP (% GDP)	14	40.0
OEFD per researcher	14	64.0
Researchers per thousand labour force	20	14.0
Tertiary graduates from STEM programmes (%)	106	116
<b>Government's role in innovation</b>		
OEFD performed by business enterprises (%)	12	40.0
OEFD financed by business enterprises (%)	9	64.0
Researchers in business enterprises (%)	11	14.0
Firms that spend on R&D (%)	9	81.7
Quality of research environment	20	10.0
High-skilled employment (%)	106	116
Intellectual property payments (% total trade)	20	30.0
State of cluster development	20	60.0
Structure	7	10.0
Government's role in innovation	10	10.0
Average documents per researcher	60	47.7
Citations per document	60	20.0
Patent applications (per 100 billion GDP)	2	60.0
<b>Government's role in innovation</b>		
Intellectual property receipts (% total trade)	34	21.0
Research design applications (per 100 billion GDP)	1	100
PCT applications (per 100 billion GDP)	13	60.7
Firms producing new goods and services (%)	41	60.0



# CHINA

	Rank	Value
<b>Consumer &amp; business electronics</b>	1	100
Treatment applications per 100 million GDP	1	100
Cultural goods exports (% exports)	18	43.9
Printing and publishing output (% manufactured output)	81	15.4
<b>Healthcare</b>	35	59.2
<b>Science</b>	1	100
Access to institutions' provisions	1	100
Depth of innovative companies	43	57.2
ISO 9001 quality certificates (% GDP)	23	57.5
ISO 14001 environmental certificates (% GDP)	12	63.2
<b>Software</b>	91	11.1
CERD licensed from abroad (%)	97	0.1
Joint ventures per strategic industry deals (% GDP)	65	5.8
Computer software spending (% GDP)	30	26.0
<b>Government services</b>	100	1.0
New business density per thousand population	106	106
Firms with one or more employees (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	22	52
<b>Infrastructure</b>	23	60.9
<b>Coverage</b>	81	41.2
3G/4G mobile network coverage (% population)	17	60.0
Secure Internet servers per 1 million population	70	5.7
Investment in telecommunication services (% GDP)	83	24.4
<b>Speed</b>	16	52.2
Mobile upload and download speeds	4	38.6
Fixed broadband upload and download speeds	23	30
Fixed broadband subscriptions (by speed) per hundred people	25	23.9
<b>Availability</b>	7	52.3
Fixed broadband latency (% QM per capita)	2	86.9
Mobile broadband basket (% QM per capita)	20	25.0
Internet and telephone competition	1	100
<b>Access</b>	26	46.2
<b>Subscriptions</b>	81	41.2
Active mobile-broadband subscriptions per hundred inhabitants	44	42.2
International Internet bandwidth per user	82	36.7
Households with Internet access at home (%)	87	59.6
<b>Skills and employment</b>	106	10
Individuals with standard ICT skills (%)	106	10
Tertiary graduates from ICT programmes (%)	106	10
ICT employment (%)	106	10
<b>Usage</b>	22	54.3
<b>Services</b>	40	52.5
Government online services	12	50.0
Fixed broadband Internet traffic per subscription	22	34.7
Mobile broadband Internet traffic per subscription	24	27.7
Internet users (%)	25	60
<b>Commerce</b>	17	71.2
ICT/FIT patent applications (per 100,000 GDP)	6	62.5
E-participation	9	60.4
Internet activities by individuals (%)	106	10
Trade in digitally deliverable services (% total trade)	80	43.0
<b>ECONOMY</b>	37	45.1
<b>Economic &amp; property records</b>	14	55.8
<b>REGISTRATION</b>	1	100
Overhead capital formation (% GDP)	2	89.0
Logistics performance	24	65.1
Transport productive capacity	5	63.7
Building quality control	1	100

	Rank	Value
<b>Business agility</b>	14	61
Time of starting a business	25	64.1
Recovery recovery rate	75	40.1
Entrepreneurial employee activity rate	80	5
Growth of corporate transactions	11	65.7
<b>Corporate openness</b>	81	26.2
<b>Trade and investment</b>	20	63.0
Trade (% GDP)	124	11.4
High-technology trade (% total trade)	6	62.5
Market concentration	25	60
Market concentration	20	64.5
<b>Product openness</b>	10	61.7
China's financial openness	66	16.4
Foreign direct investment, net inflows (% GDP)	103	35.2
Out dynamics	29	67.6
<b>Financing and domestic value added</b>	23	61
<b>Financing and credit</b>	21	61.0
Domestic credit to private sector (% GDP)	4	70.2
IMRS financing gap (% GDP)	50	67.0
Tax and contribution rate (% profit)	100	47.0
Bank nonperforming loans (%)	30	62.1
Unsecured loans ratio	51	51.4
Medium- and high-tech activities value added	29	48.6
Industry and services value added (% GDP)	15	73.1
Labour underutilization rate	21	76.5
Output per worker	65	11.5
<b>ENABLING ENVIRONMENT</b>	63	56.4
<b>Governance</b>	88	40.4
<b>Political environment</b>	104	21.3
Peace and stability	85	37.7
View and accountability	107	4.8
Quality of institutions	58	68.5
Rule of law	67	62.0
Control of corruption	87	52.0
Government effectiveness	81	72.6
<b>Socio-economic</b>	36	68
<b>Gender equity</b>	58	58.5
Female-to-male ratio in parliament	75	33.2
Female-to-male labour force participation	66	34.0
Female-to-male ratio in internal wage	1	100
<b>Gender balance</b>	60	70.3
Social protection coverage (% population)	45	70
Adult literacy rate	41	63.0
Youth not in employment, education or training (%)	85	63.1
<b>Standard of living</b>	21	61.2
Poverty headcount ratio (% population)	1	100
GDP per capita	60	16.3
<b>Health and environment</b>	97	61.4
<b>Health</b>	10	61.1
Universal health coverage	25	70
Healthy life expectancy (years)	41	61.4
Under-five mortality rate	53	64.0
<b>Environmental performance</b>	111	37.7
Renewable energy consumption (%)	100	13.0
Household footprint per capita	81	76.5
Natural hazard exposure	147	25

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# COLOMBIA

**GKI RANK** 67/154

**GKI SCORE** 49.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Colombia is a moderate performer in terms of its knowledge infrastructure. It ranks 67th out of 154 countries in the Global Knowledge Index 2021 and 10th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Average documents per researcher
- + Teaching staff compensation (% tertiary expenditure)
- + Researchers in higher education (%)
- + Firms producing new goods and services (%)
- + GERD per researcher

### AREAS OF IMPROVEMENT

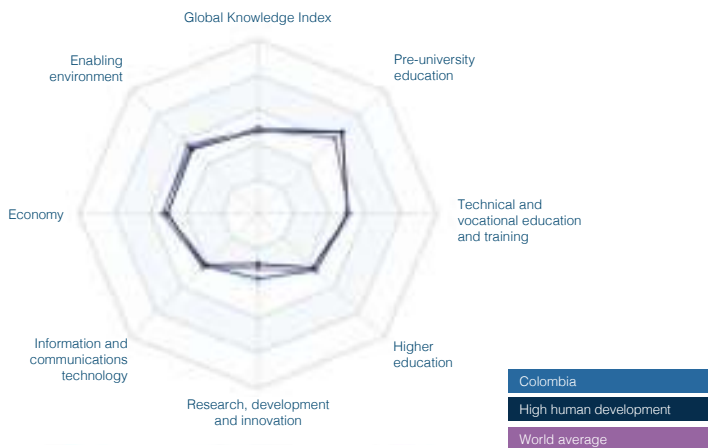
- Firms constrained with inadequately educated workforce (%)
- Trade (% GDP)
- Natural hazard exposure
- Inbound mobility rate
- Tax and contribution rate (% profit)

### KEY INDICATORS

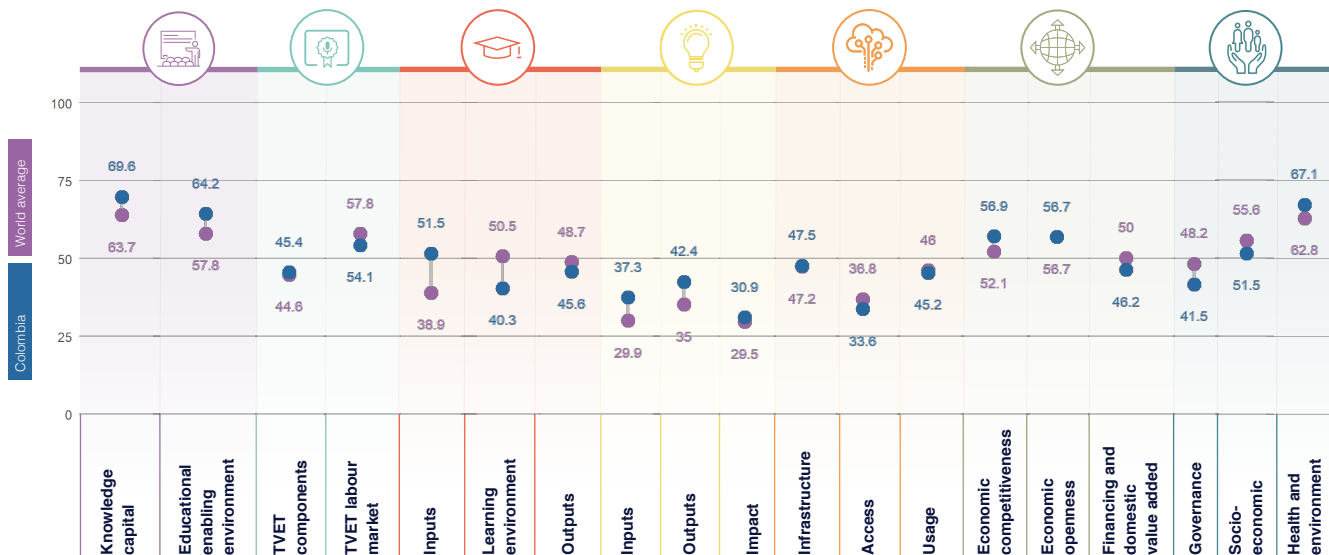
GDP US\$ billions ..... **683.942**  
 Population ..... **50,882,884**  
 HDI ..... **0.767**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	74	66.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	81	49.7
HIGHER EDUCATION	74	45.8
RESEARCH, DEVELOPMENT AND INNOVATION	40	36.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	77	42.1
ECONOMY	68	53.3
ENABLING ENVIRONMENT	79	53.4



## GKI PILLARS





# COLOMBIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	74	60.9
Enrollment	78	68.8
Enrollment rate in primary education	80	65.1
Enrollment rate in lower secondary education	47	87.1
Enrollment rate in upper secondary education	54	85.4
Enrollment rate in tertiary education	72	77.7
Completion	70	73.8
Years of compulsory education in primary and secondary	28	88.6
Completion rate in upper secondary education	80	74.7
Success rate rate in the last grade of lower secondary education	83	62
Completion	80	44.0
Assessment of Colombian students in math, science and reading	80	29.2
Learning-adjusted years of schooling	67	60.5
<b>Educational enabling environment</b>	<b>88</b>	<b>64.3</b>
Expenditure	60	91
Government expenditure on primary education (% GDP)	60	34.9
Government expenditure on secondary education (% GDP)	49	32.8
Government funding per primary student (% GDP per capita)	81	42.8
Government funding per secondary student (% GDP per capita)	74	25.5
Resources	80	65.3
Full-time teacher ratio in primary education	45	82.8
Full-time teacher ratio in secondary education	88	87.3
Schools with access to computers in primary education (%)	45	85.4
Schools with access to computers in secondary education (%)	47	87.6
Early learning	82	67.7
Class attendance rate in early childhood education	100	100
Proportion of children who are developmentally on track	100	100
Proportion of children with stimulating home learning environments	100	100
Full-time teacher ratio in preprimary education	85	87.7
Quality and infrastructure	88	70.1
Completion rate in upper secondary education, gender parity	49	83
Completion rate in upper secondary education, wealth parity	54	84.0
Completion rate in upper secondary education, location parity	71	82.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	81	75
Firms offering formal training (%)	6	78
Labour force with short-cycle tertiary education (%)	100	100
Participation rate in formal and non-formal education and training	100	100
TVET enrolment	100	8.8
Government expenditure on vocational education (%)	76	0.8
Share of students enrolled in secondary vocational programmes	65	72
Share of students enrolled in postsecondary vocational programmes	100	100
TVET quality and infrastructure	88	71
Extent of staff training	100	84.3
Quality of vocational training	45	57.7
Ratio of high-skil TVET occupations earnings to average wage	100	100
Ratio of medium-skil TVET occupations earnings to average wage	100	100
<b>TVET labour market</b>		
Efficiency of the labour market	100	82.0
Firms considered with inequality educated workforce (%)	112	26.0
Employment educational mismatch (%)	108	78
Proportion of skilled production workers	81	84.0
Unemployment rate with vocational education	100	100
Real TVET unemployment	41	51.1
Share of TVET occupations	34	60.0
Manufacturing employment (%)	86	21.4
Quality and infrastructure	78	73.0
Enrollment in vocational education, gender parity	17	84.4
Useable employment rate	100	81.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	78	45
Government expenditure per tertiary student	87	9.4
Teaching staff compensation (% tertiary expenditure)	3	88.7
Enrollment	71	26.1
Enrollment in bachelor's or equivalent level (%)	98	28.8
Enrollment in masters, doctoral or equivalent (%)	67	13.0
Resources	11	83.0
Right teacher ratio in tertiary education	54	78
Research staff in higher education (%)	5	90.0
<b>Learning environment</b>	<b>118</b>	<b>60.3</b>
Directly paid academic freedom	118	43.2
Teachers in tertiary education, gender parity	67	60.4
Labour mobility rate	118	0.8
Academic freedom	88	57.4
Quality and infrastructure	88	49.5
Class attendance rate in tertiary education, gender parity	28	88.0
Class attendance rate in tertiary education, wealth parity	61	21.2
Class attendance rate in tertiary education, location parity	28	11.8
<b>Outputs</b>	<b>88</b>	<b>45.8</b>
Attainment	88	32.0
Educational attainment rate, bachelor's or equivalent	66	30.1
Educational attainment rate, master's or equivalent	45	14.5
Educational attainment rate, doctoral or equivalent	100	100
Employment	88	73.0
Labour force participation rate with advanced education	58	73.5
Unemployment rate with advanced education	66	66.1
Innovation	88	42.0
University tertiary enrollment in R&D	69	45.0
CRISIS indicators per 100 personnel in higher education	100	100
<b>Government performance and services index</b>		
Index	88	70.3
Access to credit	88	80
GDP (% GDP)	66	4.5
GERD per researcher	6	77
Researchers per thousand labour force	61	0.6
Tertiary graduates from STEM programmes (%)	88	45.0
<b>Quality of government services</b>		
GERD performed by business enterprises (%)	69	2.9
GERD financed by business enterprises (%)	28	60.7
Researchers in business enterprises (%)	72	2.6
Firms that spend on R&D (%)	9	63.8
Quality of government services	88	82.7
High-skilled employment (%)	100	100
Intellectual property payments (% total trade)	11	62.1
State of digital development	87	43.2
<b>Science</b>	<b>88</b>	<b>70.3</b>
Access to credit	88	80
Average documents per researcher	2	86.1
Citations per document	100	100
Patent applications (per 100 billion GDP)	79	41.2
<b>Science, technology and innovation</b>		
Intellectual property receipts (% total trade)	38	20.1
Research and development expenditure (per 100 billion GDP)	81	3.1
PCT applications (per 100 billion GDP)	58	58.5
Firms producing new goods and services (%)	6	83.1



# COLOMBIA

	Rank	Value
<b>Consumer Innovation</b>	77	67.9
Treatment applications per 100 million GDP	71	32.1
Cultural goods exports (% exports)	70	5.8
Printing and publishing output (% manufactured output)	38	30.0
<b>Health</b>	66	66.0
<b>Trade</b>	75	61.2
Recess or institutions' presence	80	28.2
Depth of innovative companies	84	47.0
ISO 9001 quality certificates (% GDP)	21	50.0
ISO 14001 environmental certificates (% GDP)	20	30.0
<b>Energy</b>	70	0
CERO freed from abroad (%)	95	0.8
Coal reserves per storage volume deals (% GDP)	87	5.2
Computer software spending (% GDP)	69	11.4
<b>Government Services</b>	65	61.0
New business density per thousand population	81	0.8
Firms with new products/services (%)	45	25.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>72</b>	<b>62.3</b>
<b>Infrastructure</b>	78	47.8
<b>Coverage</b>	85	51.2
3G/4G mobile network coverage (% population)	43	80.0
Secure Internet servers per 1 million population	80	3.8
Investment in telecommunication services (% GDP)	116	114
<b>Speed</b>	81	11.1
Mobile upload and download speeds	76	16.0
Fixed broadband upload and download speeds	60	50.1
Fixed broadband subscriptions (y speed) per hundred people	86	21.1
<b>Availability</b>	81	55.0
Fixed broadband latency (% QM per user)	81	89.9
Mobile broadband basket (% QM per capita)	100	50.0
Internet and telephony competition	1	100
<b>Access</b>	87	23.6
<b>Subscriptions</b>	85	41.0
Active mobile-broadband subscriptions per fixed-line inhabitants	100	35.0
International Internet bandwidth per user	25	82
Households with Internet access at home (%)	85	52.1
<b>Skills and employment</b>	85	23.5
Individuals with standard ICT skills (%)	21	20.4
Tertiary graduates from ICT programmes (%)	81	24.0
ICT employment (%)	87	16
<b>Usage</b>	84	45.2
<b>Services</b>	86	51.2
Government online services	81	50.0
Fixed broadband internet traffic per subscription	90	1.8
Mobile broadband internet traffic per subscription	85	7.7
Internet users (%)	89	60.1
<b>Commerce</b>	81	51.1
ICT/FIT patent applications (per 100,000 GDP)	86	31.6
E-participation	20	80.0
Internet activities by individuals (%)	48	41.0
Trade in digitally deliverable services (% total trade)	44	52.2
<b>ECONOMY</b>	<b>84</b>	<b>53.3</b>
<b>Economic Competitiveness</b>	57	55.3
<b>Infrastructure Investment</b>	81	40.4
Overhead capital formation (% GDP)	112	29.3
Logistics performance	52	49.0
Transport productive capacity	85	24.0
Building quality control	75	73.3

	Rank	Value
<b>Business Agility</b>	81	67.4
Ease of starting a business	81	81
Recovery recovery rate	37	34.0
Entrepreneurial employee activity rate	25	38.0
Growth of corporate transactions	50	21.4
<b>Employee activities</b>	72	56.2
<b>Trade and Investment</b>	51	50.0
Trade (% GDP)	105	11
High-technology trade (% total trade)	38	26.4
Market concentration	76	24.0
Market concentration	100	80.1
Product diversity	11	50.1
China's financial openness	86	41.7
Foreign direct investment, net inflows (% GDP)	39	40.4
Cost dynamics	41	80
<b>Financing and domestic value added</b>	37	45.2
<b>Financing and costs</b>	104	21.0
Domestic credit to private sector (% GDP)	72	20
MSME financing gap (% GDP)	31	35.0
Tax and contribution rate (% profit)	100	30.7
Bank nonperforming loans (%)	72	80.0
Unmet loan demand	81	51.1
Medium- and high-tech activities value added	76	28.4
Industry and services value added (% GDP)	75	81.0
Labour underutilization rate	104	26.7
Output per worker	85	12.0
<b>ENABLING ENVIRONMENT</b>	<b>79</b>	<b>53.4</b>
<b>Governance</b>	84	41.5
Political environment	81	21.4
Peace and stability	110	22.0
View and accountability	86	52.7
Quality of institutions	82	43.0
Rule of law	100	23.7
Control of corruption	75	47.0
Government effectiveness	71	55.0
<b>Socio-economic</b>	82	51.0
Gender equity	88	63.0
Female-to-male ratio in parliament	100	23.0
Female-to-male labour force participation	100	67.0
Female-to-male ratio in internal wage	1	100
Gender inequality	76	80
Social protection coverage (% population)	82	51.1
Adult literacy rate	92	88.8
Youth not in employment, education or training (%)	110	40.0
Standard of living	110	23.0
Poverty headcount ratio (% population)	110	40.2
GDP per capita	76	11.8
<b>Health and environment</b>	<b>42</b>	<b>67.1</b>
<b>Health</b>	81	83.0
Universal health coverage	40	70
Healthy life expectancy (years)	35	82.0
Under-five mortality rate	71	80.0
Environmental performance	89	51.1
Renewable energy consumption (%)	80	21.0
Household footprint per capita	88	88.0
Natural hazard exposure	137	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# CONGO

(DEMOCRATIC REPUBLIC OF THE)

## KEY INDICATORS

GDP US\$ billions	96.029
Population	89,561,404
HDI	0.48

**GKI RANK** 152/154

**GKI SCORE** 27.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Congo (Democratic Republic of the) is a weak performer in terms of its knowledge infrastructure. It ranks 152nd out of 154 countries in the Global Knowledge Index 2021 and 25th out of the 27 countries with low human development.

### AREAS OF STRENGTH

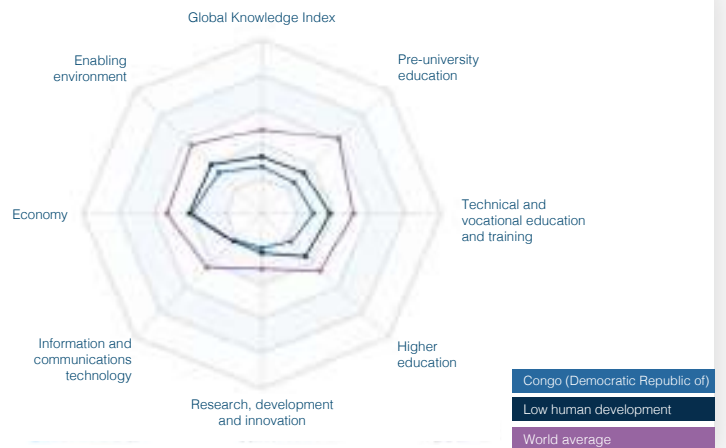
- + Renewable energy consumption (%)
- + Ecological footprint per capita
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Investment in telecommunication services (% GDP)
- + Female-to-male labour force participation

### AREAS OF IMPROVEMENT

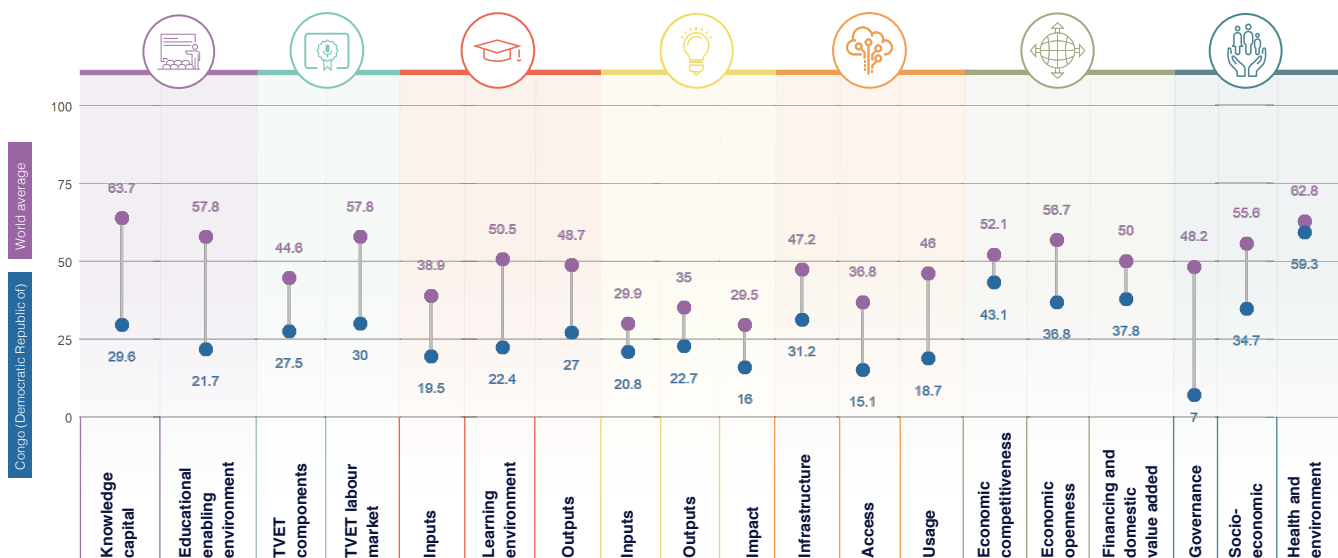
- Government expenditure on secondary education (% of GDP)
- Ratio of high-skill TVET occupations earnings to average wage
- Researchers per thousand labour force
- Mobile broadband basket (% GNI per capita)
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	150	25.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	152	28.8
HIGHER EDUCATION	153	22.9
RESEARCH, DEVELOPMENT AND INNOVATION	132	19.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	143	21.7
ECONOMY	134	39.2
ENABLING ENVIRONMENT	149	33.7



## GKI PILLARS







# CONGO (DEMOCRATIC REPUBLIC OF THE)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	181	25.8
Enrollment	196	116
Net enrolment rate in primary education	196	116
Net enrolment rate in lower secondary education	196	116
Net enrolment rate in upper secondary education	196	116
Completion	132	37.3
Years of compulsory education in primary and secondary	132	46.2
Completion rate in upper secondary education	100	36.0
Success rate rate in the last grade of lower secondary education	119	34.3
Completion	132	37.3
Assessment of 15-year-old students in math, science and reading	196	116
Learning-adjusted years of schooling	133	27.0
<b>Educational enabling environment</b>		
Expenditure	129	11.3
Government expenditure on primary education (% GDP)	81	28.4
Government expenditure on secondary education (% GDP)	151	9
Government funding per primary student (% GDP per capita)	112	18.9
Government funding per secondary student (% GDP per capita)	128	6.1
Resources	111	10.5
Pupil-based teacher ratio in primary education	85	71.5
Pupil-based teacher ratio in secondary education	85	27
Schools with access to computers in primary education (%)	85	8
Schools with access to computers in secondary education (%)	95	8
Early learning	133	10.0
Class attendance rate in early childhood education	133	4
Proportion of children who are developmentally on track	57	29.7
Proportion of children with stimulating home learning environments	47	43.4
Pupil-based teacher ratio in preprimary education	81	8
Quality and infrastructure	111	17.3
Completion rate in upper secondary education, gender parity	104	35.0
Completion rate in upper secondary education, wealth parity	85	32.7
Completion rate in upper secondary education, location parity	105	26
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	113	36.0
Firms offering formal training (%)	108	18.5
Labour force with short-cycle tertiary education (%)	81	27.0
Participation rate in formal and non-formal education and training	68	24
<b>TVET resources</b>		
Government expenditure on vocational education (%)	79	8
Share of students enrolled in secondary vocational programmes	45	30
Share of students enrolled in postsecondary vocational programmes	196	116
<b>TVET quality and infrastructure</b>		
Extent of staff training	115	36.6
Quality of vocational training	136	30
Ratio of high-skill TVET occupations earnings to average wage	115	9
Ratio of median-skill TVET occupations earnings to average wage	8	26.7
<b>TVET labour market</b>		
Efficiency of the labour market	109	31
Firms considered with inadequately educated workforce (%)	85	50.5
Employment educational mismatch (%)	85	35.0
Proportion of skilled production workers	79	62.0
Unemployment rate with vocational education	41	80
Real TVET unemployment	109	11.0
Share of TVET occupations	130	21.4
Manufacturing employment (%)	144	14
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	196	116
Useable employment rate	128	10.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	121	29
Government expenditure per tertiary student	117	2.6
Teaching staff compensation (% tertiary expenditure)	196	116
Enrollment	115	43
Enrollment in bachelor's or equivalent level (%)	123	2.8
Enrollment in masters, doctoral or equivalent (%)	80	6.4
<b>Resources</b>		
Ratio teacher ratio in tertiary education	57	76.9
Researchers in higher education (%)	80	25.0
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	128	6.1
Labour mobility rate	107	3.8
Academic freedom	115	40.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	43	78.1
Class attendance rate in tertiary education, wealth parity	84	3.3
Class attendance rate in tertiary education, location parity	75	10.6
<b>Outputs</b>		
Attainment	105	2.8
Educational attainment rate, bachelor's or equivalent	92	6.8
Educational attainment rate, master's or equivalent	97	0.3
Educational attainment rate, doctoral or equivalent	83	1.2
Employment	110	88.0
Labour force participation rate with advanced education	104	58.4
Unemployment rate with advanced education	57	66.0
Impact	104	17.0
University tertiary enrollment in FTE	118	20.1
CRIDE indicators per FTE personnel in higher education	80	11.0
<b>Government's contribution to the economic growth</b>		
<b>Inputs</b>		
Government expenditure	111	10.2
Government expenditure	111	10.2
GDP (% GDP)	80	8
GERD per researcher	9	64.7
Researchers per thousand labour force	112	9
Tertiary graduates from STEM programmes (%)	88	28.6
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	196	116
GERD financed by business enterprises (%)	100	0.1
Researchers in business enterprises (%)	196	116
Firms that spend on R&D (%)	23	46.0
<b>Quality and infrastructure</b>		
High-skill employment (%)	79	4.6
Intellectual property payments (% total trade)	134	6
State of cluster development	144	23.0
<b>Outputs</b>		
<b>Government's contribution to the economic growth</b>		
Average documents per researcher	107	20.4
Citations per document	108	27.2
Patent applications (per 100 billion GDP)	71	48.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	117	6
Research and development expenditure (per 100 billion GDP)	196	116
PCT applications (per 100 billion GDP)	128	23.5
Firms producing new goods and services (%)	58	46





# CONGO (DEMOCRATIC REPUBLIC OF THE)

	Rank	Value
<b>Business environment</b>		
Trademark applications per 100 million GDP	123	1.8
Cultural goods exports (% exports)	194	0.8
Printing and publishing output (% manufactured output)	196	0.8
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	89	5.3
Depth of innovative companies	124	34.4
ISO 9001 quality certificates (% GDP)	143	0.8
ISO 14001 environmental certificates (% GDP)	144	0.8
<b>Energy</b>		
CERD received from abroad (%)	89	2.8
Coal reserves per storage volume deals (% GDP)	194	0.8
Computer software spending (% GDP)	196	0.8
<b>Government efficiency</b>		
New business density per thousand population	136	0.1
Firms with one or more advisers (%)	51	89.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>141</b>	<b>21.7</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
30MHz mobile network coverage (% population)	129	14.8
Secure Internet servers per 1 million population	152	0.2
Investment in telecommunication services (% GDP)	1	100
<b>Quality</b>		
Mobile speed and download speeds	89	6.1
Fixed broadband upload and download speeds	113	1.8
Fixed broadband subscriptions (y speed) per hundred people	196	0.8
<b>Accessibility</b>		
Fixed broadband bandwidth (% Gbps per capita)	196	0.8
Mobile broadband basket (% Gbps per capita)	103	8
Internet and telephone competition	1	100
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	136	5.2
International Internet bandwidth per user	148	8.4
Households with Internet access at home (%)	163	1
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	194	0.8
Tertiary graduates from ICT programmes (%)	24	46.1
ICT employment (%)	118	1.8
<b>Usage</b>		
<b>Services</b>		
Government online services	108	12.0
Fixed broadband Internet traffic per subscription	194	0.8
Mobile broadband Internet traffic per subscription	112	1.8
Internet users (%)	148	7.7
<b>Services</b>		
ICT FDI parent applications (per 100 million GDP)	194	0.8
E-participation	149	25.2
Internet activities by individuals (%)	194	0.8
Trade in digitally deliverable services (% total trade)	73	30.0
<b>ECONOMY</b>	<b>124</b>	<b>38.2</b>
<b>Economic complexity indexes</b>		
REVEALING ADVANTAGE	122	41.3
Open fixed capital formation (% GDP)	71	49.4
Logistics performance	117	35.7
Transport productive capacity	142	9.4
Building quality control	80	86.7

	Rank	Value
<b>Business agility</b>		
Time of starting a business	90	81.6
Recovery recovery time	194	0.8
Entrepreneurial employee activity rate	196	0.8
Growth of corporate transactions	118	8
<b>Business openness</b>	<b>142</b>	<b>50.8</b>
<b>Trade and investment</b>		
Trade (% GDP)	84	55.7
High-technology trade (% total trade)	144	10.0
Market concentration	140	42.7
Market concentration	128	30.0
<b>Product openness</b>		
China's financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	85	42
Data openness	80	89
<b>Financing and domestic value added</b>	<b>128</b>	<b>37.3</b>
<b>Financing and credit</b>		
Domestic credit to private sector (% GDP)	147	1.8
MSME financing gap (% GDP)	89	50.0
Tax and contribution rate (% profit)	128	86.8
Bank nonperforming loans (%)	194	0.8
Unmet loan demand	87	39.4
Medium- and high-tech activities value added	194	0.8
Industry and services value added (% GDP)	100	52.7
Labour underutilization rate	80	84.0
Output per worker	148	0.7
<b>ENABLING ENVIRONMENT</b>	<b>148</b>	<b>31.7</b>
<b>Governance</b>		
<b>Political environment</b>		
Freedom of expression	148	10.0
Peace and stability	144	7.1
View and accountability	128	16.0
Quality of institutions	152	5.2
Rule of law	152	2.8
<b>Control of corruption</b>		
Government effectiveness	152	2.8
<b>Socio-economic</b>	<b>148</b>	<b>34.7</b>
<b>Gender equity</b>		
Female-to-male ratio in parliament	130	14.7
Female-to-male labour force participation	12	81.3
Female-to-male ratio in internal wage	194	0.8
<b>Gender equality</b>		
Social protection coverage (% population)	114	11.8
Adult literacy rate	89	39.8
Youth not in employment, education or training (%)	90	85.0
<b>Standard of living</b>		
Poverty headcount ratio (% population)	127	1.7
GDP per capita	100	1.2
<b>Health and environment</b>	<b>108</b>	<b>50.3</b>
<b>Health</b>		
Universal health coverage	120	4.1
Healthy life expectancy (years)	143	20
Under-five mortality rate	144	55.1
<b>Economic and performance</b>		
Renewable energy consumption (%)	1	100
Household footprint per capita	8	88.8
Natural hazard exposure	81	85

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# COSTA RICA

## KEY INDICATORS

GDP US\$ billions	96.879
Population	5,094,114
HDI	0.81

**GKI RANK** 58/154

**GKI SCORE** 51.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Costa Rica is a strong performer in terms of its knowledge infrastructure. It ranks 58th out of 154 countries in the Global Knowledge Index 2021 and 54th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

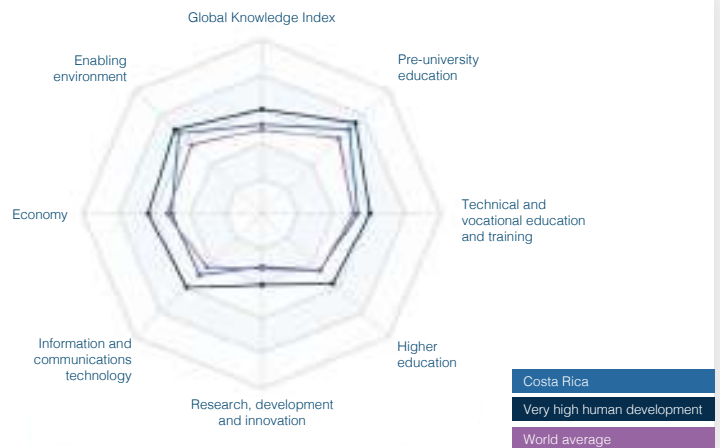
- + Firms that spend on R&D (%)
- + Net enrolment rate in primary education
- + Intellectual property payments (% total trade)
- + Trade in digitally deliverable services (% total trade)
- + Female-to-male ratio in parliament

### AREAS OF IMPROVEMENT

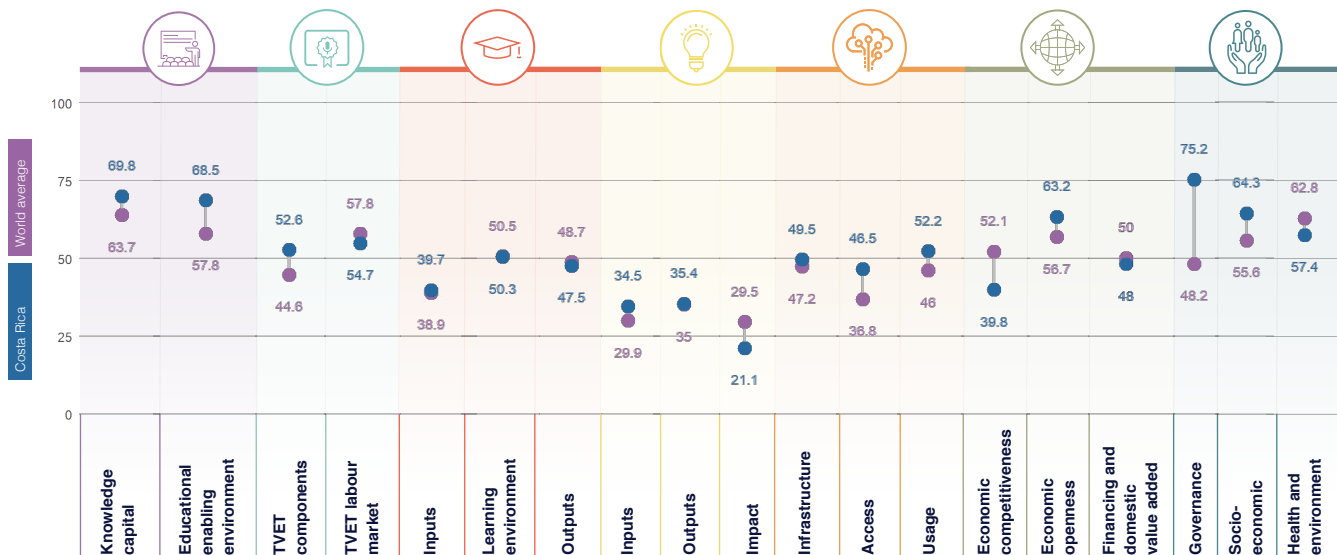
- Firms with new product/service (%)
- Entrepreneurial employee activity rate
- Industrial design applications (per 100 billion GDP)
- Ratio of medium-skill TVET occupations earnings to average wage
- Proportion of skilled production workers

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	65	69.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	66	53.6
HIGHER EDUCATION	73	45.8
RESEARCH, DEVELOPMENT AND INNOVATION	78	30.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	61	49.4
ECONOMY	82	50.4
ENABLING ENVIRONMENT	37	65.6



## GKI PILLARS





# COSTA RICA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	78	48.8
Enrollment	81	81
Net enrolment rate in primary education	7	99.9
Net enrolment rate in lower secondary education	81	98.8
Net enrolment rate in upper secondary education	41	90.0
Completion	11	111.1
Years of compulsory education in primary and secondary	28	88.8
Completion rate in upper secondary education	78	93.0
Success rate rate in the last grade of lower secondary education	100	111.1
Completion	71	41.1
Assessment of 15-year-old students in math, science and reading	17	11
Learning-adjusted years of schooling	88	88
<b>Educational enabling environment</b>		
Expenditure	11	<1
Government expenditure on primary education (% GDP)	31	41.4
Government expenditure on secondary education (% GDP)	22	41.2
Government funding per primary student (% GDP per capita)	28	11.1
Government funding per secondary student (% GDP per capita)	30	11.1
Resources	81	111.1
Pupil-based teacher ratio in primary education	9	10
Pupil-based teacher ratio in secondary education	21	81.1
Schools with access to computers in primary education (%)	41	80.0
Schools with access to computers in secondary education (%)	81	80.8
Early learning	11	111.1
Class attendance rate in early childhood education	81	11.1
Proportion of children who are developmentally on track	14	71.1
Proportion of children with stimulating home learning environments	11	88.8
Pupil-based teacher ratio in preprimary education	10	111.1
Quality and infrastructure	81	111.1
Completion rate in upper secondary education, gender parity	10	111.1
Completion rate in upper secondary education, wealth parity	71	111.1
Completion rate in upper secondary education, location parity	41	88.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	11	111.1
Firms offering formal training (%)	18	88.1
Labour force with short-cycle tertiary education (%)	118	118
Participation rate in formal and non-formal education and training	118	118
TVET resources	11	111.1
Government expenditure on vocational education (%)	21	41.1
Share of students enrolled in secondary vocational programmes	11	41.1
Share of students enrolled in postsecondary vocational programmes	118	118
TVET quality and infrastructure	71	41.1
Extent of staff training	41	11.1
Quality of vocational training	10	80.1
Ratio of high-skil TVET occupations earnings to average wage	41	11.1
Ratio of medium-skil TVET occupations earnings to average wage	100	11.1
<b>TVET labour market</b>		
Efficiency of the labour market	111	11.1
Firms considered with inequality educated workforce (%)	111	11.1
Employment educational mismatch (%)	10	111.1
Proportion of skilled production workers	117	81
Unemployment rate with vocational education	118	118
Real TVET unemployment	71	111.1
Share of TVET occupations	71	11.1
Manufacturing employment (%)	71	11.1
Quality and infrastructure	11	111.1
Enrollment in vocational education, gender parity	10	81.1
Useable employment rate	10	11.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	10	111.1
Government expenditure per tertiary student	41	11.4
Teaching staff compensation (% tertiary expenditure)	118	118
Enrollment	11	111.1
Enrollment in bachelor's or equivalent level (%)	28	111.1
Enrollment in masters, doctoral or equivalent (%)	81	11.4
Resources	41	111.1
Pupil-teacher ratio in tertiary education	118	118
Researchers in higher education (%)	28	11.1
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	118	118
Labour mobility rate	11	41
Academic freedom	10	111.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	10	111.1
Class attendance rate in tertiary education, wealth parity	12	111.1
Class attendance rate in tertiary education, location parity	41	11.4
<b>Outputs</b>		
Attainment	11	111.1
Educational attainment rate, bachelor's or equivalent	41	111.1
Educational attainment rate, master's or equivalent	47	11.1
Educational attainment rate, doctoral or equivalent	11	111.1
Employment	11	111.1
Labour force participation rate with advanced education	11	111.1
Unemployment rate with advanced education	118	118
Impact	11	111.1
University tertiary enrollment in R&D	81	111.1
OECD indicators per 100 personnel in higher education	118	118
<b>Government performance and services index</b>		
Quality	11	111.1
Access to public services	11	111.1
GDP (% GDP)	71	7.1
GERD per researcher	10	111.1
Researchers per thousand labour force	71	4.4
Tertiary graduates from STEM programmes (%)	81	10
<b>Quality of business environment</b>		
GERD performed by business enterprises (%)	10	111.1
GERD financed by business enterprises (%)	10	1.1
Researchers in business enterprises (%)	118	118
Firms that spend on R&D (%)	1	111.1
<b>Quality of financial environment</b>		
High-skilled employment (%)	118	118
Intellectual property payments (% total trade)	1	111.1
State of judicial development	11	111.1
<b>Quality of infrastructure</b>		
Access to public services	11	111.1
Average documents per researcher	11	111.1
Citations per document	10	11
Patent applications (per 100 billion GDP)	10	11.4
<b>Quality of innovation environment</b>		
Intellectual property receipts (% total trade)	11	7.1
Research and development expenditure (per 100 billion GDP)	11	11.4
PCT applications (per 100 billion GDP)	10	111.1
Firms producing new goods and services (%)	11	11.1





# COSTA RICA

	Rank	Value
<b>Consumer Innovation Adoption</b>	97	57.9
Treatment applications per 100 million GDP	22	80.6
Cultural goods exports (% exports)	88	3.3
Printing and publishing output (% manufactured output)	39	32.1
<b>Science</b>	111	11.1
<b>Health</b>	35	37.7
Risks of institutions' persistence	84	8.7
Depth of innovative companies	72	80.7
ISO 9001 quality certificates (% GDP)	75	14
ISO 14001 environmental certificates (% GDP)	83	12.4
<b>Industry</b>	97	10
CERD forecast from abroad (%)	84	4.1
Joint ventures per strategic industry deals (% GDP)	88	5.8
Computer software spending (% GDP)	30	29.2
<b>Government Innovation</b>	97	10
New business density per thousand population	53	12.8
Firms with new products/services (%)	112	44.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	81	46.4
<b>Infrastructure</b>	82	46.9
<b>Coverage</b>	82	46.1
3G/4G mobile network coverage (% population)	72	80
Secure Internet servers per 1 million population	87	0.7
Investment in telecommunication services (% GDP)	40	41.5
<b>Speed</b>	72	17.7
Mobile upload and download speeds	74	14.5
Fixed-broadband upload and download speeds	70	8
Fixed-broadband subscriptions (y-speed) per hundred people	68	27.6
<b>Availability</b>	87	32.8
Fixed broadband latency (% QM per capita)	89	81
Mobile broadband basket (% QM per capita)	37	75.0
Internet and telephony competition	85	53.8
<b>Access</b>	84	46.5
<b>Usability</b>	81	33.7
Active mobile-broadband subscriptions per hundred inhabitants	54	30.0
International Internet bandwidth per user	21	54.4
Households with Internet access at home (%)	44	84.8
<b>Skills and employment</b>	87	32.8
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	37	40.1
ICT employment (%)	21	26.7
<b>Usage</b>	89	32.2
<b>Services</b>	85	46.5
Government online services	71	85.2
Fixed broadband internet traffic per subscription	27	27.6
Mobile broadband internet traffic per subscription	71	10.8
Internet users (%)	82	59.5
<b>Commerce</b>	87	10
ICT/FIT patent applications (per 100,000 GDP)	82	37.4
E-participation	75	65.9
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	11	71
<b>ECONOMY</b>	81	54.4
<b>Economic Competitiveness</b>	123	25.3
<b>Infrastructure Investment</b>	80	41.4
Overhead capital formation (% GDP)	123	23.9
Logistics performance	73	46.8
Transport productive capacity	37	37.7
Building quality control	75	73.3

	Rank	Value
<b>Business Agility</b>	143	32.3
Time of starting a business	122	76.8
Recovery recovery time	100	32
Entrepreneurial employee activity rate	84	2.7
Growth of corporate transactions	111	14.3
<b>Business operations</b>	88	32.2
<b>Trade and Investment</b>	97	10
Trade (% GDP)	85	20
High-technology trade (% total trade)	27	60
Market concentration	89	25
Market concentration	105	83.3
<b>Product Innovation</b>	71	65.1
Climate financial openness	1	108
Foreign direct investment, net inflows (% GDP)	37	45.7
Cost dynamics	89	46.7
<b>Financing and domestic value added</b>	81	46
<b>Financing and credit</b>	57	61.2
Domestic credit to private sector (% GDP)	84	22.7
MSME financing gap (% GDP)	19	82.7
Tax and contribution rate (% profit)	108	48.8
Bank nonperforming loans (%)	41	80.6
<b>Unmet needs index</b>	104	34.3
Medium- and high-tech activities value added	86	16.7
Industry and services value added (% GDP)	30	85.1
Labour underutilization rate	122	37.4
Output per worker	87	17.4
<b>ENABLING ENVIRONMENT</b>	37	46.4
<b>Governance</b>	28	75.2
<b>Political environment</b>	74	74.6
Peace and stability	25	71.7
View and accountability	13	87.8
Quality of institutions	42	75.6
Rule of law	43	79.2
Control of corruption	33	77.4
Government effectiveness	54	83.8
<b>Socio-economic</b>	48	54.3
<b>Gender equity</b>	75	82.7
Female-to-male ratio in parliament	11	83.0
Female-to-male labour force participation	101	86.2
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	87	72.7
Social protection coverage (% population)	53	85.8
Adult literacy rate	84	87.9
Youth not in employment, education or training (%)	80	84.2
<b>Standard of living</b>	81	37.3
Poverty headcount ratio (% population)	89	59.1
GDP per capita	89	16.7
<b>Health and environment</b>	121	57.4
<b>Health</b>	80	33.6
Universal health coverage	34	77
Healthy life expectancy (years)	107	80
Under-five mortality rate	91	85.8
<b>Environmental performance</b>	104	30
Renewable energy consumption (%)	89	26.7
Household footprint per capita	126	84.8
Natural hazard exposure	134	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 39/154

**GKI SCORE** 58.5

**WORLD AVERAGE** 48.4

# CROATIA

## COUNTRY PERFORMANCE SUMMARY

Croatia is a strong performer in terms of its knowledge infrastructure. It ranks 39th out of 154 countries in the Global Knowledge Index 2021 and 38th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **10711**  
**Population** ..... **4,105,268**  
**HDI** ..... **0.851**

### AREAS OF STRENGTH

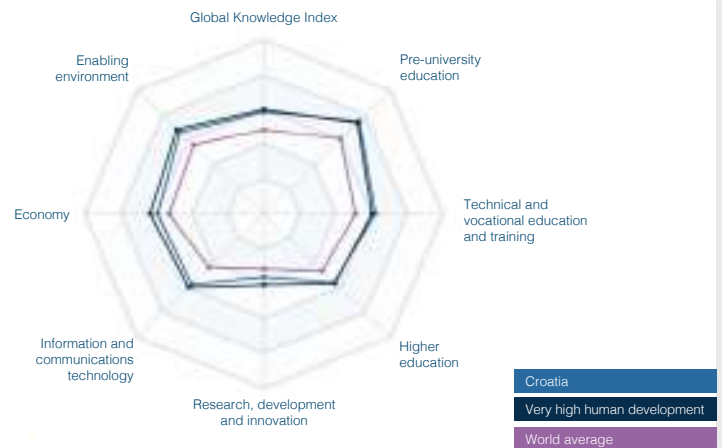
- + Product concentration
- + Enrolment in master's, doctoral or equivalent (%)
- + Completion rate in upper secondary education
- + Teachers in tertiary education, gender parity
- + Government funding per primary student (% of GDP per capita)

### AREAS OF IMPROVEMENT

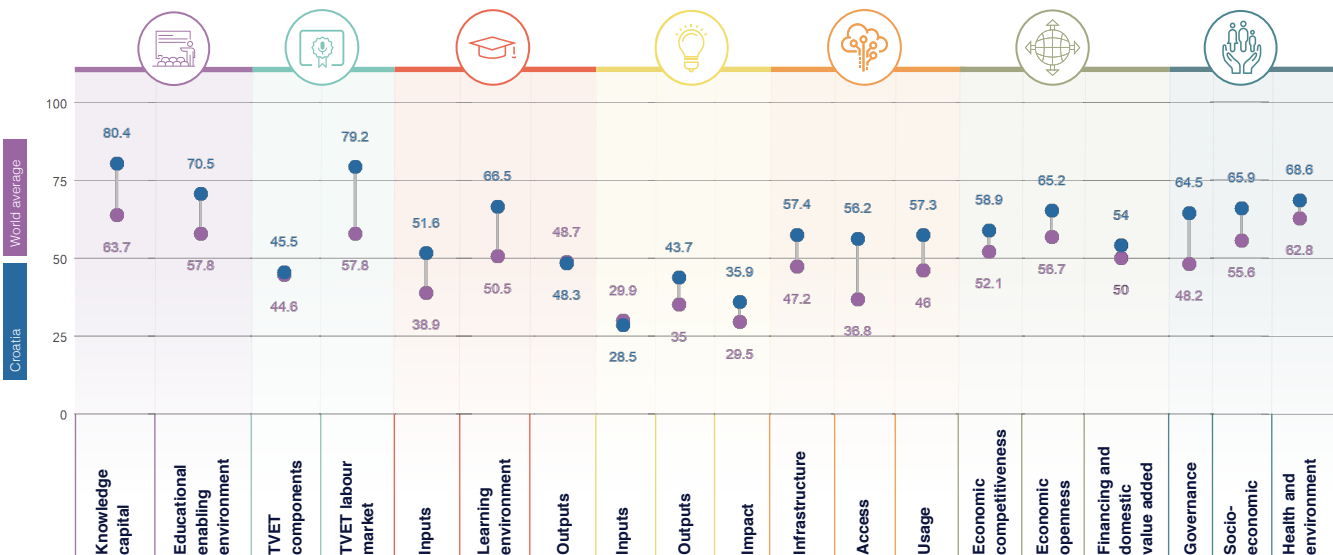
- Labour force with short-cycle tertiary education (%)
- Firms that spend on R&D (%)
- Labour force participation rate with advanced education
- Firms with new product/service (%)
- State of cluster development

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	34	75.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	32	62.3
HIGHER EDUCATION	34	55.5
RESEARCH, DEVELOPMENT AND INNOVATION	46	36
INFORMATION AND COMMUNICATIONS TECHNOLOGY	37	57
ECONOMY	49	59.3
ENABLING ENVIRONMENT	34	66.3



## GKI PILLARS





# CROATIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	37	95.4
Enrollment	17	82.5
Net enrolment rate in primary education	60	83.3
Net enrolment rate in lower secondary education	30	86.5
Net enrolment rate in upper secondary education	22	83.9
Completion	52	81.7
Years of compulsory education in primary and secondary	116	81.5
Completion rate in upper secondary education	2	80.1
Success rate rate in the last grade of lower secondary education	22	84.5
Completion	17	87
Assessment of Croatian students in math, science and reading	20	86.2
Learning-adjusted years of schooling	25	77.7
<b>Educational enabling environment</b>	<b>44</b>	<b>76.8</b>
Expenditure	5	80.4
Government expenditure on primary education (% GDP)	20	36.9
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	1	100
Government funding per secondary student (% GDP per capita)	116	116
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	100	86.2
Class attendance rate in early childhood education	60	88.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	0	80.0
Completion rate in upper secondary education, gender parity	15	87.9
Completion rate in upper secondary education, wealth parity	6	83.7
Completion rate in upper secondary education, location parity	21	87.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>15</b>	<b>80.3</b>
Companies training apprentices	116	41.5
Firms offering formal training (%)	75	31.4
Labour force with short-cycle tertiary education (%)	70	81.1
Participation rate in formal and non-formal education and training	22	49
TVET resources	27	80.0
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	51	59.5
Share of students enrolling in postsecondary vocational programmes	116	116
TVET quality and infrastructure	116	34.0
Extent of staff training	108	37.6
Quality of vocational training	115	41.2
Ratio of high-skil TVET occupations earnings to average wage	60	25.2
Ratio of medium-skil TVET occupations earnings to average wage	60	35.4
<b>TVET labour market</b>	<b>7</b>	<b>76.2</b>
Efficiency of the labour market	61	81.7
Firms considered with inequality educated workforce (%)	89	39.4
Employment educational mismatch (%)	4	80.9
Proportion of skilled production workers	59	36.0
Unemployment rate with vocational education	25	29.0
Real TVET unemployment	10	80.4
Share of TVET occupations	62	24.0
Manufacturing employment (%)	27	87.1
Quality and infrastructure	16	87.0
Enrollment in vocational education, gender parity	30	81.7
Useable employment rate	21	82.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>28</b>	<b>81.8</b>
Expenditure	16	21.0
Government expenditure per tertiary student	46	21.2
Teaching staff compensation (% tertiary expenditure)	43	38.6
Enrollment	5	80.0
Enrollment in bachelor's or equivalent level (%)	47	35.0
Enrollment in masters, doctoral or equivalent (%)	2	94.9
Resources	77	81.3
Ratios/teacher ratio in tertiary education	16	80.5
Research in higher education (%)	77	33.4
<b>Learning environment</b>	<b>28</b>	<b>86.3</b>
Timely and academic freedom	31	83.0
Teachers in tertiary education, gender parity	2	99.0
Labour mobility rate	69	12.3
Academic freedom	42	88.1
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>77</b>	<b>86.3</b>
Efficiency	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	33
Labour force participation rate with advanced education	125	24.5
Unemployment rate with advanced education	68	85.0
Impact	60	41.0
University tertiary enrollment in FTE	128	28.5
OECD students per FTE personnel in higher education	23	54.0
<b>INNOVATION, SCIENCE AND TECHNOLOGY</b>		
<b>Inputs</b>	<b>16</b>	<b>82.2</b>
Government R&D expenditure	116	100.0
GDP (% GDP)	37	14.0
GERD per researcher	66	23.3
Researchers per thousand labour force	36	26.1
Tertiary graduates from STEM programmes (%)	38	50.4
<b>Quality of innovation environment</b>	<b>116</b>	<b>100.0</b>
GERD performed by business enterprises (%)	37	12.6
GERD financed by business enterprises (%)	41	52.7
Researchers in business enterprises (%)	46	27.4
Firms that spend on R&D (%)	108	5.4
Quality of innovation environment	116	100.0
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	50	55.2
State of cluster development	128	34.7
<b>Outputs</b>	<b>17</b>	<b>86.7</b>
Government R&D expenditure	116	100.0
Average documents per researcher	17	72.1
Citations per document	36	23.4
Patent applications (per 100 billion GDP)	56	54.6
<b>Quality of innovation environment</b>	<b>116</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	42	17.0
Research design applications (per 100 billion GDP)	34	18.6
PCT applications (per 100 billion GDP)	57	56.7
Firms producing new goods and services (%)	35	34.2



# CROATIA

	Rank	Value
<b>Consumer Innovation Adoption</b>	37	67.7
Treatment applications per 100 million GDP	40	30
Cultural goods exports (% exports)	49	18.6
Printing and publishing output (% manufactured output)	9	21.0
<b>Health</b>	46	65.0
<b>Energy</b>	75	60.0
Access to institutions' premises	42	18.8
Depth of innovative companies	103	40
ISO 9001 quality certificates (% GDP)	7	65.0
ISO 14001 environmental certificates (% GDP)	6	81.4
<b>Education</b>	70	71.1
CERD freedom from abuse (%)	41	20.5
Cost savings per strategic alliance deals (% GDP)	65	10.7
Computer software spending (% GDP)	97	4.5
<b>Government Services</b>	76	60.0
New business density per thousand population	27	20.1
Firms with new products/services (%)	115	41.4
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	27	37
<b>Infrastructure</b>	44	67.4
<b>Coverage</b>	56	67.0
30MHz mobile network coverage (% population)	20	80.0
Secure Internet servers per 1 million population	34	25.2
Investment in telecommunication services (% GDP)	34	43.5
<b>Quality</b>	59	62.0
Mobile upload and download speeds	104	104
Fixed broadband upload and download speeds	50	11.0
Fixed broadband subscriptions (by speed) per hundred people	88	68.0
<b>Availability</b>	41	64.0
Fixed broadband latency (% QM per capita)	9	84.6
Mobile broadband basket (% QM per capita)	60	57.0
Internet and telephony competition	1	100
<b>Access</b>	23	66.0
<b>Usability</b>	10	61.0
Active mobile-broadband subscriptions per hundred inhabitants	33	46.4
International Internet bandwidth per user	22	63.1
Households with Internet access at home (%)	43	65.1
<b>Skills and employment</b>	27	60.0
Individuals with standard ICT skills (%)	17	65.0
Tertiary graduates from ICT programmes (%)	69	31.0
ICT employment (%)	23	54.4
<b>Usage</b>	27	67.0
<b>Services</b>	46	60
Government online services	61	55.0
Fixed broadband Internet traffic per subscription	42	25.0
Mobile broadband Internet traffic per subscription	15	29.6
Internet users (%)	57	77.1
<b>Commerce</b>	61	61.0
ICT FDI patent applications (per 100 million GDP)	56	46.4
E-participation	22	60.0
Internet activities by individuals (%)	21	25.1
Trade in digitally deliverable services (% total trade)	60	35.2
<b>ECONOMY</b>	44	64.0
<b>Economic Competitiveness</b>	61	65.0
<b>Investment in Innovation</b>	10	60.0
Overhead capital formation (% GDP)	70	45.4
Logistics performance	46	52.6
Transport productive capacity	65	27.0
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	41	62.0
Cost of starting a business	66	84.0
Recovery recovery rate	81	36.0
Entrepreneurial employee activity rate	6	87
Growth of corporate transactions	50	21.4
<b>Employee experience</b>	48	65.0
Trust and disaffection	20	60.4
Tax (% GDP)	42	27.4
High-technology trade (% total trade)	56	48.0
Market concentration	1	84.0
Market concentration	27	60.4
Product diversity	70	60
Climate financial openness	60	50
Foreign direct investment, net inflows (% GDP)	104	35.0
Cost dynamics	41	60
<b>Financing and domestic value added</b>	55	64
<b>Financing and costs</b>	60	60.0
Domestic credit to private sector (% GDP)	65	22.7
MSME financing gap (% GDP)	71	62.4
Tax and contribution rate (% profit)	10	87.0
Bank nonperforming loans (%)	88	60.0
Unmet loan demand	70	47.1
Medium- and high-tech activities value added	50	33.5
Industry and services value added (% GDP)	55	57.0
Labour underutilization rate	69	60.0
Output per worker	42	27.0
<b>ENABLING ENVIRONMENT</b>	34	64.0
<b>Governance</b>	40	64.0
Political environment	40	64.0
Peace and stability	35	65.0
View and accountability	47	61.0
Quality of institutions	51	61.1
Rule of law	54	60
Control of corruption	54	61.0
Government effectiveness	60	60.0
<b>Socio-economic</b>	40	65.0
Gender equity	50	60.0
Female-to-male ratio in parliament	61	45.0
Female-to-male labour force participation	76	35.0
Female-to-male ratio in internal wage	65	61.0
Gender inequality	47	77.0
Social protection coverage (% population)	55	64.7
Adult literacy rate	20	88.0
Youth not in employment, education or training (%)	44	70
Standard of living	61	60.1
Poverty headcount ratio (% population)	40	74.0
GDP per capita	46	23.0
<b>Health and environment</b>	32	65.0
Health	31	60.0
Universal health coverage	71	71
Healthy life expectancy (years)	20	81.7
Under-five mortality rate	55	67.0
Environmental performance	71	60.0
Renewable energy consumption (%)	27	34.1
Household footprint per capita	88	28.0
Natural hazard exposure	60	65

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 34/154

**GKI SCORE** 59.3

**WORLD AVERAGE** 48.4

# CYPRUS

## KEY INDICATORS

**GDP US\$ billions** 33.667  
**Population** 1,207,361  
**HDI** 0.887

## COUNTRY PERFORMANCE SUMMARY

Cyprus is a strong performer in terms of its knowledge infrastructure. It ranks 34th out of 154 countries in the Global Knowledge Index 2021 and 34th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

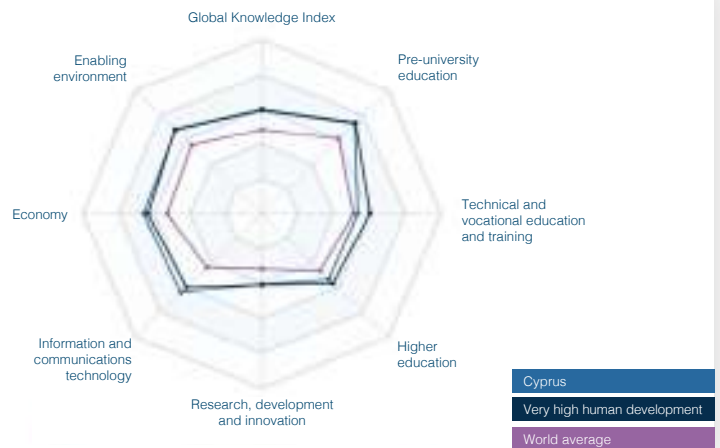
- + International Internet bandwidth per user
- + Government funding per secondary student (% of GDP per capita)
- + Average documents per researcher
- + Under-five mortality rate
- + Government funding per primary student (% of GDP per capita)

### AREAS OF IMPROVEMENT

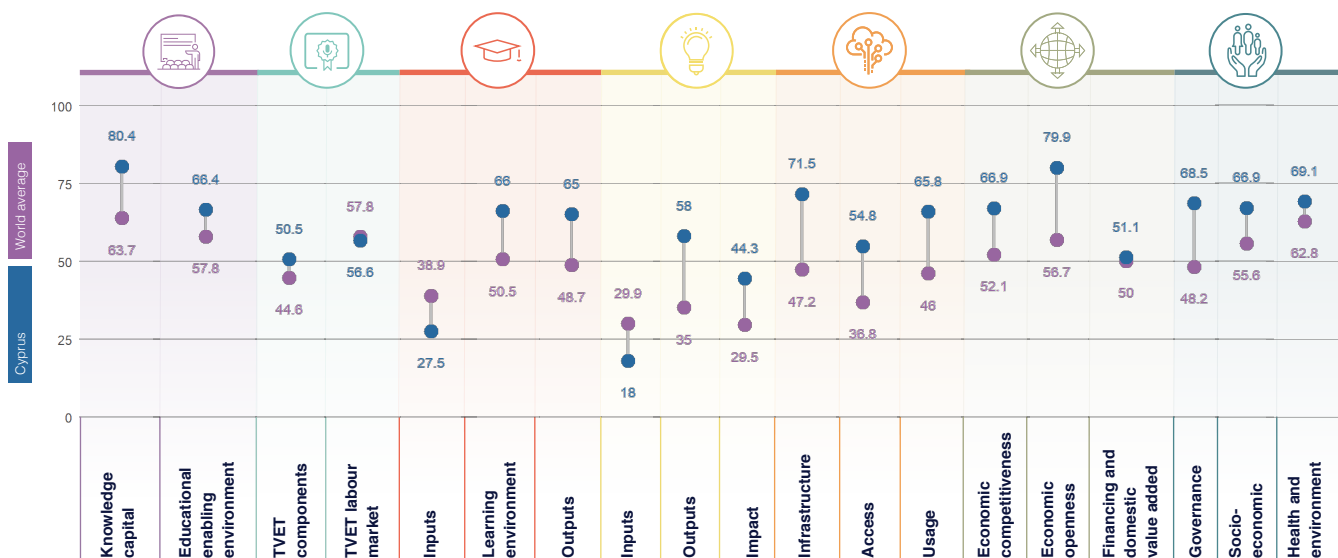
- Firms that spend on R&D (%)
- Enrolment in vocational education, gender parity
- Bank non-performing loans (%)
- GERD per researcher
- Tertiary graduates from STEM programmes (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	34	75.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	32	62.3
HIGHER EDUCATION	34	55.5
RESEARCH, DEVELOPMENT AND INNOVATION	46	36
INFORMATION AND COMMUNICATIONS TECHNOLOGY	37	57
ECONOMY	49	59.3
ENABLING ENVIRONMENT	34	66.3



## GKI PILLARS







# CYPRUS

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	38	93.4
Enrolment	27	95.4
Net enrolment rate in primary education	27	98.5
Net enrolment rate in lower secondary education	28	99.1
Net enrolment rate in upper secondary education	30	91.5
Completion	29	92.7
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	11	97.1
Success rate rate in the last grade of lower secondary education	38	81.7
Completion	40	82.5
Assessment of Cyprus's students in math, science and reading	43	47.4
Learning-adjusted years of schooling	29	82.1
<b>Educational enabling environment</b>	<b>84</b>	<b>96.4</b>
Expenditure	9	17.5
Government expenditure on primary education (% GDP)	21	44.3
Government expenditure on secondary education (% GDP)	9	31
Government funding per primary student (% GDP per capita)	4	66
Government funding per secondary student (% GDP per capita)	3	87.9
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	100	41
Class attendance rate in early childhood education	99	37
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	11	54.5
Completion rate in upper secondary education, gender parity	62	90.5
Completion rate in upper secondary education, wealth parity	11	92.7
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>63</b>	<b>85.3</b>
Companies training apprentices	70	64.5
Firms offering formal training (%)	38	48.9
Labour force with short-cycle tertiary education (%)	25	80.8
Participation rate in formal and non-formal education and training	18	85.1
TVET enrolment	70	45.2
Government expenditure on vocational education (%)	46	23.6
Share of students enrolled in secondary vocational programmes	62	13.5
Share of students enrolling in postsecondary vocational programmes	1	100
TVET quality and infrastructure	116	40.5
Extent of staff training	81	57.5
Quality of vocational training	40	55.7
Ratio of high-skil TVET occupations earnings to average wage	72	21.5
Ratio of median-skil TVET occupations earnings to average wage	100	34
<b>TVET labour market</b>	<b>97</b>	<b>96.8</b>
Efficiency of the labour market	67	51.5
Firms considered with inappropriately educated workforce (%)	74	64.6
Employment educational mismatch (%)	44	72.9
Proportion of skilled production workers	88	30
Unemployment rate with vocational education	67	76
Real TVET unemployment	76	66.1
Share of TVET occupations	41	65.6
Manufacturing employment (%)	119	24.6
Quality and infrastructure	103	55.2
Enrolment in vocational education, gender parity	108	35.7
Useable employment rate	30	67.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>122</b>	<b>37.8</b>
Expenditure	100	11.5
Government expenditure per tertiary student	85	9.1
Teaching staff compensation (% tertiary expenditure)	77	13.8
Enrolment	44	29.8
Enrolment in bachelor's or equivalent level (%)	78	18.4
Enrolment in masters, doctoral or equivalent (%)	41	43.2
Resources	103	41.5
Pupil-teacher ratio in tertiary education	100	58.5
Researchers in higher education (%)	65	26.1
<b>Learning environment</b>	<b>21</b>	<b>86</b>
Directly paid academic freedom	30	80
Teachers in tertiary education, gender parity	88	45.8
Labour mobility rate	11	68.8
Academic freedom	92	65.5
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>21</b>	<b>88</b>
Efficiency	28	50.8
Educational attainment rate, bachelor's or equivalent	48	58.8
Educational attainment rate, master's or equivalent	20	50.9
Educational attainment rate, doctoral or equivalent	19	50.5
Employment	88	74.5
Labour force participation rate with advanced education	81	85.7
Unemployment rate with advanced education	79	80.8
Impact	12	85.9
University tertiary enrollment in R&D	78	36.7
OECD indicators per 100 personnel in higher education	1	99
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>124</b>	<b>36</b>
Access to credit resources	117	50.8
GDP (% GDP)	57	13.9
GERD per researcher	100	4.4
Researchers per thousand labour force	50	15.1
Tertiary graduates from STEM programmes (%)	114	18.8
Quality and infrastructure	116	116
GERD performed by business enterprises (%)	61	9.8
GERD financed by business enterprises (%)	82	9.4
Researchers in business enterprises (%)	61	9.8
Firms that spend on R&D (%)	100	9.8
Quality and infrastructure	116	116
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	32	95.8
State of cluster development	88	49.2
<b>Outputs</b>	<b>9</b>	<b>36</b>
Access to credit resources	117	50.8
Average documents per researcher	3	85.2
Citations per document	20	43.7
Patent applications (per 100 billion GDP)	34	93.4
Quality and infrastructure	116	116
Intellectual property receipts (% total trade)	12	81
Research design applications (per 100 billion GDP)	18	43.5
PCT applications (per 100 billion GDP)	25	76.7
Firms producing new goods and services (%)	91	27.4



# CYPRUS

	Rank	Value
<b>Business environment</b>	15	67.9
Treatment applications per 100 million GDP	9	71.7
Cultural goods exports (% exports)	51	76
Printing and publishing output (% manufactured output)	19	49.9
<b>Energy</b>	55	66.3
<b>Trade</b>	35	69.5
Rules of investors' protection	68	74
Depth of innovative companies	101	43.8
ISO 9001 quality certificates (% GDP)	18	67.4
ISO 14001 environmental certificates (% GDP)	12	66.1
<b>Integrity</b>	37	70
CERD freedom from abuse (%)	35	23.6
Joint ventures per strategic industry deals (% GDP)	14	62.8
Computer software spending (% GDP)	75	14.5
<b>Government efficiency</b>	37	69.1
New business density per thousand population	19	37.8
Firms with one or more patents (%)	65	68.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	18	64
<b>Infrastructure</b>	15	71.8
<b>Coverage</b>	41	62.8
3G/4G mobile network coverage (% population)	74	69.8
Secure Internet servers per 1 million population	28	29.9
Investment in telecommunication services (% GDP)	108	32
<b>Quality</b>	9	69.9
Mobile speed and download speeds	114	114
Fixed broadband upload and download speeds	114	114
Fixed broadband subscriptions (y speed) per hundred people	13	66.8
<b>Availability</b>	41	63.1
Fixed broadband bandwidth (% Gbps per capita)	78	68.8
Mobile broadband basket (% Gbps per capita)	59	60
Internet and telephony competition	90	60.8
<b>Access</b>	23	64.8
<b>Subscribers</b>	8	71
Active mobile-broadband subscriptions per fixed-line inhabitants	25	62.1
International Internet bandwidth per user	9	73.8
Households with Internet access at home (%)	93	62.9
<b>Skills and employment</b>	14	66.8
Individuals with standard ICT skills (%)	39	46.8
Tertiary graduates from ICT programmes (%)	100	21
ICT employment (%)	87	41.8
<b>Usage</b>	22	65.8
<b>Services</b>	47	58.4
Government online services	27	67.1
Fixed broadband Internet traffic per subscription	39	38
Mobile broadband Internet traffic per subscription	69	6.4
Internet users (%)	24	60.8
<b>Commerce</b>	11	71.7
ICT FDI patent applications (per 100 million GDP)	14	72.9
E-participation	14	65.2
Internet activities by individuals (%)	36	56.8
Trade in digitally deliverable services (% total trade)	17	70.3
<b>ECONOMY</b>	24	66
<b>Economic Competitiveness</b>	27	65.3
<b>Infrastructure Investment</b>	11	61.8
Overhead capital formation (% GDP)	69	43.8
Logistics performance	43	53.6
Transport productive capacity	42	37
Building quality control	75	73.3

	Rank	Value
<b>Business agility</b>	9	61.8
Ease of starting a business	45	62
Recovery recovery rate	34	60.1
Entrepreneurial employee activity rate	12	65.4
Growth of corporate transactions	1	100
<b>Employee experience</b>	6	76.3
<b>Trust and development</b>	27	60.8
Tax (% GDP)	15	61.1
High-technology trade (% total trade)	68	42.7
Market concentration	110	60.6
Market concentration	12	65.4
Product diversity	9	60.8
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	1	100
Cost dynamics	41	60
<b>Financing and domestic value added</b>	28	61.8
<b>Financing and costs</b>	26	61.8
Domestic credit to private sector (% GDP)	21	43.8
MSME financing gap (% GDP)	114	114
Tax and contribution rate (% profit)	27	65.4
Bank nonperforming loans (%)	111	35.8
Unmet loan demand	110	47.8
Medium- and high-tech activities value added	57	31.8
Industry and services value added (% GDP)	69	65.8
Labour underutilization rate	74	66.1
Output per worker	47	65.8
<b>ENABLING ENVIRONMENT</b>	21	64.3
<b>Governance</b>	42	65.3
Political environment	34	63.7
Peace and stability	25	60.1
View and accountability	20	74.4
Quality of institutions	41	71.3
Rule of law	42	70.7
Control of corruption	45	65.8
Government effectiveness	25	71.8
<b>Socio-economic</b>	39	66.8
Gender equity	74	66.8
Female-to-male ratio in parliament	126	14.7
Female-to-male labour force participation	59	62.1
Female-to-male ratio in internal wage	1	100
Gender inequality	46	71.8
Social protection coverage (% population)	61	60.1
Adult literacy rate	96	66.8
Youth not in employment, education or training (%)	52	74.4
<b>Standard of living</b>	27	68.8
Poverty headcount ratio (% population)	32	79.8
GDP per capita	32	23.7
<b>Health and environment</b>	33	60.1
<b>Health</b>	11	60.1
Universal health coverage	30	78
Healthy life expectancy (years)	9	84.4
Under-five mortality rate	5	69.7
<b>Environmental performance</b>	111	47.8
Renewable energy consumption (%)	106	12.8
Household footprint per capita	100	73.8
Natural hazard exposure	79	57

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# CZECHIA

**GKI RANK** 25/154

**GKI SCORE** 62.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Czechia is a leading performer in terms of its knowledge infrastructure. It ranks 25th out of 154 countries in the Global Knowledge Index 2021 and 25th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **412.007**  
**Population** ..... **10,708,982**  
**HDI** ..... **0.9**

### AREAS OF STRENGTH

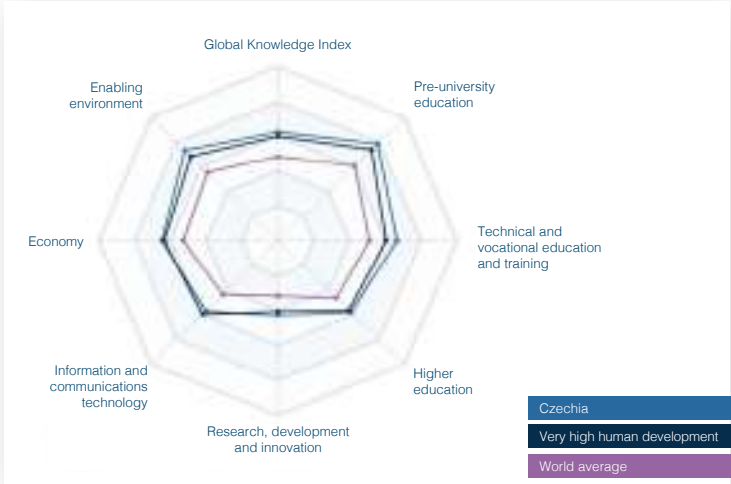
- + Completion rate in upper secondary education, gender parity
- + Share of TVET occupations
- + Manufacturing employment (%)
- + Gross enrolment ratio in early childhood education
- + Unemployment rate with advanced education

### AREAS OF IMPROVEMENT

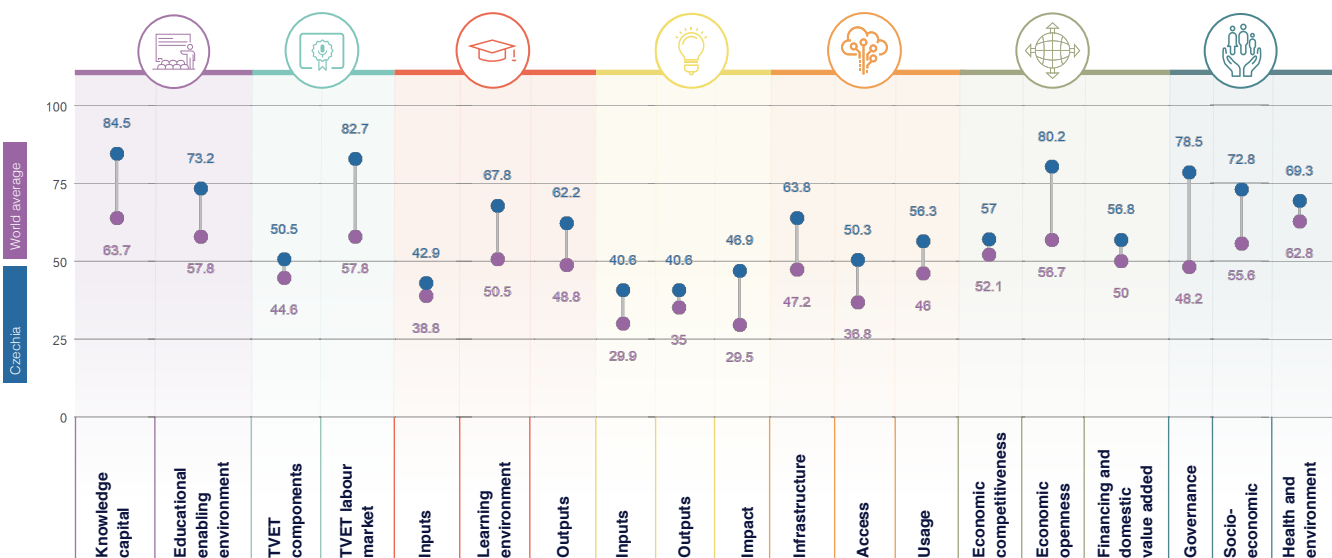
- Pupil-teacher ratio in tertiary education
- Building quality control
- Government expenditure on primary education (% of GDP)
- MSME financing gap (% GDP)
- Share of students enrolled in post-secondary vocational programmes

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	17	78.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	15	66.6
HIGHER EDUCATION	30	57.6
RESEARCH, DEVELOPMENT AND INNOVATION	26	42.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	39	56.8
ECONOMY	31	64.7
ENABLING ENVIRONMENT	23	73.5



## GKI PILLARS







# CZECHIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	21	64.3
Enrolment	10	97.3
Net enrolment rate in primary education	42	97.4
Net enrolment rate in lower secondary education	17	99.4
Net enrolment rate in upper secondary education	25	95.2
Completion	41	97.2
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	3	99.0
Success rate rate in the last grade of lower secondary education	29	75.6
Completion	20	74.0
Assessment of 15-year-old students in math, science and reading	21	60.0
Learning-adjusted years of schooling	19	84
<b>Educational enabling environment</b>		
Expenditure	60	32.0
Government expenditure on primary education (% GDP)	113	17.6
Government expenditure on secondary education (% GDP)	50	22.6
Government funding per primary student (% GDP per capita)	88	36.9
Government funding per secondary student (% GDP per capita)	24	43
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	3	90.0
Class attendance rate in early childhood education	2	90.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	3	90.0
Completion rate in upper secondary education, gender parity	1	100
Completion rate in upper secondary education, wealth parity	10	99.5
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	43	97.3
Firms offering formal training (%)	51	53.6
Labour force with short-cycle tertiary education (%)	62	67.4
Participation rate in formal and non-formal education and training	22	60.4
TVET enrolment	76	41.2
Government expenditure on vocational education (%)	10	86.0
Share of students enrolled in secondary vocational programmes	15	54.0
Share of students enrolling in postsecondary vocational programmes	67	22.3
TVET quality and infrastructure	30	42.7
Extent of staff training	37	38
Quality of vocational training	43	56.1
Ratio of high-skil TVET occupations earnings to average wage	86	79.8
Ratio of medium-skil TVET occupations earnings to average wage	85	65.1
<b>TVET labour market</b>		
Efficiency of the labour market	60	60.0
Firms considered with inappropriately educated workforce (%)	89	60.4
Employment educational mismatch (%)	11	60.7
Proportion of skilled production workers	82	68.7
Unemployment rate with vocational education	4	64.2
Real TVET unemployment	1	60.7
Share of TVET occupations	2	60.0
Manufacturing employment (%)	2	60.0
Quality and infrastructure	30	42.7
Enrolment in vocational education, gender parity	89	64.0
Useable employment rate	47	60.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	34	33.8
Government expenditure per tertiary student	29	44
Teaching staff compensation (% tertiary expenditure)	48	34.6
Enrolment	34	48.0
Enrolment in bachelor's or equivalent level (%)	47	29.8
Enrolment in master's, doctoral or equivalent (%)	18	62.0
Resources	108	48.0
Pupil-teacher ratio in tertiary education	113	52.1
Researchers in higher education (%)	64	28.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	75	64.0
Labour mobility rate	14	50.0
Academic freedom	18	64.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Retention	37	61
Educational attainment rate, bachelor's or equivalent	44	50.0
Educational attainment rate, master's or equivalent	12	60.0
Educational attainment rate, doctoral or equivalent	34	32.0
Employment	22	60.0
Labour force participation rate with advanced education	66	73.2
Unemployment rate with advanced education	3	60
Impact	33	50
University tertiary enrolment in R&D	27	81
OECD indicators per 100 personnel in higher education	27	50
<b>Government's contribution and financing plan</b>		
Inputs	18	60.0
Quality and infrastructure	30	42.7
Research and development	16	36.0
GERD (% GDP)	16	36.0
GERD per researcher	37	32.0
Researchers per thousand labour force	25	48.5
Tertiary graduates from STEM programmes (%)	40	47.6
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	17	32.0
GERD financed by business enterprises (%)	50	49.0
Researchers in business enterprises (%)	19	62.0
Firms that spend on R&D (%)	20	41.7
<b>Quality and infrastructure</b>		
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	52	65.0
State of cluster development	67	46.0
<b>Outputs</b>		
Research and development	16	41.7
Average documents per researcher	43	61.7
Citations per document	38	21.6
Patent applications (per 100 billion GDP)	30	60.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	28	24.7
Research design applications (per 100 billion GDP)	33	21.6
PCT applications (per 100 billion GDP)	36	67.0
Firms producing new goods and services (%)	72	26.7





# CZECHIA

	Rank	Value
<b>Business environment</b>	30	85.9
Treatment applications (per 100 million GDP)	37	44.0
Cultural goods exports (% exports)	41	20.4
Printing and publishing output (% manufactured output)	89	10.7
<b>Energy</b>	71	66.9
<b>Finance</b>	7	111.1
Access to venture capital	23	39.9
Depth of innovative companies	47	55.2
ISO 9001 quality certificates (% GDP)	5	80.0
ISO 14001 environmental certificates (% GDP)	6	82.0
<b>Industry</b>	39	91
CERD forecast from abroad (%)	11	60.5
Cost indexes per strategic industry deals (% GDP)	85	7
Computer software spending (% GDP)	53	22.4
<b>International trade</b>	31	91.7
New business density per thousand population	35	31.0
Firms with new products/services (%)	79	81.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>24</b>	<b>98.9</b>
<b>Infrastructure</b>	81	60.8
<b>Coverage</b>	22	113.0
30MHz mobile network coverage (% population)	29	80.0
Secure Internet servers per 1 million population	13	49.3
Investment in telecommunication services (% GDP)	115	10.9
<b>Quality</b>	34	112.0
Mobile speed and download speeds	17	47.9
Fixed broadband upload and download speeds	39	22
Fixed broadband subscriptions (y speed) per hundred people	20	34.6
<b>Accessibility</b>	27	87.0
Fixed broadband latency (% QM per capita)	25	89.9
Mobile broadband basket (% QM per capita)	7	80.2
Internet and telephony competition	102	54.8
<b>Access</b>	<b>28</b>	<b>96.3</b>
<b>Subscriptions</b>	33	101.1
Active mobile broadband subscriptions per hundred inhabitants	46	41.2
International Internet bandwidth per user	72	30
Households with Internet access at home (%)	53	81.0
<b>Skills and employment</b>	35	95.2
Individuals with standard ICT skills (%)	41	44.9
Tertiary graduates from ICT programmes (%)	44	36.4
ICT employment (%)	17	56.1
<b>Usage</b>	<b>42</b>	<b>98.3</b>
<b>Services</b>	37	49.6
Government online services	67	72.4
Fixed broadband internet traffic per subscription	29	32.0
Mobile broadband internet traffic per subscription	23	6.1
Internet users (%)	50	80.0
<b>Commerce</b>	30	90
ICT FDI patent applications (per 100 million GDP)	49	49.1
E-participation	64	72.0
Internet activities by individuals (%)	19	84.8
Trade in digitally deliverable services (% total trade)	45	50.0
<b>ECONOMY</b>	<b>21</b>	<b>94.7</b>
<b>Economic complexity indexes</b>	33	37
<b>International investment</b>	31	52.0
Overhead capital formation (% GDP)	47	60.4
Logistics performance	20	87
Transport productive capacity	45	35.0
Building quality control	126	22.0

	Rank	Value
<b>Business agility</b>	30	41.2
Cost of starting a business	114	82.1
Recovery recovery rate	29	73.0
Entrepreneurial employee activity rate	34	37.1
Growth of corporate transactions	79	57.1
<b>Employee activities</b>	7	60.2
<b>Trade and investment</b>	11	111.4
Trade (% GDP)	19	66.0
High-technology trade (% total trade)	10	74.7
Market concentration	30	87.2
Market concentration	80	80.1
<b>Product innovation</b>	11	81
Climate financial openness	1	109
Foreign direct investment, net inflows (% GDP)	35	45.1
Cost dynamics	1	109
<b>Financing and domestic value added</b>	<b>48</b>	<b>90.8</b>
<b>Financing and costs</b>	122	40.1
Domestic credit to private sector (% GDP)	74	19.0
MSME financing gap (% GDP)	100	25.0
Tax and contribution rate (% profit)	110	81.2
Bank nonperforming loans (%)	47	83.0
<b>Unmet needs index</b>	13	91.0
Medium- and high-tech activities value added	12	61.1
Industry and services value added (% GDP)	32	85.0
Labour underutilization rate	2	97
Output per worker	35	10.8
<b>ENABLING ENVIRONMENT</b>	<b>24</b>	<b>70.5</b>
<b>Governance</b>	<b>24</b>	<b>75.5</b>
<b>Political environment</b>	31	76.0
Peace and stability	19	75.2
View and accountability	26	79.2
Quality of institutions	55	77.1
Rule of law	26	83.0
Control of corruption	41	71.2
Government effectiveness	22	78.6
<b>Socio-economic</b>	<b>23</b>	<b>72.8</b>
<b>Gender equity</b>	52	80.0
Female-to-male ratio in parliament	81	20.0
Female-to-male labour force participation	81	34.0
Female-to-male ratio in internal wage	60	90
<b>Gender equality</b>	10	81.2
Social protection coverage (% population)	31	80.5
Adult literacy rate	106	109
Youth not in employment, education or training (%)	19	83.0
<b>Standard of living</b>	10	80.0
Poverty headcount ratio (% population)	15	85.4
GDP per capita	30	29.0
<b>Health and environment</b>	<b>29</b>	<b>60.3</b>
<b>Health</b>	31	81.7
Universal health coverage	40	70
Healthy life expectancy (years)	30	81.2
Under-five mortality rate	14	85.0
<b>Environmental performance</b>	16	83.0
Renewable energy consumption (%)	100	15.2
Household footprint per capita	129	89.1
Natural hazard exposure	11	83

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# CÔTE D'IVOIRE

## KEY INDICATORS

GDP US\$ billions	136.484
Population	26,378,275
HDI	0.538

**GKI RANK** 138/154

**GKI SCORE** 32.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Côte d'Ivoire is a weak performer in terms of its knowledge infrastructure. It ranks 138th out of 154 countries in the Global Knowledge Index 2021 and 12th out of the 27 countries with low human development.

### AREAS OF STRENGTH

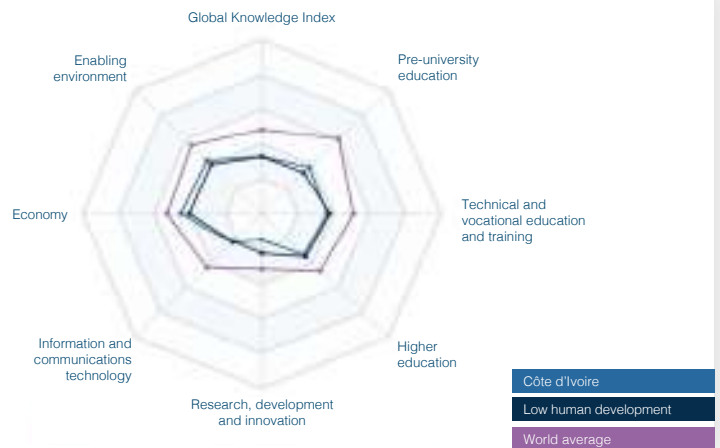
- + Market concentration
- + Ratio of high-skill TVET occupations earnings to average wage
- + MSME financing gap (% GDP)
- + Ease of starting a business
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

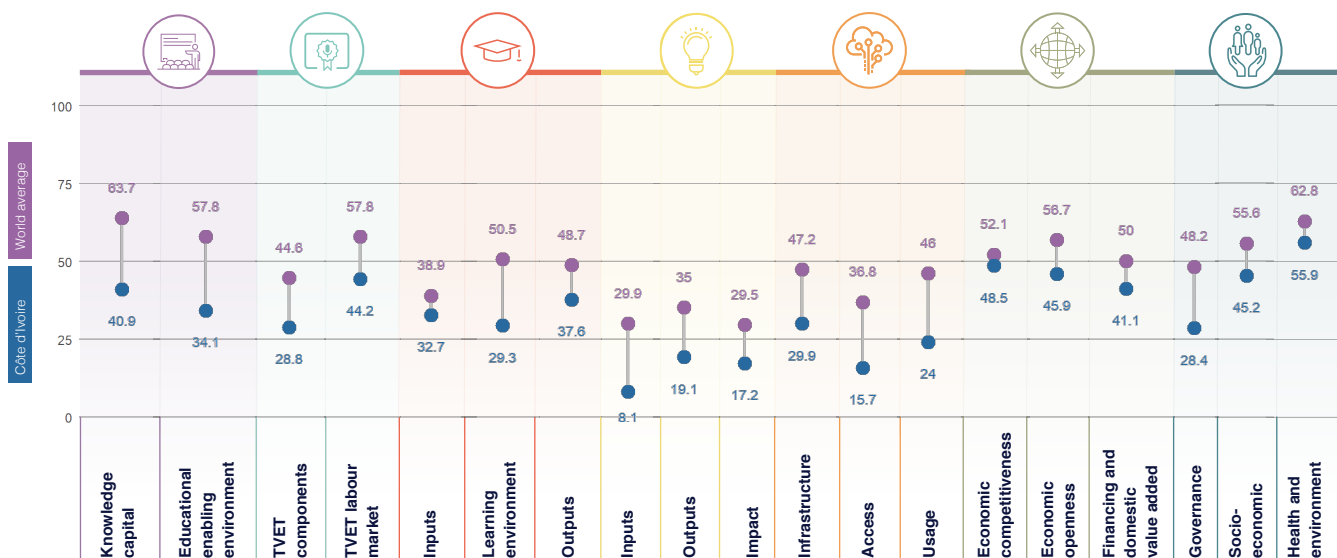
- Internet activities by individuals (%)
- Research institutions prominence
- Gross attendance ratio for tertiary education, location parity
- Teaching staff compensation (% tertiary expenditure)
- Schools with access to computers in primary education (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	133	37.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	137	36.5
HIGHER EDUCATION	134	33.2
RESEARCH, DEVELOPMENT AND INNOVATION	151	14.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	136	23.2
ECONOMY	113	45.2
ENABLING ENVIRONMENT	121	43.2



## GKI PILLARS



	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	129	60.8
Enrollment	124	54.7
Net enrolment rate in primary education	80	89.0
Net enrolment rate in lower secondary education	128	47.8
Net enrolment rate in upper secondary education	118	32.9
Completion	126	41.4
Years of compulsory education in primary and secondary	42	78.0
Completion rate in upper secondary education	124	11.7
Success rate rate in the last grade of lower secondary education	113	47.6
Completion	123	24.0
Assessment of 15-year-old students in math, science and reading	196	196
Learning-adjusted years of schooling	128	24.8
<b>Educational enabling environment</b>		
Expenditure	81	24.0
Government expenditure on primary education (% GDP)	33	22.8
Government expenditure on secondary education (% GDP)	39	20.1
Government funding per primary student (% GDP per capita)	86	23.3
Government funding per secondary student (% GDP per capita)	83	17.8
Resources	102	41.1
Pupil-based teacher ratio in primary education	71	83.5
Pupil-based teacher ratio in secondary education	83	82.8
Schools with access to computers in primary education (%)	85	6
Schools with access to computers in secondary education (%)	196	196
Early learning	102	30.0
Class attendance rate in early childhood education	104	8
Proportion of children who are developmentally on track	51	40.3
Proportion of children with stimulating home learning environments	81	16.7
Pupil-based teacher ratio in preprimary education	49	83.5
Quality and infrastructure	119	33.3
Completion rate in upper secondary education, gender parity	80	82.4
Completion rate in upper secondary education, wealth parity	108	4.5
Completion rate in upper secondary education, location parity	118	79
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	100	23.0
Firms offering formal training (%)	51	43.5
Labour force with short-cycle tertiary education (%)	196	196
Participation rate in formal and non-formal education and training	80	3.8
TVET resources	100	11.0
Government expenditure on vocational education (%)	68	70
Share of students enrolled in secondary vocational programmes	100	8
Share of students enrolled in postsecondary vocational programmes	196	196
TVET quality and infrastructure	37	31.4
Extent of staff training	41	80.6
Quality of vocational training	84	53.4
Ratio of high-skill TVET occupations earnings to average wage	51	81.0
Ratio of medium-skill TVET occupations earnings to average wage	60	80.0
<b>TVET labour market</b>		
Efficiency of the labour market	100	41.0
Firms considered with inappropriately educated workforce (%)	111	29.4
Employment educational mismatch (%)	113	7
Proportion of skilled production workers	71	87.3
Unemployment rate with vocational education	35	85.4
Real TVET unemployment	100	11.7
Share of TVET occupations	123	32.9
Manufacturing employment (%)	82	21.1
Quality and infrastructure	111	30.3
Enrollment in vocational education, gender parity	40	80
Useable employment rate	107	26.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	108	16
Government expenditure per tertiary student	48	16.7
Teaching staff compensation (% tertiary expenditure)	88	9
Enrollment	117	4.4
Enrollment in bachelor's or equivalent level (%)	128	2.1
Enrollment in masters, doctoral or equivalent (%)	80	6.8
Resources	11	83.0
Rp/teacher ratio in tertiary education	40	83.8
Researchers in higher education (%)	196	196
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	118	10.0
Labour mobility rate	76	9.3
Academic freedom	84	30.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	42	78.1
Class attendance rate in tertiary education, wealth parity	82	3.8
Class attendance rate in tertiary education, location parity	76	6
<b>Outputs</b>		
Attainment	196	196
Educational attainment rate, bachelor's or equivalent	196	196
Educational attainment rate, master's or equivalent	196	196
Educational attainment rate, doctoral or equivalent	196	196
Employment	121	41.8
Labour force participation rate with advanced education	123	25.5
Unemployment rate with advanced education	107	84.0
Impact	101	30.0
University tertiary enrollment in FTE	117	38.8
CRIDE indicators per FTE personnel in higher education	196	196
<b>Government's contribution to the economic growth</b>		
Balance	122	8.1
Value of FDI inflows	107	1.1
GDP (% GDP)	114	1.2
GERD per researcher	196	196
Researchers per thousand labour force	196	196
Tertiary graduates from STEM programmes (%)	196	196
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	196	196
GERD financed by business enterprises (%)	196	196
Researchers in business enterprises (%)	196	196
Firms that spend on R&D (%)	87	12.0
Quality of research innovation	100	37.5
High-skill employment (%)	73	11.8
Intellectual property payments (% total trade)	111	2
State of cluster development	100	38.0
<b>Support</b>		
Government R&D expenditure	100	80.0
Average documents per researcher	196	196
Citations per document	30	26.0
Patent applications (per 100 billion GDP)	118	28.5
<b>Industry's contribution to innovation</b>		
Intellectual property receipts (% total trade)	80	4
Research design applications (per 100 billion GDP)	77	4.3
PCT applications (per 100 billion GDP)	158	21.0
Firms producing new goods and services (%)	47	80.0



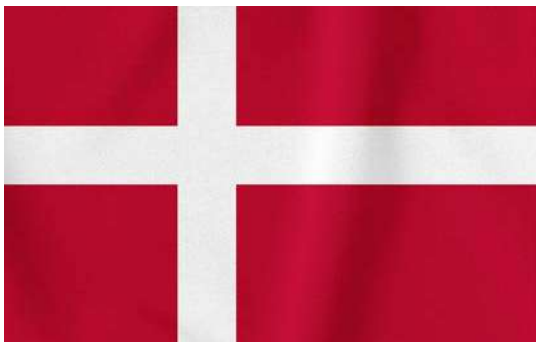
# CÔTE D'IVOIRE

	Rank	Value
<b>Consumer electronics</b>	105	37
Treatment applications per 100 million GDP	107	5.8
Cultural goods exports (% exports)	108	0.5
Printing and publishing output (% manufactured output)	109	1.9
<b>Energy</b>	114	11.2
<b>Finance</b>	115	33.3
Access to institutions' provisions	115	8
Depth of innovative companies	85	44.2
ISO 9001 quality certificates (% GDP)	85	0.5
ISO 14001 environmental certificates (% GDP)	108	2.2
<b>Language</b>	100	5.5
CERD freedom from abuse (%)	109	1.9
Joint ventures per strategic industry deals (% GDP)	107	1.8
Computer software spending (% GDP)	119	1.1
<b>Science and technology</b>	85	30.5
New business density per thousand population	90	5.8
Firms with new products/services (%)	80	30.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	108	23.2
<b>Infrastructure</b>	128	26.9
<b>Coverage</b>	119	30
3G/4G mobile network coverage (% population)	112	54.9
Secure Internet servers per 1 million population	124	1.2
Investment in telecommunication services (% GDP)	89	22.7
<b>Quality</b>	119	8.2
Mobile upload and download speeds	85	18
Fixed broadband upload and download speeds	87	9
Fixed broadband subscriptions (y speed) per hundred people	117	0.7
<b>Availability</b>	105	41.0
Fixed broadband latency (% QM per capita)	127	51.4
Mobile broadband basket (% QM per capita)	128	37.0
Internet and telephony competition	106	50.6
<b>Access</b>	128	18.7
<b>Subscriptions</b>	111	22.0
Active mobile-broadband subscriptions per fixed-line inhabitants	84	32.0
International Internet bandwidth per user	103	20.0
Households with Internet access at home (%)	109	16.7
<b>Skills and employment</b>	101	9.0
Individuals with standard ICT skills (%)	83	3.5
Tertiary graduates from ICT programmes (%)	106	1.9
ICT employment (%)	76	10.1
<b>Usage</b>	129	24
<b>Services</b>	106	22.5
Government online services	118	45.3
Fixed broadband Internet traffic per subscription	79	7.8
Mobile broadband Internet traffic per subscription	88	4.3
Internet users (%)	115	22.0
<b>Commerce</b>	100	21.4
eTPU/T purchase applications (per 100 million GDP)	87	34.0
E-participation	122	40.0
Internet activities by individuals (%)	79	24
Trade in digitally deliverable services (% total trade)	117	23.0
<b>ECONOMY</b>	111	60.2
<b>Economic complexity/structure</b>	81	48.3
<b>REGISTRATION</b>	104	4
Overhead capital formation (% GDP)	85	45.4
Logistics performance	47	52.1
Transport productive capacity	148	7.8
Building quality control	80	80.7

	Rank	Value
<b>Business agility</b>	85	28.1
Ease of starting a business	25	83.7
Recovery recovery rate	77	40
Entrepreneurial employee activity rate	106	1.9
Growth of corporate transactions	88	28.0
<b>Business operations</b>	119	48.3
<b>Trade and investment</b>	75	27.3
Trade (% GDP)	118	18.0
High-technology trade (% total trade)	109	1.9
Market concentration	117	81.5
Market concentration	15	85.0
<b>Product ownership</b>	121	27.0
Ownership financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	100	35.0
Data dynamics	80	50
<b>Financing and domestic value added</b>	128	81.0
<b>Financing and loans</b>	112	21.2
Domestic credit to private sector (% GDP)	126	7.1
MSME financing gap (% GDP)	15	88.0
Tax and contribution rate (% profit)	127	87.2
Bank nonperforming loans (%)	104	1.9
Unmet loan demand	100	30
Medium- and high-tech activities value added	88	17.4
Industry and services value added (% GDP)	140	35.7
Labour underutilization rate	79	87.0
Output per worker	110	68
<b>ENABLING ENVIRONMENT</b>	121	40.3
<b>Governance</b>	112	26.4
<b>Political environment</b>	105	24.5
Peace and stability	125	15.1
View and accountability	89	23.8
Quality of institutions	101	32.4
Rule of law	110	29.0
Control of corruption	100	32.7
Government effectiveness	100	33.8
<b>Socio-economic</b>	113	45.2
<b>Gender equity</b>	111	23.0
Female-to-male ratio in parliament	127	18.5
Female-to-male labour force participation	86	88.0
Female-to-male ratio in internal wage	87	82.7
<b>Gender equality</b>	100	23.8
Social protection coverage (% population)	109	1.9
Adult literacy rate	79	87
Youth not in employment, education or training (%)	145	23.0
<b>Standard of living</b>	117	21.0
Poverty headcount ratio (% population)	102	44.0
GDP per capita	119	4.1
<b>Health and environment</b>	122	55.9
<b>Health</b>	104	13.1
Universal health coverage	124	47
Healthy life expectancy (years)	128	35.4
Under-five mortality rate	141	32.0
<b>Environmental performance</b>	101	21.1
Renewable energy consumption (%)	28	85.0
Household footprint per capita	88	88.0
Natural hazard exposure	59	81

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# DENMARK

**GKI RANK** 7/154

**GKI SCORE** 69

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Denmark is a leading performer in terms of its knowledge infrastructure. It ranks 7th out of 154 countries in the Global Knowledge Index 2021 and 7th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 325.508  
**Population** 5,792,203  
**HDI** 0.94

### AREAS OF STRENGTH

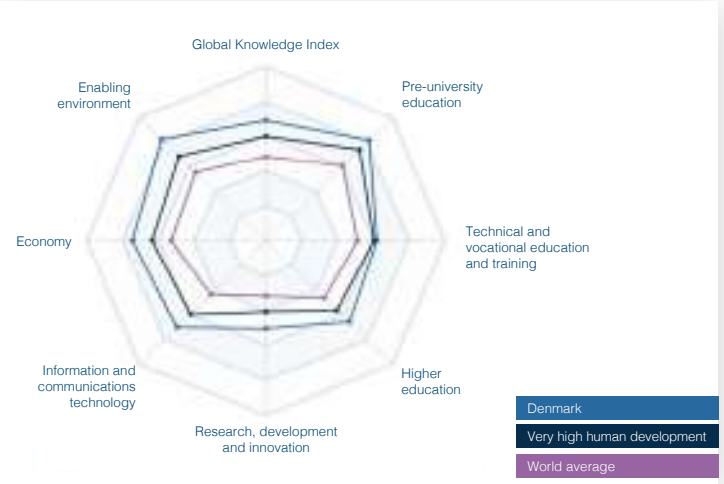
- + Researchers per thousand labour force
- + Secure Internet servers per 1 million population
- + Internet activities by individuals (%)
- + Entrepreneurial employee activity rate
- + Control of corruption

### AREAS OF IMPROVEMENT

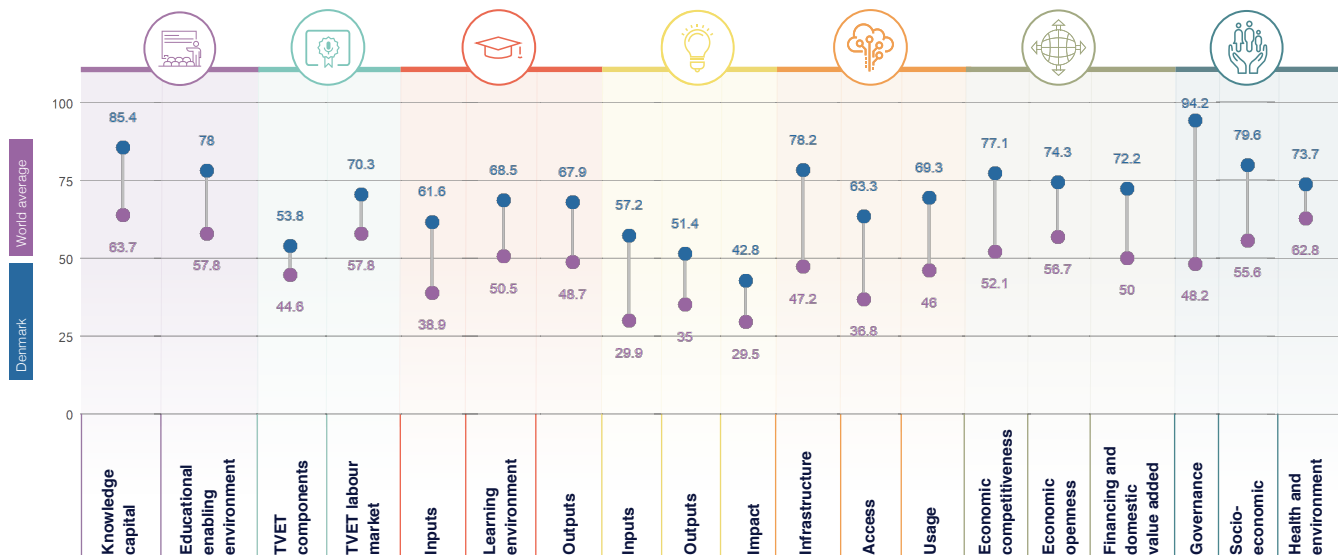
- Researchers in higher education (%)
- Investment in telecommunication services (% GDP)
- Enrolment in vocational education, gender parity
- Foreign direct investment, net inflows (% GDP)
- Ecological footprint per capita

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	2	81.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	33	62
HIGHER EDUCATION	10	66
RESEARCH, DEVELOPMENT AND INNOVATION	9	50.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	10	70.3
ECONOMY	5	74.5
ENABLING ENVIRONMENT	6	82.5



## GKI PILLARS





# DENMARK

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	13	83.4
Enrollment	34	83.7
Net enrolment rate in primary education	25	87.0
Net enrolment rate in lower secondary education	8	89.6
Net enrolment rate in upper secondary education	48	86.4
Completion	25	81.5
Years of compulsory education in primary and secondary	42	76.0
Completion rate in upper secondary education	25	80.0
Success rate rate in the last grade of lower secondary education	18	87.1
Completion	19	75
Assessment of 7th-grade students in math, science and reading	15	88.2
Learning-adjusted years of schooling	20	83.8
<b>Educational enabling environment</b>	13	78
Expenditure	11	81.2
Government expenditure on primary education (% GDP)	1	80
Government expenditure on secondary education (% GDP)	15	46.5
Government funding per primary student (% GDP per capita)	32	59.5
Government funding per secondary student (% GDP per capita)	28	41.2
Resources	1	100
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	43	71.2
Class attendance rate in early childhood education	20	71.2
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	31	81.8
Completion rate in upper secondary education, gender parity	37	81.0
Completion rate in upper secondary education, wealth parity	7	83.5
Completion rate in upper secondary education, location parity	50	77.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	13	80.8
Commence training and learning	25	74.9
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	29	80.0
Participation rate in formal and non-formal education and training	17	88.2
TVET resources	30	82.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	37	32.5
Share of students enrolling in postsecondary vocational programmes	116	116
TVET quality and infrastructure	20	84.2
Extent of staff training	1	71.2
Quality of vocational training	4	70.5
Ratio of high-skill TVET occupations earnings to average wage	63	23.7
Ratio of medium-skill TVET occupations earnings to average wage	52	45.3
<b>TVET labour market</b>	44	70.3
Efficiency of the labour market	6	84.5
Firms considered well-integrated with workforce (%)	116	116
Employment educational mismatch (%)	22	81.8
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	25	87.0
High TVET employment	30	84.0
Share of TVET occupations	60	59.0
Manufacturing employment (%)	64	35.2
Quality and infrastructure	10	71.1
Enrollment in vocational education, gender parity	97	68.0
Useable employment rate	62	84.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	9	81.8
Expenditure	5	88.0
Government expenditure per tertiary student	5	84.3
Teaching staff compensation (% tertiary expenditure)	30	44.9
Enrollment	11	80.0
Enrollment in bachelor's or equivalent level (%)	23	40
Enrollment in masters, doctoral or equivalent (%)	12	78.0
Resources	10	80.2
Pupil-teacher ratio in tertiary education	26	85.5
Research staff in higher education (%)	73	34.0
<b>Learning environment</b>	23	88.5
Timely and academic freedom	31	88.0
Teachers in tertiary education, gender parity	42	37.0
Labour mobility rate	25	37
Academic freedom	20	80.0
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	15	87.3
Attainment	11	83.2
Educational attainment rate, bachelor's or equivalent	12	88.5
Educational attainment rate, master's or equivalent	18	81
Educational attainment rate, doctoral or equivalent	11	80.0
Employment	11	87.3
Labour force participation rate with advanced education	55	74.5
Unemployment rate with advanced education	43	87.7
Impact	21	55.0
University tertiary enrollment in FTE	10	88.1
OECD students per FTE personnel in higher education	23	46
<b>INNOVATION, RESEARCH AND DEVELOPMENT</b>		
<b>Inputs</b>	11	87.2
Share of R&D expenditure	6	80.0
GDP (% GDP)	6	61.0
OEFD per researcher	38	32.0
Researchers per thousand labour force	1	108
Tertiary graduates from STEM programmes (%)	60	41.8
<b>Quality and infrastructure</b>	11	80.0
OEFD performed by business enterprises (%)	33	50.0
OEFD financed by business enterprises (%)	13	72.6
Researchers in business enterprises (%)	13	73.7
Firms that spend on R&D (%)	116	116
Quality of research environment	11	80.0
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	43	20.2
State of cluster development	12	87.1
<b>Outputs</b>	27	85.8
Share of R&D expenditure	11	80.0
Average documents per researcher	44	81.4
Citations per document	22	38.2
Patent applications (per 100 billion GDP)	9	78.3
<b>Quality and infrastructure</b>	11	80.0
Intellectual property receipts (% total trade)	11	84.2
Research design applications (per 100 billion GDP)	15	41.5
PCT applications (per 100 billion GDP)	6	87.5
Firms producing new goods and services (%)	116	116



# DENMARK

	Rank	Value
<b>Business environment</b>	10	82.2
Treatment applications per 100 million GDP	71	22.0
Cultural goods exports (% exports)	20	76
Printing and publishing output (% manufactured output)	89	22.1
<b>Energy</b>	10	82.2
<b>Trade</b>	9	82.1
Rules of institutions' provisions	28	22.5
Depth of innovative companies	9	85.1
ISO 9001 quality certificates (% GDP)	47	27
ISO 14001 environmental certificates (% GDP)	32	24.7
<b>Finance</b>	11	81.8
CERD received from abroad (%)	47	31
Bank returns per strategic finance deals (% GDP)	15	87.6
Computer software spending (% GDP)	12	46.0
<b>Government services</b>	10	82.2
New business density per thousand population	14	49.0
Firms with new products/services (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	18	75.2
<b>Infrastructure</b>	3	75.2
<b>Coverage</b>	1	100
3G/4G mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	1	100
Investment in telecommunication services (% GDP)	108	22.1
<b>Speed</b>	10	82.2
Mobile upload and download speeds	13	60.0
Fixed broadband upload and download speeds	9	87.3
Fixed broadband subscriptions (by speed) per hundred people	6	89.6
<b>Availability</b>	9	82.7
Fixed broadband latency (% QM per capita)	19	80.6
Mobile broadband latency (% QM per capita)	12	87.2
Internet and telephony competition	1	100
<b>Access</b>	12	83.3
<b>Subscriptions</b>	20	80.0
Active mobile-broadband subscriptions per hundred inhabitants	12	80.0
International Internet bandwidth per user	80	44.2
Households with Internet access at home (%)	21	82.7
<b>Skills and employment</b>	12	80.6
Individuals with standard ICT skills (%)	7	80.6
Tertiary graduates from ICT programmes (%)	49	35.0
ICT employment (%)	11	80.0
<b>Usage</b>	18	85.3
<b>Services</b>	16	81.4
Government online services	3	87.1
Fixed broadband Internet traffic per subscription	17	20.2
Mobile broadband Internet traffic per subscription	21	26.9
Internet users (%)	9	86.4
<b>Commerce</b>	16	71.0
ICT/FIT patent applications (per 100,000 GDP)	23	83.1
E-participation	9	86.4
Internet activities by individuals (%)	1	100
Trade in digitally deliverable services (% total trade)	85	21.4
<b>ECONOMY</b>	9	74.3
<b>Economic competitiveness</b>	2	71.3
<b>International investment</b>	11	81.0
Overhead capital formation (% GDP)	72	49.4
Logistics performance	6	34.6
Transport productive capacity	22	44.0
Building quality control	25	23.0

	Rank	Value
<b>Business agility</b>	1	82.0
Ease of starting a business	41	82.7
Recovery recovery rate	7	86.1
Entrepreneurial employee activity rate	1	100
Growth of corporate transactions	13	85.7
<b>Corporate openness</b>	16	74.3
Trust and dissatisfaction	17	21.0
<b>Tax</b>	36	42.5
Tax (% GDP)	33	58.0
High-technology trade (% total trade)	11	81.6
Market concentration	24	64.0
Market concentration	24	64.0
<b>Product openness</b>	19	76.7
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	140	30.1
Cost dynamics	1	100
<b>Financing and domestic value added</b>	7	82.2
<b>Financing and costs</b>	8	82.0
Domestic credit to private sector (% GDP)	8	82.0
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	29	83.0
Bank nonperforming loans (%)	27	82.0
<b>Unmet needs index</b>	11	84.0
Medium- and high-tech activities value added	7	86.5
Industry and services value added (% GDP)	81	84.0
Labour underutilization rate	49	37
Output per worker	12	47.0
<b>ENABLING ENVIRONMENT</b>	6	81.5
<b>Governance</b>	7	84.2
<b>Political environment</b>	9	82.0
Peace and stability	15	81.0
View and accountability	6	87.0
Quality of institutions	3	82.7
Rule of law	5	88.1
Control of corruption	1	100
Government effectiveness	6	88.1
<b>Socio-economic</b>	11	70.6
<b>Gender equity</b>	14	82.2
Female-to-male ratio in parliament	26	85.7
Female-to-male labour force participation	34	83.6
Female-to-male ratio in internal wage	45	80.0
<b>Gender balance</b>	21	81
Social protection coverage (% population)	50	85.2
Adult literacy rate	106	106
Youth not in employment, education or training (%)	21	85.0
<b>Standard of living</b>	9	88.7
Poverty headcount ratio (% population)	24	83
GDP per capita	11	80.0
<b>Health and environment</b>	8	73.7
<b>Health</b>	21	81.7
Universal health coverage	21	81
Healthy life expectancy (years)	19	83.6
Under-five mortality rate	26	80.4
<b>Environmental performance</b>	17	87.0
Renewable energy consumption (%)	54	26.7
Household footprint per capita	138	44.1
Natural hazard exposure	6	86

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 95/154

**GKI SCORE** 44.6

**WORLD AVERAGE** 48.4

# DOMINICAN REPUBLIC

## KEY INDICATORS

**GDP US\$ billions** 184.447  
**Population** 10,847,904  
**HDI** 0.756

## COUNTRY PERFORMANCE SUMMARY

Dominican Republic is a modest performer in terms of its knowledge infrastructure. It ranks 95th out of 154 countries in the Global Knowledge Index 2021 and 31st out of the 39 countries with high human development.

### AREAS OF STRENGTH

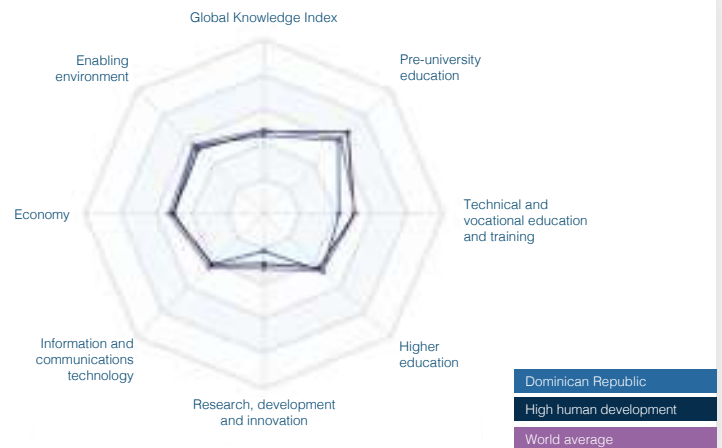
- + Cultural goods exports (% exports)
- + Fixed broadband Internet traffic per subscription
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Enrolment in bachelor's or equivalent level (%)
- + Mobile broadband Internet traffic per subscription

### AREAS OF IMPROVEMENT

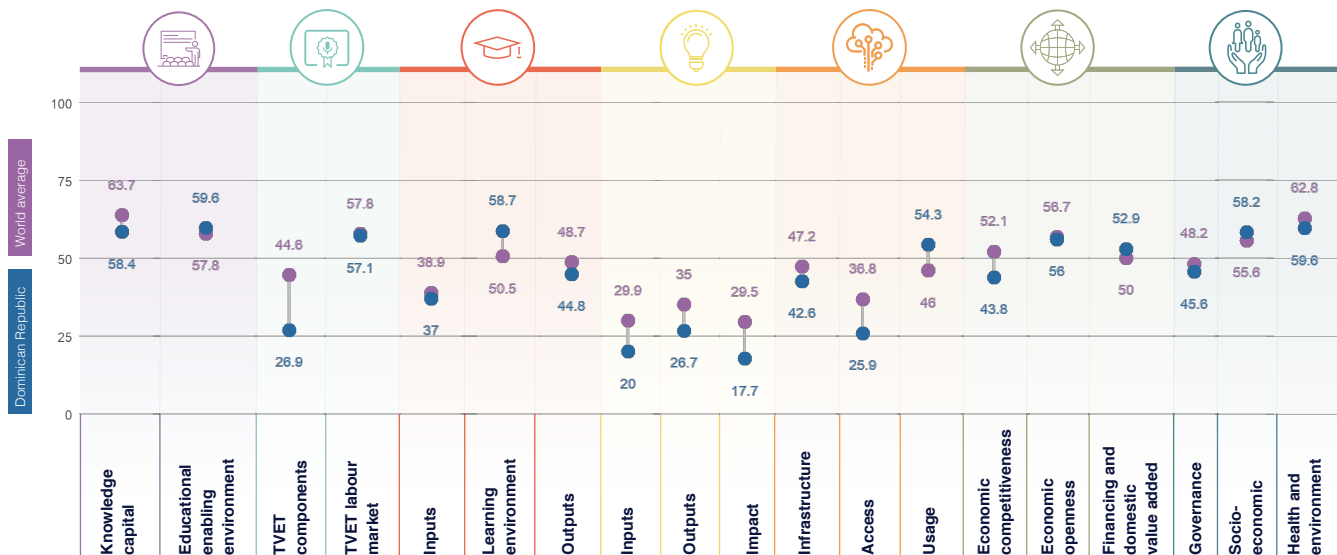
- Assessment of 15-year-old students in math, science and reading
- Educational attainment rate, doctorate or equivalent
- Industrial design applications (per 100 billion GDP)
- Research institutions prominence
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	92	59
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	124	42
HIGHER EDUCATION	70	46.8
RESEARCH, DEVELOPMENT AND INNOVATION	126	21.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	83	40.9
ECONOMY	75	50.9
ENABLING ENVIRONMENT	73	54.5



## GKI PILLARS







# DOMINICAN REPUBLIC

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	166	38.4
Enrollment	89	81.5
Net enrolment rate in primary education	85	87.5
Net enrolment rate in lower secondary education	80	87.8
Net enrolment rate in upper secondary education	88	89.6
Completion	79	73.1
Years of compulsory education in primary and secondary	9	82.9
Completion rate in upper secondary education	52	57.7
Success rate rate in the last grade of lower secondary education	75	69.1
Completion	108	59.5
Assessment of 15-year-old students in math, science and reading	72	8
Learning-adjusted years of schooling	100	41
<b>Educational enabling environment</b>		
Expenditure	74	31.5
Government expenditure on primary education (% GDP)	27	46.9
Government expenditure on secondary education (% GDP)	88	21.7
Government funding per primary student (% GDP per capita)	58	33.6
Government funding per secondary student (% GDP per capita)	37	36.7
Resources	73	33.5
Pupil-based teacher ratio in primary education	35	87.2
Pupil-based teacher ratio in secondary education	88	66.7
Schools with access to computers in primary education (%)	65	46.5
Schools with access to computers in secondary education (%)	65	65.7
Early learning	11	69.3
Class attendance rate in early childhood education	61	69.3
Proportion of children who are developmentally on track	17	73.8
Proportion of children with stimulating home learning environments	41	62.6
Pupil-based teacher ratio in preprimary education	39	66.5
Quality and infrastructure	11	87.8
Completion rate in upper secondary education, gender parity	100	75.7
Completion rate in upper secondary education, wealth parity	55	58
Completion rate in upper secondary education, location parity	58	71.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	100	19.1
Firms offering formal training (%)	85	37.6
Labour force with short-cycle tertiary education (%)	116	119
Participation rate in formal and non-formal education and training	83	83
TVET resources	117	115.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	89	17.9
Share of students enrolling in postsecondary vocational programmes	116	116
TVET quality and infrastructure	79	44.9
Extent of staff training	81	83.8
Quality of vocational training	80	45.1
Ratio of high-skil TVET occupations earnings to average wage	100	14
Ratio of medium-skil TVET occupations earnings to average wage	11	65.4
<b>TVET labour market</b>		
Efficiency of the labour market	99	53.5
Firms considered with inappropriately educated workforce (%)	89	41.1
Employment educational mismatch (%)	52	60.5
Proportion of skilled production workers	82	43.6
Unemployment rate with vocational education	85	76.2
Real TVET unemployment	10	18.9
Share of TVET occupations	59	81.2
Manufacturing employment (%)	77	33.4
Quality and infrastructure	16	64.4
Enrollment in vocational education, gender parity	89	89.9
Useable employment rate	34	59.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	10	24.1
Enrollment in bachelor's or equivalent level (%)	27	43.6
Enrollment in masters, doctoral or equivalent (%)	69	6.6
Resources	117	99
Pupil-teacher ratio in tertiary education	117	80
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
Timely and academic freedom	10	58.7
Teachers in tertiary education, gender parity	42	77.7
Labour mobility rate	94	61
Academic freedom	22	62.9
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Skilled labour	16	16.9
Educational attainment rate, bachelor's or equivalent	48	48.3
Educational attainment rate, master's or equivalent	78	8.4
Educational attainment rate, doctoral or equivalent	66	6
Employment	17	63.2
Labour force participation rate with advanced education	58	78.7
Unemployment rate with advanced education	58	84.9
Impact	89	33.2
University tertiary enrollment in R&D	100	38.2
OECD students per 1000 personnel in higher education	116	116
<b>Government's contribution to innovation and research</b>		
Research	117	117
Share of R&D expenditure	91	21.2
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	117	21.9
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	15.1
Quality of research environment	10	111
High-skilled employment (%)	52	24.9
Intellectual property payments (% total trade)	65	7.2
State of cluster development	48	63.2
<b>Support</b>		
Government R&D expenditure	116	116
Average documents per researcher	116	116
Citations per document	110	18.8
Patent applications (per 100 billion GDP)	119	23.2
<b>Government's contribution to innovation and research</b>		
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	117	6
PCT applications (per 100 billion GDP)	87	45.4
Firms producing new goods and services (%)	52	48.9



# DOMINICAN REPUBLIC

	Rank	Value
<b>Business environment</b>		
Treatment applications (per 100 million GDP)	50	50.6
Cultural goods exports (% exports)	5	34.6
Printing and publishing output (% manufactured output)	196	196
<b>Energy</b>	111	111.7
<b>Finance</b>	110	110
Access to venture capital	115	8
Depth of innovative companies	60	50.0
ISO 9001 quality certificates (% GDP)	112	3.8
ISO 14001 environmental certificates (% GDP)	103	1.3
<b>Logistics</b>	100	100
CERD forecast from abroad (%)	106	106
Cost volume per storage volume deals (% GDP)	109	1.8
Computer software spending (% GDP)	118	1.3
<b>Government services</b>	80	80.1
New business density per thousand population	70	7.3
Firms with one or more employees (%)	89	87.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>81</b>	<b>81.3</b>
<b>Infrastructure</b>	81	81.3
<b>Coverage</b>	100	100.0
30MHz mobile network coverage (% population)	29	87.0
Secure Internet servers per 1 million population	108	1.8
Investment in telecommunication services (% GDP)	100	30
<b>Quality</b>	81	111.5
Mobile upload and download speeds	81	21.2
Fixed broadband upload and download speeds	81	6.2
Fixed broadband subscriptions (y speed) per hundred people	82	15
<b>Availability</b>	80	71.5
Fixed broadband latency (% QM per capita)	76	76.8
Mobile broadband basket (% QM per capita)	112	45.3
Internet and telephony competition	1	100
<b>Access</b>	100	23.8
<b>Subscriptions</b>	100	34.0
Active mobile broadband subscriptions per fixed-line inhabitants	88	30.7
International Internet bandwidth per user	70	40.3
Households with Internet access at home (%)	106	33.6
<b>Skills and employment</b>	100	10
Individuals with standard ICT skills (%)	104	108
Tertiary graduates from ICT programmes (%)	84	26.0
ICT employment (%)	84	7.1
<b>Usage</b>	84	56.3
<b>Services</b>	87	81.1
Government online services	81	50.5
Fixed broadband Internet traffic per subscription	8	71.8
Mobile broadband Internet traffic per subscription	20	30
Internet users (%)	87	34.5
<b>Commerce</b>	70	41.0
ICT FDI parent applications (per 100 million GDP)	81	31.0
E-participation	80	77.4
Internet activities by individuals (%)	104	108
Trade in digitally deliverable services (% total trade)	111	25.0
<b>ECONOMY</b>	<b>71</b>	<b>80.9</b>
<b>Economic complexity metrics</b>	100	41.0
<b>REGISTRATION</b>	41	10.1
Overhead capital formation (% GDP)	30	81
Logistics performance	85	41.5
Transport productive capacity	40	35.0
Building quality control	20	80.7

	Rank	Value
<b>Business agility</b>	100	31.0
Cost of starting a business	80	85.4
Recovery recovery time	108	10.4
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	118	8
<b>Corporate openness</b>	73	38
<b>Trade and investment</b>	110	11.7
Trade (% GDP)	101	10.0
High-technology trade (% total trade)	70	46.0
Market concentration	94	80
Market concentration	107	88.7
<b>Product openness</b>	80	10.5
China's financial openness	58	69
Foreign direct investment, net inflows (% GDP)	45	46
Cost dynamics	80	40.0
<b>Financing and domestic value added</b>	87	81.0
<b>Financing and costs</b>	87	26.7
Domestic credit to private sector (% GDP)	100	10.7
MSME financing gap (% GDP)	60	83.7
Tax and contribution rate (% profit)	100	88.5
Bank nonperforming loans (%)	80	84.1
<b>Unmet needs index</b>	10	10.1
Medium- and high-tech activities value added	108	108
Industry and services value added (% GDP)	45	85.0
Labour underutilization rate	87	84.4
Output per worker	71	10.2
<b>ENABLING ENVIRONMENT</b>	<b>73</b>	<b>81.5</b>
<b>Governance</b>	73	45.8
<b>Political environment</b>	80	11.7
Peace and stability	60	52.4
View and accountability	81	81.1
Quality of institutions	80	37.5
Rule of law	81	41.0
Control of corruption	113	26.0
Government effectiveness	81	45.4
<b>Socio-economic</b>	73	50.2
<b>Gender equity</b>	88	87.0
Female-to-male ratio in parliament	81	30.7
Female-to-male labour force participation	108	88.0
Female-to-male ratio in internal usage	1	100
<b>Gender inequality</b>	78	88
Social protection coverage (% population)	81	52.3
Adult literacy rate	84	80
Youth not in employment, education or training (%)	111	47.7
<b>Standard of living</b>	88	81.0
Poverty headcount ratio (% population)	59	20.0
GDP per capita	88	19.0
<b>Health and environment</b>	108	50.8
<b>Health</b>	88	11.0
Universal health coverage	50	74
Healthy life expectancy (years)	80	80.1
Under-five mortality rate	100	77.4
<b>Environmental performance</b>	115	80.0
Renewable energy consumption (%)	80	16.7
Household footprint per capita	80	80.8
Natural hazard exposure	137	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ECUADOR

**GKI RANK** 89/154

**GKI SCORE** 45.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Ecuador is a moderate performer in terms of its knowledge infrastructure. It ranks 89th out of 154 countries in the Global Knowledge Index 2021 and 26th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Firms offering formal training (%)
- + Firms producing new goods and services (%)
- + Firms that spend on R&D (%)
- + Gross intake ratio to the last grade of lower secondary education
- + Firms with new product/service (%)

### AREAS OF IMPROVEMENT

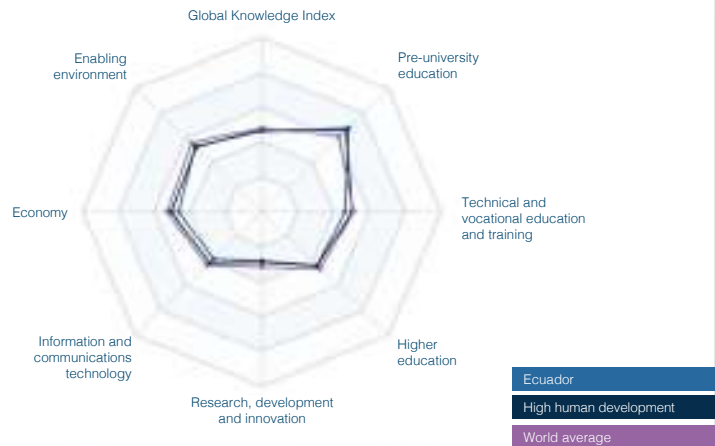
- Ease of starting a business
- Average documents per researcher
- Government funding per secondary student (% of GDP per capita)
- GERD financed by business enterprises (%)
- Tertiary graduates from ICT programmes (%)

### KEY INDICATORS

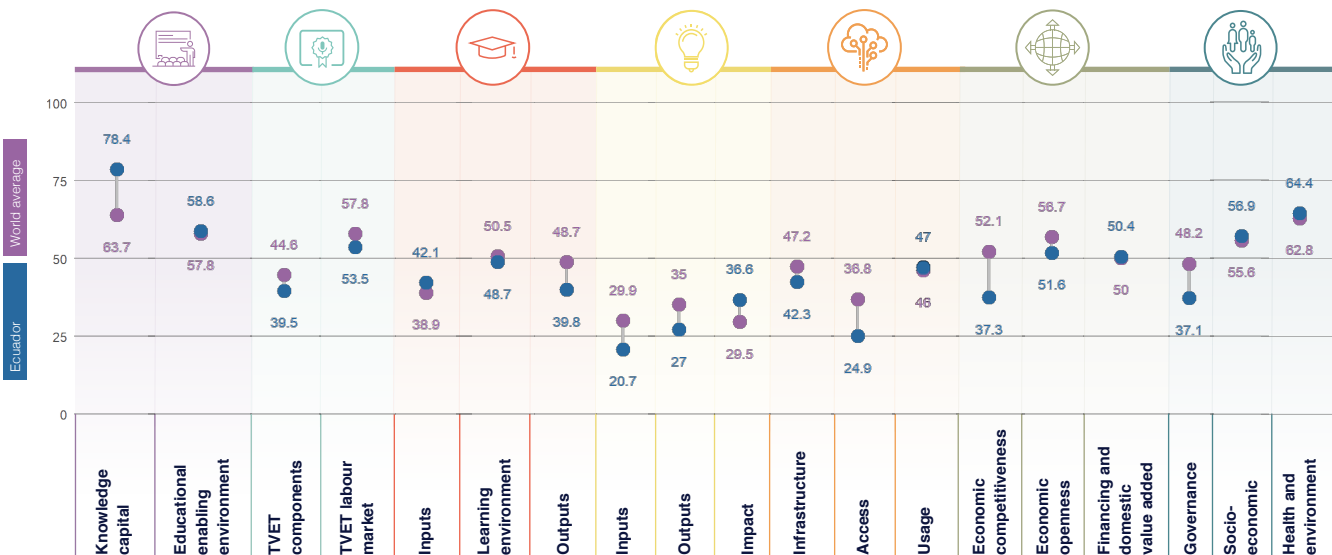
**GDP** US\$ billions ..... **182.239**  
**Population** ..... **17,643,060**  
**HDI** ..... **0.759**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	67	68.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	99	46.5
HIGHER EDUCATION	84	43.5
RESEARCH, DEVELOPMENT AND INNOVATION	91	28.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	90	38.1
ECONOMY	106	46.4
ENABLING ENVIRONMENT	82	52.8



## GKI PILLARS







# ECUADOR

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	47	79.4
Enrollment	34	83.7
Net enrolment rate in primary education	52	85.9
Net enrolment rate in lower secondary education	35	87.9
Net enrolment rate in upper secondary education	79	75.4
Completion	25	84.3
Years of compulsory education in primary and secondary	5	82.9
Completion rate in upper secondary education	52	75.1
Success rate rate in the last grade of lower secondary education	18	85.8
Completion	47	81.2
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	81	81.2
<b>Educational enabling environment</b>		
Expenditure	113	10.5
Government expenditure on primary education (% GDP)	86	27.9
Government expenditure on secondary education (% GDP)	117	9.7
Government funding per primary student (% GDP per capita)	89	26.9
Government funding per secondary student (% GDP per capita)	117	3.1
Resources	66	73.9
Pupil-based teacher ratio in primary education	50	70.1
Pupil-based teacher ratio in secondary education	59	69.9
Schools with access to computers in primary education (%)	54	72.9
Schools with access to computers in secondary education (%)	66	69.2
Early learning	24	85.2
Class attendance rate in early childhood education	65	44.5
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	42	65.9
Quality and infrastructure	51	75.9
Completion rate in upper secondary education, gender parity	32	85.3
Completion rate in upper secondary education, wealth parity	47	81.8
Completion rate in upper secondary education, location parity	35	72.8
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Enrollment training enrollment	51	41.9
Firms offering formal training (%)	2	82.9
Labour force with short-cycle tertiary education (%)	104	104
Participation rate in formal and non-formal education and training	62	4.2
TVET resources	104	11.1
Government expenditure on vocational education (%)	53	19.7
Share of students enrolled in secondary vocational programmes	58	22.9
Share of students enrolled in postsecondary vocational programmes	104	104
TVET quality and infrastructure	71	40.9
Extent of staff training	104	43.4
Quality of vocational training	59	54.2
Ratio of high-skill TVET occupations earnings to average wage	104	104
Ratio of median-skill TVET occupations earnings to average wage	104	104
<b>TVET labour market</b>		
Efficiency of the labour market	51	11.4
Firms considered with inequality educated workforce (%)	72	88.9
Employment educational mismatch (%)	82	50.9
Proportion of skilled production workers	82	83.4
Unemployment rate with vocational education	104	104
Real TVET unemployment	104	75.7
Share of TVET occupations	119	59.9
Manufacturing employment (%)	81	31.8
Quality and infrastructure	104	41.7
Enrollment in vocational education, gender parity	37	75.9
Useable employment rate	104	40.9

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	41	34.9
Government expenditure per tertiary student	79	11.4
Teaching staff compensation (% tertiary expenditure)	73	88.2
Enrollment	66	48.9
Enrollment in bachelor's or equivalent level (%)	68	27.7
Enrollment in masters, doctoral or equivalent (%)	68	5.3
Resources	37	73.9
Ratio teacher ratio in tertiary education	62	75.9
Researchers in higher education (%)	28	71.7
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	61	67.7
Labour mobility rate	57	2.8
Academic freedom	32	85.1
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	37	81.9
Class attendance rate in tertiary education, wealth parity	43	32.9
Class attendance rate in tertiary education, location parity	18	82.9
<b>Outputs</b>		
Skilled labour	51	11.9
Educational attainment rate, bachelor's or equivalent	69	24.7
Educational attainment rate, master's or equivalent	64	4
Educational attainment rate, doctoral or equivalent	104	104
Skilled labour	51	81.4
Labour force participation rate with advanced education	48	77.2
Unemployment rate with advanced education	54	85.7
<b>Impact</b>		
University tertiary enrollment in R&D	100	54.7
CRIDE indicators per 100 personnel in higher education	69	5.3
<b>Government's contribution to the innovation system</b>		
Inputs	111	12.2
<b>Quality and infrastructure</b>		
Government R&D expenditure	100	77.9
GDP (% GDP)	67	9.4
GERD per researcher	68	24.9
Researchers per thousand labour force	72	5.9
Tertiary graduates from STEM programmes (%)	91	80
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	62	5.2
GERD financed by business enterprises (%)	100	0.1
Researchers in business enterprises (%)	104	104
Firms that spend on R&D (%)	9	82.9
<b>Quality and infrastructure</b>		
High-skill employment (%)	57	22.9
Intellectual property payments (% total trade)	65	16.4
State of cluster development	100	94
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	106	30.9
Citations per document	107	12.9
Patent applications (per 100 billion GDP)	69	33.3
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	67	5.9
Research and development expenditure (per 100 billion GDP)	60	1.4
PCT applications (per 100 billion GDP)	117	33.9
Firms producing new goods and services (%)	2	83.7





# ECUADOR

	Rank	Value
<b>Business environment</b>	87	52.3
Treatment applications (per 100 million GDP)	30	45.1
Cultural goods exports (% exports)	121	1.3
Printing and publishing output (% manufactured output)	87	20.0
<b>Energy</b>	41	36.3
<b>Finance</b>	75	37.7
Access to venture capital	56	37
Depth of innovative companies	114	40
ISO 9001 quality certificates (% GDP)	49	34.9
ISO 14001 environmental certificates (% GDP)	75	1.8
<b>Logistics</b>	100	3.3
CERD forecast from abroad (%)	82	4.7
Cost of letters per storage volume deals (% GDP)	103	3.2
Computer software spending (% GDP)	62	19.8
<b>Macroeconomic</b>	5	77.6
New business density per thousand population	196	196
Firms with new products/services (%)	99	37.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	86	36.2
<b>Infrastructure</b>	85	40.3
<b>Coverage</b>	104	30.3
3G/4G mobile network coverage (% population)	81	81.0
Secure Internet servers per 1 million population	88	3.8
Investment in telecommunication services (% GDP)	109	15.1
<b>Quality</b>	81	36.0
Mobile speed and download speeds	69	50
Fixed broadband upload and download speeds	80	0.3
Fixed broadband subscriptions (y speed) per hundred people	72	21.0
<b>Availability</b>	87	55.4
Fixed broadband latency (% QM per capita)	88	88.8
Mobile broadband basket (% QM per capita)	80	51.7
Internet and telephone competition	1	100
<b>Access</b>	104	24.8
<b>Subscribers</b>	81	33.1
Active mobile-broadband subscriptions per fixed-line inhabitants	106	23.0
International Internet bandwidth per user	88	37.2
Households with Internet access at home (%)	83	52.0
<b>Skills and employment</b>	119	11.8
Individuals with standard ICT skills (%)	57	21.0
Tertiary graduates from ICT programmes (%)	119	2.8
ICT employment (%)	81	16.0
<b>Usage</b>	75	47
<b>Services</b>	80	40.4
Government online services	59	81.2
Fixed broadband Internet traffic per subscriber	29	20.1
Mobile broadband Internet traffic per subscriber	70	50.8
Internet users (%)	87	51.0
<b>Statistics</b>	81	50.7
ICT FDI patent applications (per 100 million GDP)	81	44.7
E-participation	49	79.0
Internet activities by individuals (%)	106	196
Trade in digitally deliverable services (% total trade)	107	27.7
<b>ECONOMY</b>	106	36.4
<b>Economic Competitiveness</b>	133	37.3
<b>Infrastructure Investment</b>	80	40.0
Overhead capital formation (% GDP)	89	81.4
Logistics performance	62	47
Transport productive capacity	45	33.2
Building quality control	126	82.0

	Rank	Value
<b>Business agility</b>	117	32.3
Cost of starting a business	147	89.1
Recovery recovery time	127	19.9
Entrepreneurial employee activity rate	88	9.8
Growth of corporate transactions	111	74.3
<b>Business operations</b>	89	31.0
<b>Trade and investment</b>	114	31.0
Trade (% GDP)	124	10.6
High-technology trade (% total trade)	80	41.2
Market concentration	100	86.8
Market concentration	86	87.0
Product diversity	91	80.8
Climate financial openness	80	70
Foreign direct investment, net inflows (% GDP)	128	32.0
Cost dynamics	100	46.5
<b>Financing and domestic value added</b>	73	50.4
<b>Financing and costs</b>	60	57.1
Domestic credit to private sector (% GDP)	82	17.4
MSME financing gap (% GDP)	80	86.0
Tax and contribution rate (% profit)	80	75.1
Bank nonperforming loans (%)	51	87.4
Unmet loan demand	10	39.0
Medium- and high-tech activities value added	96	17.0
Industry and services value added (% GDP)	70	83.1
Labour underutilization rate	79	88.0
Output per worker	87	0.3
<b>ENABLING ENVIRONMENT</b>	82	52.8
<b>Governance</b>	87	37.1
<b>Political environment</b>	81	40.4
Peace and stability	82	34.4
View and accountability	71	46.4
Quality of institutions	86	33.0
Rule of law	106	32.0
Control of corruption	100	32.2
Government effectiveness	86	37
<b>Socio-economic</b>	74	56.0
<b>Gender equity</b>	51	56.2
Female-to-male ratio in parliament	29	85.1
Female-to-male labour force participation	100	85.4
Female-to-male ratio in internal wage	50	85.1
Gender inequality	81	62.0
Social protection coverage (% population)	85	32.0
Adult literacy rate	88	81.0
Youth not in employment, education or training (%)	71	85.1
<b>Standard of living</b>	100	31.0
Poverty headcount ratio (% population)	82	50.0
GDP per capita	80	6.8
<b>Health and environment</b>	87	58.4
<b>Health</b>	81	81.0
Universal health coverage	34	77
Healthy life expectancy (years)	42	81.2
Under-five mortality rate	75	80.0
<b>Environmental performance</b>	119	46.0
Renewable energy consumption (%)	86	15.0
Household footprint per capita	81	80.8
Natural hazard exposure	143	31

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# EGYPT

**GKI RANK** 53/154

**GKI SCORE** 52.3

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Egypt is a strong performer in terms of its knowledge infrastructure. It ranks 53rd out of 154 countries in the Global Knowledge Index 2021 and 4th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Educational attainment rate, master's or equivalent
- + Share of students enrolled in secondary vocational programmes
- + Market concentration
- + Ecological footprint per capita
- + Firms with new product/service (%)

### AREAS OF IMPROVEMENT

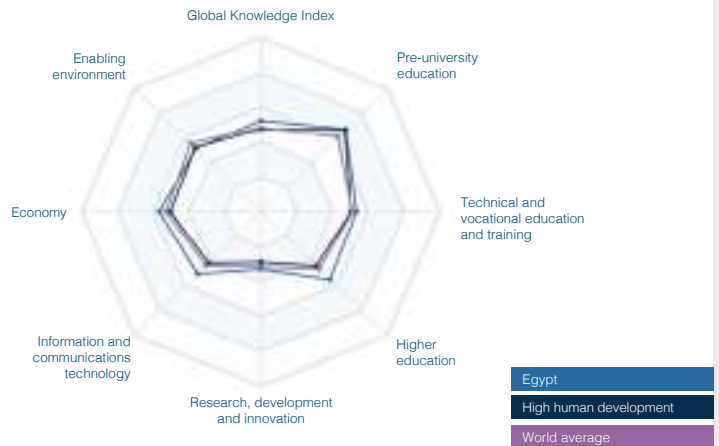
- Ratio of high-skill TVET occupations earnings to average wage
- Academic freedom
- Firms that spend on R&D (%)
- Intellectual property receipts (% total trade)
- Firms producing new goods and services (%)

### KEY INDICATORS

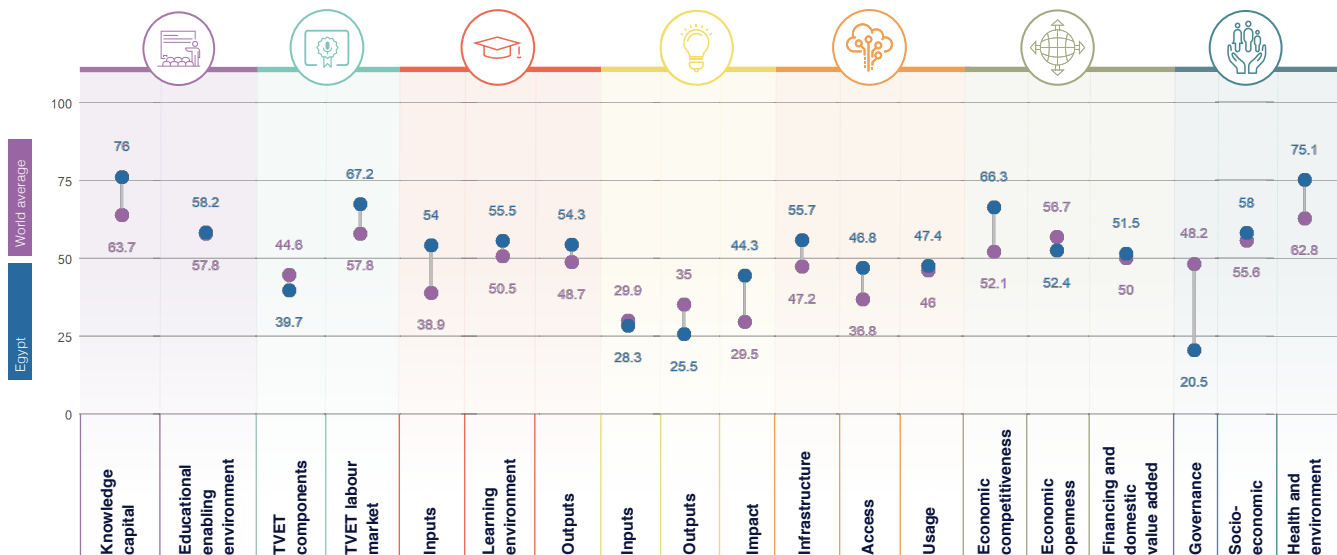
**GDP US\$ billions** 1,223.044  
**Population** 102,334,403  
**HDI** 0.707

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	72	67.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	68	53.4
HIGHER EDUCATION	35	54.6
RESEARCH, DEVELOPMENT AND INNOVATION	58	32.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	57	50
ECONOMY	56	56.7
ENABLING ENVIRONMENT	88	51.2



## GKI PILLARS





# EGYPT

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	36
Enrollment	43	84.0
Net enrolment rate in primary education	20	87.0
Net enrolment rate in lower secondary education	43	86.7
Net enrolment rate in upper secondary education	45	80.0
Completion	28	83.3
Years of compulsory education in primary and secondary	9	82.0
Completion rate in upper secondary education	41	85.4
Success rate rate in the last grade of lower secondary education	71	72.2
Completion	88	80.0
Assessment of 15-year-old students in math, science and reading	114	114
Learning-adjusted years of schooling	85	80.0
<b>Educational enabling environment</b>	<b>88</b>	<b>88.3</b>
Expenditure	100	22.0
Government expenditure on primary education (% GDP)	43	29.0
Government expenditure on secondary education (% GDP)	89	20.0
Government funding per primary student (% GDP per capita)	118	15.3
Government funding per secondary student (% GDP per capita)	100	13.0
Resources	81	80.0
Pupil-based teacher ratio in primary education	31	87.0
Pupil-based teacher ratio in secondary education	28	87.8
Schools with access to computers in primary education (%)	44	84.7
Schools with access to computers in secondary education (%)	60	83.6
Early learning	88	85.0
Class attendance rate in early childhood education	100	25
Proportion of children who are developmentally on track	114	114
Proportion of children with stimulating home learning environments	114	114
Pupil-based teacher ratio in preprimary education	35	87.4
Quality and infrastructure	77	80.0
Completion rate in upper secondary education, gender parity	30	85.7
Completion rate in upper secondary education, wealth parity	60	37.1
Completion rate in upper secondary education, location parity	75	80
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>100</b>	<b>86.7</b>
Companies training apprentices	100	10.0
Firms offering formal training (%)	43	46.6
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	49	70.0
TVET resources	88	81.7
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	6	80.0
Share of students enrolled in postsecondary vocational programmes	85	36.0
TVET quality and infrastructure	114	10.0
Extent of staff training	75	48.8
Quality of vocational training	65	53.0
Ratio of high-skil TVET occupations earnings to average wage	108	71
Ratio of medium-skil TVET occupations earnings to average wage	88	45.7
<b>TVET labour market</b>	<b>84</b>	<b>87.0</b>
Efficiency of the labour market	88	80.0
Firms considered with inappropriately educated workforce (%)	29	81.0
Employment educational mismatch (%)	63	40.0
Proportion of skilled production workers	20	80.4
Unemployment rate with vocational education	114	114
Real TVET unemployment	88	80.0
Share of TVET occupations	40	84.0
Manufacturing employment (%)	89	40.0
Quality and infrastructure	88	76.0
Enrollment in vocational education, gender parity	72	75.0
Useable employment rate	54	81.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>27</b>	<b>84</b>
Expenditure	114	114
Government expenditure per tertiary student	114	114
Teaching staff compensation (% tertiary expenditure)	114	114
Enrollment	17	26.0
Enrollment in bachelor's or equivalent level (%)	31	46
Enrollment in masters, doctoral or equivalent (%)	72	12.8
Resources	28	33.0
Rp/teacher ratio in tertiary education	71	36.0
Research in higher education (%)	15	83
<b>Learning environment</b>	<b>84</b>	<b>88.0</b>
Directly paid academic freedom	77	81.0
Teachers in tertiary education, gender parity	9	85
Labour mobility rate	13	82.0
Academic freedom	142	8
Quality and infrastructure	14	88.0
Class attendance rate in tertiary education, gender parity	25	80.0
Class attendance rate in tertiary education, wealth parity	18	89
Class attendance rate in tertiary education, location parity	14	88.4
<b>Outputs</b>	<b>88</b>	<b>84.0</b>
Efficiency	14	84.7
Educational attainment rate, bachelor's or equivalent	114	114
Educational attainment rate, master's or equivalent	3	84.1
Educational attainment rate, doctoral or equivalent	20	43.4
Employment	114	114
Labour force participation rate with advanced education	114	114
Unemployment rate with advanced education	114	114
Impact	88	43.0
University tertiary enrollment in FTE	28	88.0
UNITE documents per FTE personnel in higher education	55	30.0
<b>Innovation, knowledge and services trade</b>		
<b>Inputs</b>	<b>88</b>	<b>88.0</b>
Access to FDI resources	11	100.0
GDP (% GDP)	47	14.0
GERD per researcher	88	22.0
Researchers per thousand labour force	44	20.0
Tertiary graduates from STEM programmes (%)	31	82.0
<b>Quality and infrastructure</b>	<b>11</b>	<b>100.0</b>
GERD performed by business enterprises (%)	78	0.8
GERD financed by business enterprises (%)	61	28.4
Researchers in business enterprises (%)	84	19.0
Firms that spend on R&D (%)	118	0.2
Quality of research innovation	11	100.0
High-skilled employment (%)	13	60.7
Intellectual property payments (% total trade)	75	13.2
State of double development	27	80.0
<b>Outputs</b>	<b>111</b>	<b>88.0</b>
Access to FDI resources	11	100.0
Average documents per researcher	84	47.1
Citations per document	67	26.0
Patent applications (per 100 billion GDP)	66	49.0
<b>Quality and infrastructure</b>	<b>11</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	68	8.8
PCT applications (per 100 billion GDP)	68	26.0
Firms producing new goods and services (%)	121	6





# EGYPT

	Rank	Value
<b>Consumer Electronics Adoption</b>	100	9.0
Smartphone applications per 100 million GDP	30	75
Cultural goods exports (% exports)	85	4
Printing and publishing output (% manufactured output)	84	90.9
<b>Energy</b>	74	49.3
<b>Finance</b>	87	36.1
Access to investors' protection	33	31.5
Depth of innovative companies	37	60.5
ISO 9001 quality certificates (% GDP)	45	27.4
ISO 14001 environmental certificates (% GDP)	20	32.0
<b>Industry</b>	100	7.5
CERD freedom from abuse (%)	94	0.8
Cost of contracts per strategic contract deals (% GDP)	100	6.1
Computer software spending (% GDP)	72	10.0
<b>Government Services</b>	1	89.6
New business density per thousand population	104	104
Firms with one or more employees (%)	1	87.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	57	30
<b>Infrastructure</b>	81	66.7
<b>Coverage</b>	81	44.3
3G/4G mobile network coverage (% population)	87	67.3
Secure Internet servers per 1 million population	40	22.5
Investment in telecommunication services (% GDP)	70	30
<b>Quality</b>	81	27.3
Mobile upload and download speeds	78	40.1
Fixed broadband upload and download speeds	35	23.8
Fixed broadband subscriptions (by speed) per hundred people	32	41.9
<b>Availability</b>	80	81
Fixed broadband latency (% QM per user)	83	70.2
Mobile broadband latency (% QM per capita)	81	66.8
Internet and telephony competition	1	100
<b>Access</b>	22	66.8
<b>Subscribers</b>	80	53.2
Active mobile-broadband subscriptions per fixed-line inhabitants	45	41.5
International Internet bandwidth per user	83	38
Households with Internet access at home (%)	21	62.1
<b>Skills and employment</b>	80	20.1
Individuals with standard ICT skills (%)	14	69.6
Tertiary graduates from ICT programmes (%)	35	35.4
ICT employment (%)	87	6.7
<b>Usage</b>	77	47.4
<b>Services</b>	80	45.1
Government online services	80	57.1
Fixed broadband Internet traffic per subscriber	20	29.0
Mobile broadband Internet traffic per subscriber	24	21.9
Internet users (%)	30	66.3
<b>Commerce</b>	80	41.6
ICT/FIT patent applications (per 100,000 GDP)	100	21.1
E-participation	100	57.2
Internet activities by individuals (%)	23	68.8
Trade in digitally deliverable services (% total trade)	85	47.2
<b>ECONOMY</b>	34	34.7
<b>Economic Competitiveness</b>	22	55.3
<b>Infrastructure Investment</b>	31	10.4
Overhead capital formation (% GDP)	85	51.8
Logistics performance	67	45.6
Transport productive capacity	25	42.5
Building quality control	8	62.0

	Rank	Value
<b>Business Agility</b>	81	26.2
Cost of starting a business	80	87.6
Recovery recovery time	37	66.7
Entrepreneurial employee activity rate	15	54.5
Growth of corporate transactions	13	65.7
<b>Customer experience</b>	84	22.4
<b>Trust and development</b>	20	63
Trade (% GDP)	70	29.7
High-technology trade (% total trade)	80	40.1
Market concentration	39	66.2
Market concentration	5	66
Product diversity	100	41.7
Contract financial openness	86	41.7
Foreign direct investment, net inflows (% GDP)	54	43.0
Cost dynamics	110	40
<b>Financing and domestic value added</b>	88	51.3
<b>Financing and costs</b>	80	27.2
Domestic credit to private sector (% GDP)	85	21.2
IMRS financing gap (% GDP)	32	77.4
Tax and contribution rate (% profit)	80	75.1
Bank nonperforming loans (%)	104	104
Unsecured loans ratio	10	41.0
Medium- and high-tech activities value added	77	24.8
Industry and services value added (% GDP)	40	65.7
Labour underutilization rate	80	76.8
Output per worker	84	17.8
<b>ENABLING ENVIRONMENT</b>	88	51.3
<b>Governance</b>	124	20.5
Political environment	143	9.5
Peace and stability	100	11.3
View and accountability	145	7.7
Quality of institutions	100	31.0
Rule of law	80	68.0
Control of corruption	121	22.0
Government effectiveness	100	32.2
<b>Socio-economic</b>	71	58
Gender equity	71	63.2
Female-to-male ratio in parliament	30	56.5
Female-to-male labour force participation	100	60.9
Female-to-male ratio in internal wage	65	50.5
Gender inequality	80	62.0
Social protection coverage (% population)	54	65.7
Adult literacy rate	81	71.0
Youth not in employment, education or training (%)	40	70
Standard of living	70	63.2
Poverty headcount ratio (% population)	81	70.2
GDP per capita	84	19.2
<b>Health and environment</b>	6	75.1
Health	20	83.0
Universal health coverage	85	85
Healthy life expectancy (years)	11	82.0
Under-five mortality rate	50	65.7
Environmental performance	87	61.4
Renewable energy consumption (%)	81	22.0
Household footprint per capita	1	88.8
Natural hazard exposure	25	75

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 102/154

**GKI SCORE** 42.6

**WORLD AVERAGE** 48.4

# EL SALVADOR

## COUNTRY PERFORMANCE SUMMARY

El Salvador is a modest performer in terms of its knowledge infrastructure. It ranks 102nd out of 154 countries in the Global Knowledge Index 2021 and 7th out of the 27 countries with medium human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **52.256**  
**Population** ..... **6,486,201**  
**HDI** ..... **0.673**

### AREAS OF STRENGTH

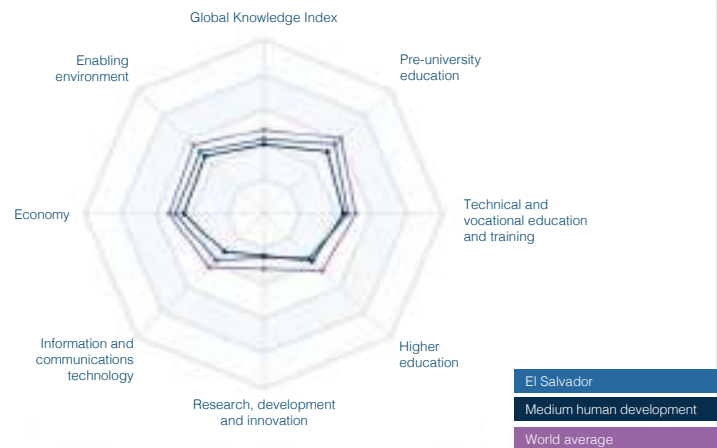
- + Tertiary graduates from ICT programmes (%)
- + Citations per document
- + Gross attendance ratio for tertiary education, gender parity
- + Firms offering formal training (%)
- + Investment in telecommunication services (% GDP)

### AREAS OF IMPROVEMENT

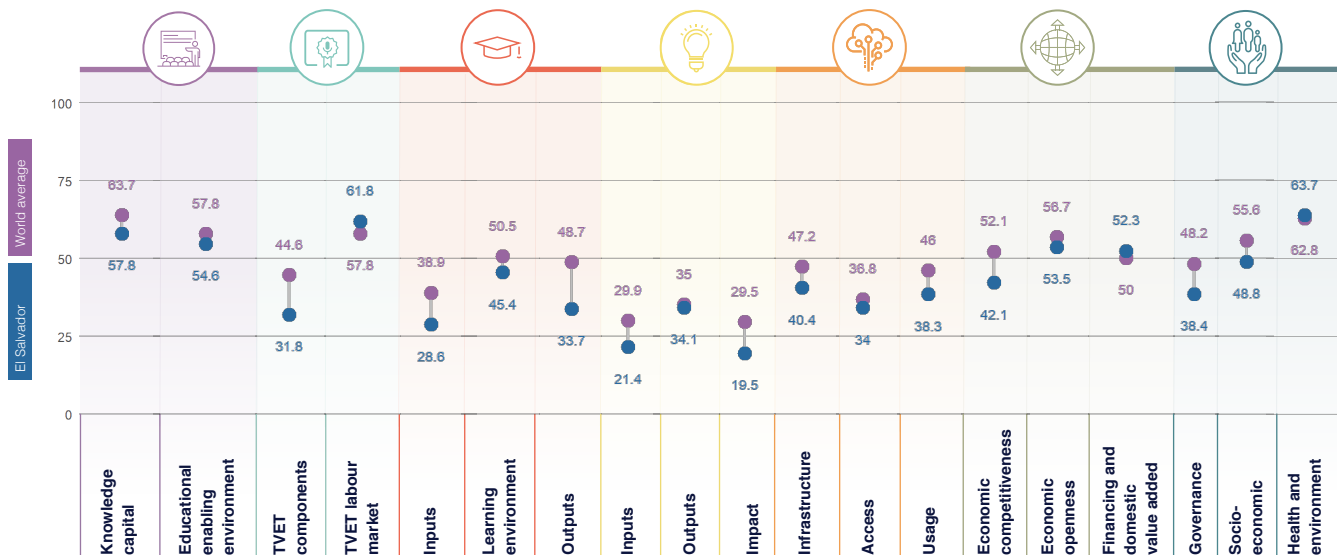
- Joint ventures per strategic alliance deals (% GDP)
- Educational attainment rate, doctorate or equivalent
- Educational attainment rate, master's or equivalent
- Research institutions prominence
- Government expenditure on vocational education (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	101	56.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	98	46.8
HIGHER EDUCATION	124	35.9
RESEARCH, DEVELOPMENT AND INNOVATION	110	25
INFORMATION AND COMMUNICATIONS TECHNOLOGY	93	37.6
ECONOMY	87	49.3
ENABLING ENVIRONMENT	95	50.3



## GKI PILLARS





# EL SALVADOR

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	181	56.2
Enrollment	123	55.5
Net enrolment rate in primary education	128	92
Net enrolment rate in lower secondary education	107	83.7
Net enrolment rate in upper secondary education	104	83.1
Completion	88	83.0
Years of compulsory education in primary and secondary	67	83.0
Completion rate in upper secondary education	75	81
Success rate rate in the last grade of lower secondary education	88	81.3
Completion	82	81.2
Assessment of 15-year-old students in math, science and reading	144	104
Learning-adjusted years of schooling	85	81.2
<b>Educational enabling environment</b>		
Expenditure	85	27.5
Government expenditure on primary education (% GDP)	89	36.9
Government expenditure on secondary education (% GDP)	82	20.5
Government funding per primary student (% GDP per capita)	85	38.5
Government funding per secondary student (% GDP per capita)	85	17.4
Resources	76	31.8
Pupil-based teacher ratio in primary education	55	77.7
Pupil-based teacher ratio in secondary education	63	81
Schools with access to computers in primary education (%)	63	81
Schools with access to computers in secondary education (%)	68	83.4
Early learning	37	55.0
Class attendance rate in early childhood education	101	28.5
Proportion of children who are developmentally on track	30	71.0
Presence of children with stimulating home learning environments	39	84.2
Pupil-based teacher ratio in preprimary education	54	77.7
Quality and inclusiveness	71	81.1
Completion rate in upper secondary education, gender parity	27	86.0
Completion rate in upper secondary education, wealth parity	65	84.6
Completion rate in upper secondary education, location parity	76	84.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	99	54.5
Firms offering formal training (%)	18	87.1
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	74	2.5
TVET resources	102	11.1
Government expenditure on vocational education (%)	78	8
Share of students enrolled in secondary vocational programmes	50	27.5
Share of students enrolled in postsecondary vocational programmes	114	114
TVET quality and inclusiveness	81	46.0
Extent of staff training	112	43.1
Quality of vocational training	100	44.2
Ratio of high-skill TVET occupations earnings to average wage	25	43.0
Ratio of medium-skill TVET occupations earnings to average wage	25	54.0
<b>TVET labour market</b>		
Efficiency of the labour market	101	54.7
Firms considered with inappropriately educated workforce (%)	82	52.4
Employment educational mismatch (%)	76	55.5
Presence of skilled production workers	72	86.5
Unemployment rate with vocational education	114	114
Real TVET unemployment	81	51.8
Share of TVET occupations	87	47.5
Manufacturing employment (%)	32	86.2
Quality and inclusiveness	71	33.0
Enrollment in vocational education, gender parity	73	84.2
Useable employment rate	88	63.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	117	83
Government expenditure per tertiary student	112	35
Teaching staff compensation (% tertiary expenditure)	114	114
Enrollment	101	55.7
Enrollment in bachelor's or equivalent level (%)	84	17.8
Enrollment in masters, doctoral or equivalent (%)	74	11.8
Resources	81	87.0
Pupil-teacher ratio in tertiary education	39	71
Research in higher education (%)	31	64.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	68	62.0
Labour mobility rate	100	1.8
Academic freedom	76	34.7
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	13	83.0
Class attendance rate in tertiary education, wealth parity	81	28.8
Class attendance rate in tertiary education, location parity	32	11.0
<b>Outputs</b>		
Skilled labour	101	1.9
Educational attainment rate, bachelor's or equivalent	80	20
Educational attainment rate, master's or equivalent	81	0.8
Educational attainment rate, doctoral or equivalent	80	1.8
Skilled labour	71	13.4
Labour force participation rate with advanced education	85	73.4
Unemployment rate with advanced education	114	114
Impact	108	20
University tertiary enrollment in R&D	118	27.0
OECD students per 1000 personnel in higher education	86	13.0
<b>Government expenditure and financing</b>		
Inputs	102	21.4
<b>Quality and inclusiveness</b>		
GDP (% GDP)	86	3.1
OECD per researcher	38	55.0
Researchers per thousand labour force	82	0.8
Tertiary graduates from RTOB programmes (%)	88	38.8
<b>Quality and inclusiveness</b>		
OECD performed by business enterprises (%)	87	1.8
OECD financed by business enterprises (%)	21	43.0
Researchers in business enterprises (%)	114	114
Firms that spend on R&D (%)	79	14.8
Quality and inclusiveness	101	22.2
High-skill employment (%)	21	18.0
Intellectual property payments (% total trade)	55	23.4
State of digital development	128	32.1
<b>Outputs</b>		
<b>Quality and inclusiveness</b>		
Average documents per researcher	80	45.0
Citations per document	18	48.0
Patent applications (per 100 billion GDP)	118	20.0
<b>Quality and inclusiveness</b>		
Intellectual property receipts (% total trade)	89	5.8
Research design applications (per 100 billion GDP)	104	0.8
PCT applications (per 100 billion GDP)	128	32.1
Firms producing new goods and services (%)	52	47.0



# EL SALVADOR

	Rank	Value
<b>Business environment</b>		
Treatment applications per 100 million GDP	43	42.5
Cultural goods exports (% exports)	33	29.4
Printing and publishing output (% manufactured output)	196	196
<b>Energy</b>	133	15.3
<b>Finance</b>	110	35.3
Access to venture capital	113	8
Depth of innovative companies	123	35.1
ISO 9001 quality certificates (% GDP)	76	14.1
ISO 14001 environmental certificates (% GDP)	37	3.7
<b>Logistics</b>	110	33.3
CERD received from abroad (%)	84	10.7
Cost volume per storage volume deals (% GDP)	128	1.7
Computer software spending (% GDP)	100	4
<b>Science and innovation</b>	111	35.3
New business density per thousand population	106	2.7
Firms with new products/services (%)	25	75
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>83</b>	<b>37.3</b>
<b>Infrastructure</b>	88	40.4
<b>Coverage</b>	111	33.3
3G/4G mobile network coverage (% population)	111	33.0
Secure Internet servers per 1 million population	97	3
Investment in telecommunication services (% GDP)	91	42.8
<b>Quality</b>	121	33.3
Mobile speed and download speeds	100	7.3
Fixed broadband upload and download speeds	100	3.1
Fixed broadband subscriptions (y speed) per hundred people	85	8.8
<b>Availability</b>	111	35.3
Fixed broadband latency (% QM per capita)	111	60.9
Mobile broadband basket (% QM per capita)	111	45.0
Internet and telephone competition	1	100
<b>Access</b>	<b>84</b>	<b>38</b>
<b>Subscriptions</b>	113	33.3
Active mobile broadband subscriptions per fixed-line inhabitants	100	26.1
International Internet bandwidth per user	88	43.2
Households with Internet access at home (%)	116	23.3
<b>Skills and employment</b>	101	37.3
Individuals with standard ICT skills (%)	114	19
Tertiary graduates from ICT programmes (%)	6	80.4
ICT employment (%)	87	8
<b>Usage</b>	<b>87</b>	<b>38.3</b>
<b>Services</b>	106	33
Government online services	94	57.7
Fixed broadband internet traffic per subscription	25	20.3
Mobile broadband internet traffic per subscription	81	5.2
Internet users (%)	100	47.0
<b>Commerce</b>	111	41.0
ICT FDI patent applications (per 100 million GDP)	86	35.9
E-participation	74	87.0
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	100	27.7
<b>ECONOMY</b>	<b>87</b>	<b>45.3</b>
<b>Economic competitiveness</b>	120	41.3
FDI inflows (billion USD)	111	41.0
Overhead capital formation (% GDP)	123	30
Logistics performance	100	39.4
Transport productive capacity	95	30.7
Building quality control	80	86.7

	Rank	Value
<b>Business agility</b>	100	40.0
Cost of starting a business	126	35.6
Recovery time	88	35.2
Entrepreneurial employee activity rate	72	7.1
Growth of corporate transactions	89	42.0
<b>Customer experience</b>	<b>82</b>	<b>33.3</b>
Trust and dissatisfaction	91	37.0
Tax (% GDP)	80	27.6
High-technology trade (% total trade)	87	47.1
Market concentration	47	87.6
Market competition	100	34.0
Product diversity	101	40.0
Customer financial openness	80	70
Foreign direct investment, net inflows (% GDP)	81	36.0
Cost dynamics	122	28.0
<b>Financing and domestic value added</b>	<b>83</b>	<b>33.3</b>
Financing and costs	91	32.0
Domestic credit to private sector (% GDP)	82	33.1
MSME financing gap (% GDP)	104	198
Tax and contribution rate (% profit)	73	71.1
Bank nonperforming loans (%)	31	84.0
Unmet loan demand	111	41.0
Medium- and high-tech activities value added	81	32.2
Industry and services value added (% GDP)	85	83.0
Labour underutilization rate	88	75
Output per worker	100	6.1
<b>ENABLING ENVIRONMENT</b>	<b>84</b>	<b>36.3</b>
<b>Governance</b>	<b>83</b>	<b>35.4</b>
Political environment	89	40.0
Peace and stability	74	43.0
View and accountability	76	47.6
Quality of institutions	110	31
Rule of law	122	22.1
Control of corruption	108	20.3
Government effectiveness	86	38.0
<b>Socio-economic</b>	<b>101</b>	<b>46.8</b>
Gender equity	97	62.4
Female-to-male ratio in parliament	84	37.7
Female-to-male labour force participation	104	54.2
Female-to-male ratio in internal wage	79	85.0
Gender inequality	110	10.1
Social protection coverage (% population)	100	19.0
Adult literacy rate	71	86
Youth not in employment, education or training (%)	124	41.4
Standard of living	86	31.1
Poverty headcount ratio (% population)	80	83.0
GDP per capita	101	6.7
<b>Health and environment</b>	<b>77</b>	<b>63.7</b>
Health	71	10.4
Universal health coverage	40	70
Healthy life expectancy (years)	80	83.1
Under-five mortality rate	79	80.2
Environmental performance	101	33.0
Renewable energy consumption (%)	77	24.1
Household footprint per capita	81	88.7
Natural hazard exposure	124	34

\*All values are normalized to a scale from 0 (worst) to 100 (best).

# ESTONIA

**GKI RANK** 15/154

**GKI SCORE** 66.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Estonia is a leading performer in terms of its knowledge infrastructure. It ranks 15th out of 154 countries in the Global Knowledge Index 2021 and 15th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Government online services
- + Bank non-performing loans (%)
- + Entrepreneurial employee activity rate
- + E-participation
- + New business density per thousand population

### AREAS OF IMPROVEMENT

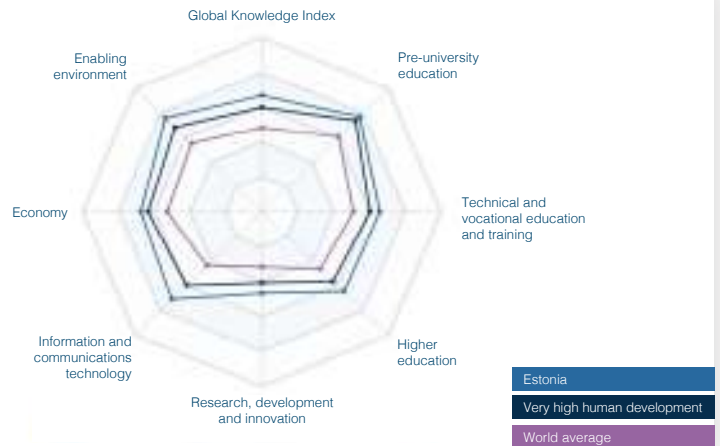
- MSME financing gap (% GDP)
- Teaching staff compensation (% tertiary expenditure)
- Ratio of high-skill TVET occupations earnings to average wage
- Firms with new product/service (%)
- Ecological footprint per capita

### KEY INDICATORS

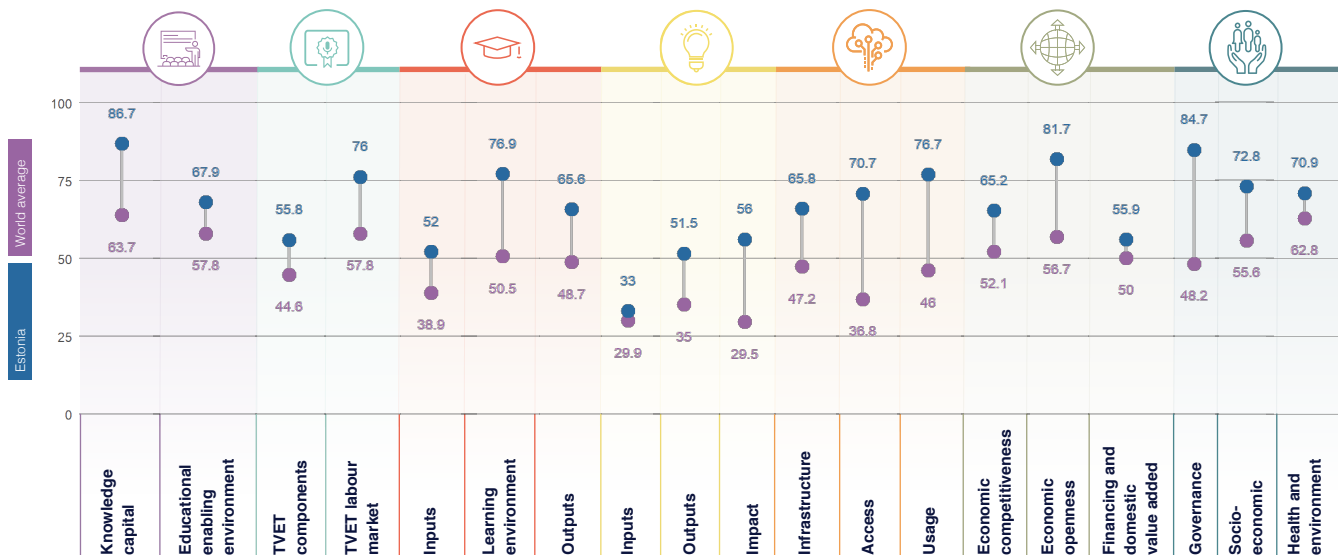
**GDP** US\$ billions ..... **46.921**  
**Population** ..... **1,326,539**  
**HDI** ..... **0.892**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	31	77.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	18	65.9
HIGHER EDUCATION	13	64.8
RESEARCH, DEVELOPMENT AND INNOVATION	17	46.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	5	71.1
ECONOMY	21	67.6
ENABLING ENVIRONMENT	18	76.2



## GKI PILLARS





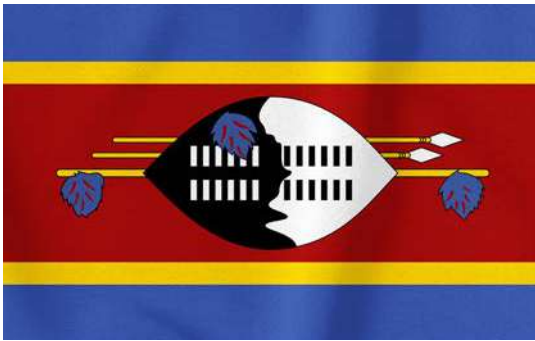
	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	9	94.7
Enrolment	25	91.1
Net enrolment rate in primary education	72	90.4
Net enrolment rate in lower secondary education	33	90.1
Net enrolment rate in upper secondary education	17	87.9
Completion	47	87.1
Years of compulsory education in primary and secondary	67	86.9
Completion rate in upper secondary education	39	86.3
Success rate rate in the last grade of lower secondary education	26	81.4
Completion	3	80.9
Assessment of 15-year-old students in math, science and reading	4	78.1
Learning-adjusted years of schooling	5	82.7
<b>Educational enabling environment</b>	<b>66</b>	<b>87.9</b>
Enrolment	65	87.9
Government expenditure on primary education (% GDP)	74	30.7
Government expenditure on secondary education (% GDP)	80	23.7
Government funding per primary student (% GDP per capita)	89	46.1
Government funding per secondary student (% GDP per capita)	99	32.6
Resources	1	100
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	65	83.9
Class attendance rate in early childhood education	29	83.5
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	65	84.7
Completion rate in upper secondary education, gender parity	65	90.1
Completion rate in upper secondary education, wealth parity	32	75.5
Completion rate in upper secondary education, location parity	40	88.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET participation</b>	<b>21</b>	<b>88.8</b>
Companies training apprentices	97	82.9
Firms offering formal training (%)	35	56.2
Labour force with short-cycle tertiary education (%)	30	70
Participation rate in formal and non-formal education and training	27	59.5
TVET enrolment	21	88.8
Government expenditure on vocational education (%)	27	46.5
Share of students enrolled in secondary vocational programmes	34	35.3
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	71	86
Extent of staff training	28	82.9
Quality of vocational training	29	81.7
Ratio of high-skil TVET occupations earnings to average wage	90	18.9
Ratio of medium-skill TVET occupations earnings to average wage	67	41.3
<b>TVET labour market</b>	<b>11</b>	<b>76</b>
Efficiency of the labour market	11	74
Firms considered with inequality educated workforce (%)	93	71.3
Employment educational mismatch (%)	28	75.3
Proportion of skilled production workers	5	82.8
Unemployment rate with vocational education	47	81.9
High TVET unemployment	11	84.4
Share of TVET occupations	90	73.5
Manufacturing employment (%)	38	83.9
Quality and infrastructure	71	86.0
Enrolment in vocational education, gender parity	89	63.7
Useable employment rate	17	83.9

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>28</b>	<b>83</b>
Enrolment	67	33.9
Government expenditure per tertiary student	23	44.2
Teaching staff compensation (% tertiary expenditure)	69	29.8
Enrolment	11	83.9
Enrolment in bachelor's or equivalent level (%)	28	34.5
Enrolment in master's, doctoral or equivalent (%)	14	79.2
Resources	43	78.7
Pupil-teacher ratio in tertiary education	26	88.5
Researchers in higher education (%)	43	85
<b>Learning environment</b>	<b>9</b>	<b>76.8</b>
Timely and academic freedom	11	78.9
Teachers in tertiary education, gender parity	9	97.4
Labour mobility rate	22	38.1
Academic freedom	16	54.9
Quality and infrastructure	106	106
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>	<b>19</b>	<b>83.8</b>
Attainment	9	83.8
Educational attainment rate, bachelor's or equivalent	17	88.5
Educational attainment rate, master's or equivalent	5	89.8
Educational attainment rate, doctoral or equivalent	19	44.9
Employment	25	85
Labour force participation rate with advanced education	25	82.7
Unemployment rate with advanced education	47	87.4
Impact	65	43.1
University tertiary enrolment in R&D	38	47.9
OECD students per 1000 personnel in higher education	47	38.6
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>22</b>	<b>33</b>
Access to credit resources	11	80
GDPD (% GDP)	23	28.3
GERD per researcher	67	18.9
Researchers per thousand labour force	26	42.3
Tertiary graduates from STEM programmes (%)	34	87.9
<b>Quality of innovation environment</b>	<b>11</b>	<b>80.0</b>
GERD performed by business enterprises (%)	32	18.4
GERD financed by business enterprises (%)	36	53.9
Researchers in business enterprises (%)	37	43.3
Firms that spend on R&D (%)	45	29
Quality of financial environment	65	33.3
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	97	6.8
State of startup development	86	43.9
<b>Outputs</b>	<b>22</b>	<b>53.3</b>
Access to credit resources	11	80.0
Average documents per researcher	30	83.9
Citations per document	13	67.9
Patent applications (per 100 billion GDP)	48	57.9
<b>Infrastructure and innovation environment</b>	<b>65</b>	<b>43.1</b>
Intellectual property receipts (% total trade)	52	11.9
Research and development expenditure (per 100 billion GDP)	36	24.9
PCT applications (per 100 billion GDP)	28	79.9
Firms producing new goods and services (%)	18	48.9

# ESTONIA

	Rank	Value		Rank	Value
<b>Business environment</b>			<b>Business agility</b>	10	81.4
Treatment applications (per 100 million GDP)	14	89.0	Cost of starting a business	11	85.4
Cultural goods exports (% exports)	43	19.6	Recovery recovery rate	76	38.2
Printing and publishing output (% manufactured output)	20	46.3	Entrepreneurial employee activity rate	3	79.0
<b>Energy</b>	1	99.0	Growth of corporate transactions	50	21.4
Renewable	1	99.0	<b>Employee openness</b>	6	87.2
Renewal of institutions' provisions	46	13.7	Trust and dissatisfaction	11	76.0
Depth of innovative companies	10	80.1	Taxable (% GDP)	16	80.2
ISO 9001 quality certificates (% GDP)	13	82	High-technology trade (% total trade)	25	80.0
ISO 14001 environmental certificates (% GDP)	8	80.0	Market concentration	16	81.4
<b>Finance</b>	10	80.0	Market concentration	20	84
CERD received from abroad (%)	27	26.5	Product ownership	1	80.0
Cost of raising per strategic finance deals (% GDP)	30	26.7	Private financial openness	1	100
Computer software spending (% GDP)	76	12.0	Foreign direct investment, net inflows (% GDP)	15	80.7
<b>Government efficiency</b>	1	100	Gov dynamics	1	100
New business density per thousand population	1	100	<b>Financing and domestic value added</b>	48	80.0
Firms with new products/services (%)	100	84.6	Financing and costs	52	80.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>3</b>	<b>71.5</b>	Domestic credit to private sector (% GDP)	80	24.2
<b>Infrastructure</b>	24	66.9	IMR financing gap (% GDP)	60	56.2
Coverage	10	80.4	Tax and contribution rate (% profit)	117	69.6
30MHz mobile network coverage (% population)	25	80.4	Bank nonperforming loans (%)	3	80.0
Secure Internet servers per 1 million population	9	85	Unsecured loans sector	41	71
Investment in telecommunication services (% GDP)	60	22.0	Medium- and high-tech activities value added	51	34.6
<b>Quality</b>	17	80.4	Industry and services value added (% GDP)	84	84
Mobile speed and download speeds	21	41.2	Labour underutilization rate	29	80
Fixed broadband upload and download speeds	28	30.0	Output per worker	56	80.0
Fixed broadband subscriptions (by speed) per hundred people	26	88.0	<b>ENABLING ENVIRONMENT</b>	<b>18</b>	<b>74.3</b>
<b>Availability</b>	11	71.0	<b>Governance</b>	16	84.7
Fixed broadband bandwidth (% Gb per capita)	24	88.2	Political environment	90	76.0
Mobile broadband basket (% Gb per capita)	16	85.0	Peace and stability	31	70.5
Internet and telephony competition	1	100	View and accountability	10	88.8
<b>Access</b>	3	70.2	Quality of institutions	16	95.1
<b>Connectivity</b>	8	70.1	Rule of law	18	88.8
Active mobile-broadband subscriptions per fixed-line inhabitants	4	73.0	Control of corruption	16	82.3
International Internet bandwidth per user	40	47.6	Government effectiveness	20	88.0
Households with Internet access at home (%)	32	80.0	<b>Socio-economic</b>	<b>24</b>	<b>72.8</b>
<b>Skills and employment</b>	1	71	Gender equity	50	71.0
Individuals with standard ICT skills (%)	12	70.7	Female-to-male ratio in parliament	74	34.7
Tertiary graduates from ICT programmes (%)	15	87.0	Female-to-male labour force participation	60	74.6
ICT employment (%)	5	80.0	Female-to-male ratio in internal wage	1	100
<b>Usage</b>	6	70.7	Government access	1	80.0
<b>Services</b>	1	71.1	Social protection coverage (% population)	14	80.4
Government online services	2	89.4	Adult literacy rate	4	80.0
Fixed broadband internet traffic per subscription	104	74	Youth not in employment, education or training (%)	16	80.7
Mobile broadband internet traffic per subscription	11	45.6	<b>Standard of living</b>	40	80.1
Internet users (%)	20	80.0	Poverty headcount ratio (% population)	63	80.0
<b>Security</b>	10	70.0	GDP per capita	36	21.0
ICT/FIT patent applications (per 100,000 GDP)	30	80	<b>Health and environment</b>	<b>29</b>	<b>70.9</b>
E-participation	1	100	Health	24	80.1
Internet activities by individuals (%)	8	81.4	Universal health coverage	51	75
Trade in digitally deliverable services (% total trade)	30	50.0	Healthy life expectancy (years)	22	80.0
<b>ECONOMY</b>	<b>21</b>	<b>67.6</b>	Unemployment rate	6	80.0
<b>Economic complexity/structure</b>	22	80.2	Government performance	40	80.7
Manufacture innovation	10	80	Renewable energy consumption (%)	60	20.0
Overhead capital formation (% GDP)	15	80.0	Household budget per capita	100	80.2
Logistics performance	33	57.6	Natural hazard exposure	4	81
Transport productive capacity	47	54.1			
Building quality control	75	73.3			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ESWATINI (KINGDOM OF)

## KEY INDICATORS

GDP US\$ billions	9.737
Population	1,160,164
HDI	0.611

**GKI RANK** 118/154

**GKI SCORE** 38.5

**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**

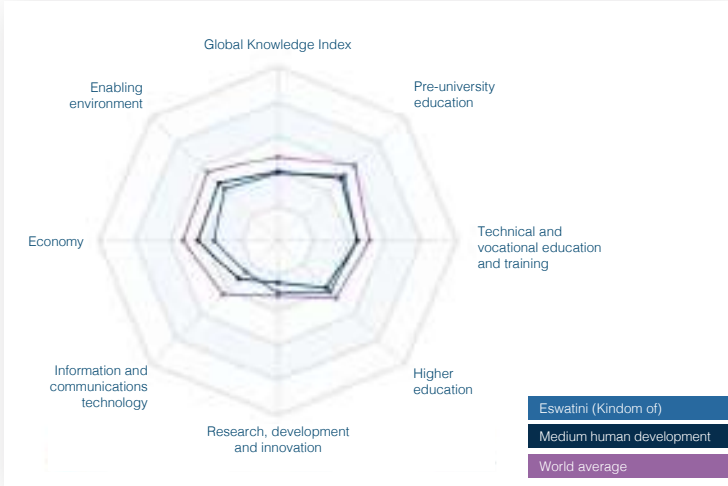
Eswatini (Kingdom of) is a modest performer in terms of its knowledge infrastructure. It ranks 118th out of 154 countries in the Global Knowledge Index 2021 and 16th out of the 27 countries with medium human development.

- AREAS OF STRENGTH**
- + Government expenditure on primary education (% of GDP)
  - + Gross attendance ratio for tertiary education, gender parity
  - + GERD financed from abroad (%)
  - + Government expenditure on secondary education (% of GDP)
  - + Firms constrained with inadequately educated workforce (%)

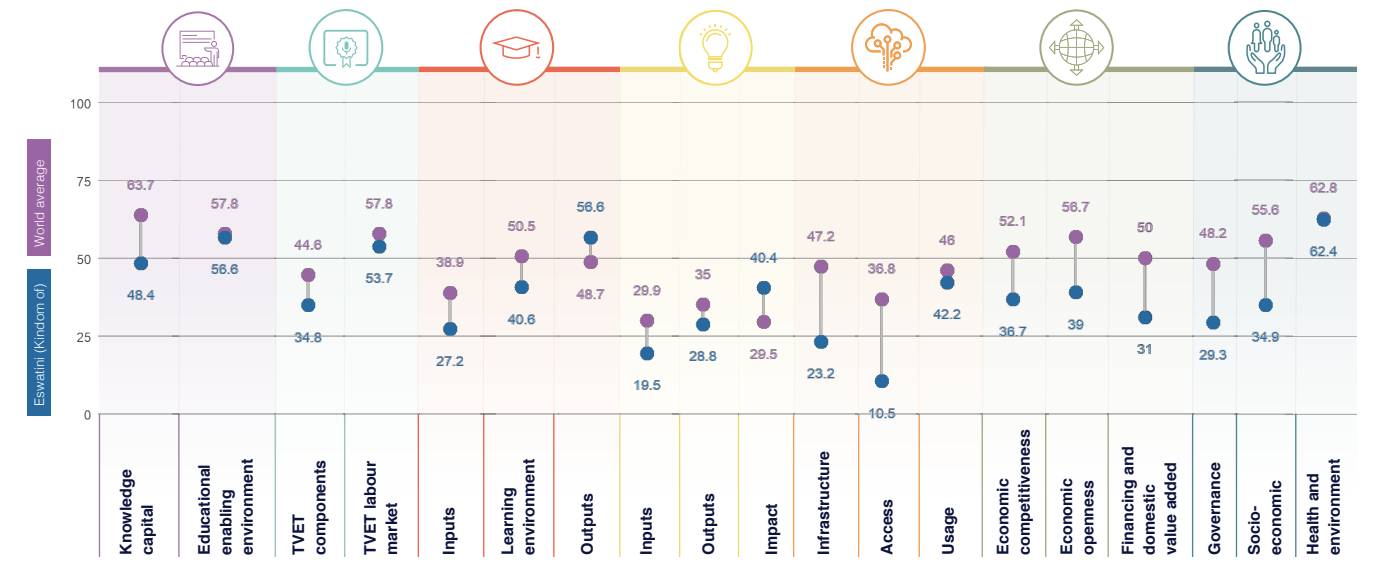
- AREAS OF IMPROVEMENT**
- Gross attendance ratio for tertiary education, location parity
  - Tertiary graduates from STEM programmes (%)
  - GERD performed by business enterprises (%)
  - Research institutions prominence
  - Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	110	52.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	110	44.2
HIGHER EDUCATION	95	41.5
RESEARCH, DEVELOPMENT AND INNOVATION	80	29.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	125	25.3
ECONOMY	147	35.6
ENABLING ENVIRONMENT	125	42.2



## GKI PILLARS







# ESWATINI (KINGDOM OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolutedge capital	114	52.8
Enrollment	118	68.4
Enrollment rate in primary education	89	77.1
Net enrolment rate in primary education	105	53.7
Net enrolment rate in lower secondary education	48	86.2
Net enrolment rate in upper secondary education	68	87.3
Completion	121	45.2
Years of compulsory education in primary and secondary	126	53.8
Completion rate in upper secondary education	100	31
Success rate rate in the last grade of lower secondary education	100	52.8
Completion	103	21.0
Assessment of Grade 6 students in math, science and reading	104	104
Learning-adjusted years of schooling	104	21.0
<b>Educational enabling environment</b>	<b>88</b>	<b>86.8</b>
Expenditure	9	53.0
Government expenditure on primary education (% GDP)	3	76.1
Government expenditure on secondary education (% GDP)	11	42
Government funding per primary student (% GDP per capita)	87	28.1
Government funding per secondary student (% GDP per capita)	98	48.5
Resources	77	89.0
Pupil-based teacher ratio in primary education	81	75.2
Pupil-based teacher ratio in secondary education	42	70.9
Schools with access to computers in primary education (%)	57	80.7
Schools with access to computers in secondary education (%)	75	58.7
Early learning	110	41.1
Class attendance rate in early childhood education	100	21.5
Proportion of children who are developmentally on track	50	43.0
Proportion of children with stimulating home learning environments	99	25.2
Pupil-based teacher ratio in preprimary education	49	62.6
Quality and infrastructure	11	81
Completion rate in upper secondary education, gender parity	47	83
Completion rate in upper secondary education, wealth parity	64	50.0
Completion rate in upper secondary education, location parity	70	62.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>118</b>	<b>86.8</b>
Occupational training enrollment	100	11.0
Firms offering formal training (%)	47	44.2
Labour force with short-cycle tertiary education (%)	106	104
Participation rate in formal and non-formal education and training	73	2.8
TVET resources	81	81
Government expenditure on vocational education (%)	74	1.8
Share of students enrolled in secondary vocational programmes	104	0.2
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	81	41.0
Extent of staff training	81	31
Quality of vocational training	118	40.0
Ratio of high-skil TVET occupations earnings to average wage	27	47.0
Ratio of medium-skil TVET occupations earnings to average wage	55	45
<b>TVET labour market</b>	<b>100</b>	<b>51.2</b>
Efficiency of the labour market	86	11.4
Firms considered with inappropriately educated workforce (%)	12	86.0
Employment educational mismatch (%)	63	82.5
Proportion of skilled production workers	40	88.7
Unemployment rate with vocational education	115	24.0
Real TVET unemployment	81	51.1
Share of TVET occupations	87	51.1
Manufacturing employment (%)	37	53.1
Quality and infrastructure	120	47.0
Enrollment in vocational education, gender parity	113	29.0
Useable employment rate	84	65.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>104</b>	<b>27.2</b>
Expenditure	80	52.0
Government expenditure per tertiary student	38	28.2
Teaching staff compensation (% tertiary expenditure)	75	18.2
Enrollment	108	1.9
Enrollment in bachelor's or equivalent level (%)	128	1.9
Enrollment in masters, doctoral or equivalent (%)	104	104
Resources	10	82.0
Ratio teacher ratio in tertiary education	75	32
Researchers in higher education (%)	60	43
<b>Learning environment</b>	<b>115</b>	<b>40.8</b>
Timely and academic freedom	116	38.0
Teachers in tertiary education, gender parity	52	72.4
Labour mobility rate	104	1.8
Academic freedom	121	38.0
Quality and infrastructure	41	44.0
Class attendance rate in tertiary education, gender parity	9	65.0
Class attendance rate in tertiary education, wealth parity	36	37.0
Class attendance rate in tertiary education, location parity	34	6
<b>Outputs</b>	<b>49</b>	<b>50.8</b>
Efficiency	104	104
Educational attainment rate, bachelor's or equivalent	104	104
Educational attainment rate, master's or equivalent	104	104
Educational attainment rate, doctoral or equivalent	104	104
Employment	10	10.0
Labour force participation rate with advanced education	20	83.2
Unemployment rate with advanced education	64	68.0
Impact	16	32.0
University tertiary enrollment in FTE	100	35.1
CRIDE scholarships per FTE enrolment in higher education	36	48.5
<b>ESWATINI'S ECONOMIC AND FINANCIAL DATA</b>		
<b>Inputs</b>	<b>111</b>	<b>10.8</b>
Human capital resources	107	100.0
GDP (% GDP)	84	5.2
GERD per researcher	36	34.5
Researchers per thousand labour force	79	2.8
Tertiary graduates from STEM programmes (%)	116	9
<b>Quality and infrastructure</b>	<b>81</b>	<b>41.0</b>
GERD performed by business enterprises (%)	87	9
GERD financed by business enterprises (%)	69	37.0
Researchers in business enterprises (%)	78	0.8
Firms that spend on R&D (%)	36	32.0
Quality of financial resources	81	41.0
High-skilled employment (%)	36	28.2
Intellectual property payments (% total trade)	17	45.0
State of cluster development	94	41.0
<b>Outputs</b>	<b>100</b>	<b>51.2</b>
Efficiency of financial resources	81	51.2
Average documents per researcher	36	63.2
Citations per document	128	12.0
Patent applications (per 100 billion GDP)	104	104
<b>Quality and infrastructure</b>	<b>81</b>	<b>41.0</b>
Intellectual property receipts (% total trade)	100	2.2
Research and development expenditure (per 100 billion GDP)	104	104
PCT applications (per 100 billion GDP)	71	50.5
Firms producing new goods and services (%)	80	33.0





# ESWATINI (KINGDOM OF)

	Rank	Value
<b>Business environment</b>	111	57.7
Treatment applications per 100 million GDP	116	116
Cultural goods exports (% exports)	54	13.5
Printing and publishing output (% manufactured output)	80	6.1
<b>Energy</b>	111	46.4
<b>Energy</b>	111	46.4
Access to electricity's proximity	115	8
Depth of innovative companies	122	40
ISO 9001 quality certificates (% GDP)	96	6.8
ISO 14001 environmental certificates (% GDP)	41	20.0
<b>Employment</b>	111	57.7
CERD freedom from abuse (%)	9	63.1
Cost of contracts per strategic contract deals (% GDP)	122	8
Computer software spending (% GDP)	116	116
<b>Government services</b>	111	57.7
New business density per thousand population	116	116
Firms with one or more employees (%)	42	32.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	125	25.2
<b>Infrastructure</b>	147	10.2
<b>Coverage</b>	141	32
30MHz mobile network coverage (% population)	128	47.2
Secure Internet servers per 1 million population	115	1.8
Investment in telecommunication services (% GDP)	121	56.5
<b>Quality</b>	147	10.2
Mobile upload and download speeds	116	116
Fixed broadband upload and download speeds	116	116
Fixed broadband subscriptions (by speed) per hundred people	128	0.1
<b>Availability</b>	115	47.2
Fixed broadband bandwidth (% Gbps per capita)	129	62.3
Mobile broadband basket (% Gbps per capita)	129	34.2
Internet and telephony competition	128	54.5
<b>Access</b>	144	16.5
<b>Subscribers</b>	115	47.2
Active mobile-broadband subscriptions per fixed-line inhabitants	145	5.8
International Internet bandwidth per user	128	56.5
Households with Internet access at home (%)	111	36.0
<b>Skills and employment</b>	111	57.7
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	117	8
ICT employment (%)	85	39.8
<b>Usage</b>	89	42.2
<b>Services</b>	111	57.7
Government online services	112	45.8
Fixed broadband Internet traffic per subscriber	116	116
Mobile broadband Internet traffic per subscriber	116	116
Internet users (%)	127	21.6
<b>Commerce</b>	111	57.7
ICT/FIT patent applications (per 100,000 GDP)	116	116
E-participation	113	45.2
Internet activities by individuals (%)	116	116
Trade in digitally deliverable services (% total trade)	41	55.1
<b>ECONOMY</b>	147	10.2
<b>Economic complexity/structure</b>	133	36.2
<b>Infrastructure Investment</b>	144	16.1
Overhead capital formation (% GDP)	103	25.2
Logistics performance	116	116
Transport productive capacity	85	22.2
Building quality control	126	62.0

	Rank	Value
<b>Business agility</b>	116	22.2
Cost of starting a business	107	71.2
Recovery recovery time	75	40.6
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	118	8
<b>Business operations</b>	141	38
<b>Trade and investment</b>	132	40.2
Trade (% GDP)	45	36.2
High-technology trade (% total trade)	141	17.2
Market concentration	107	66.6
Market concentration	142	64.2
<b>Product innovation</b>	111	57.7
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	122	31.2
Cost dynamics	106	46.0
<b>Financing and domestic value added</b>	144	32
<b>Financing and costs</b>	129	28.2
Domestic credit to private sector (% GDP)	125	1.1
MSME financing gap (% GDP)	107	15
Tax and contribution rate (% profit)	71	21.2
Bank nonperforming loans (%)	105	60
<b>Unmet needs index</b>	141	22.0
Medium- and high-tech activities value added	134	2.1
Industry and services value added (% GDP)	87	63.2
Labour underutilization rate	142	14.0
Output per worker	77	15.0
<b>ENABLING ENVIRONMENT</b>	126	42.2
<b>Governance</b>	111	25.2
<b>Political environment</b>	111	25.2
Peace and stability	75	43.4
View and accountability	127	19
Quality of institutions	168	36.0
Rule of law	100	33.0
Control of corruption	87	26.1
Government effectiveness	126	21.6
<b>Socio-economic</b>	128	34.8
<b>Gender equity</b>	121	47.0
Female-to-male ratio in parliament	100	10.0
Female-to-male labour force participation	25	88.6
Female-to-male ratio in internal wage	116	116
<b>Gender equality</b>	121	47.0
Social protection coverage (% population)	86	30
Adult literacy rate	76	66.1
Youth not in employment, education or training (%)	146	20.2
<b>Standard of living</b>	111	11.0
Poverty headcount ratio (% population)	125	10.0
GDP per capita	88	3
<b>Health and environment</b>	87	62.8
<b>Health</b>	111	67.1
Universal health coverage	100	83
Healthy life expectancy (years)	107	18.0
Under-five mortality rate	124	50.0
<b>Economic and performance</b>	11	21.2
Renewable energy consumption (%)	25	66.0
Household footprint per capita	87	66.0
Natural hazard exposure	25	75

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ETHIOPIA

**GKI RANK** 139/154

**GKI SCORE** 32.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Ethiopia is a weak performer in terms of its knowledge infrastructure. It ranks 139th out of 154 countries in the Global Knowledge Index 2021 and 13th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Labour force participation rate with advanced education
- + Renewable energy consumption (%)
- + Firms constrained with inadequately educated workforce (%)
- + Female-to-male ratio in parliament
- + MSME financing gap (% GDP)

### AREAS OF IMPROVEMENT

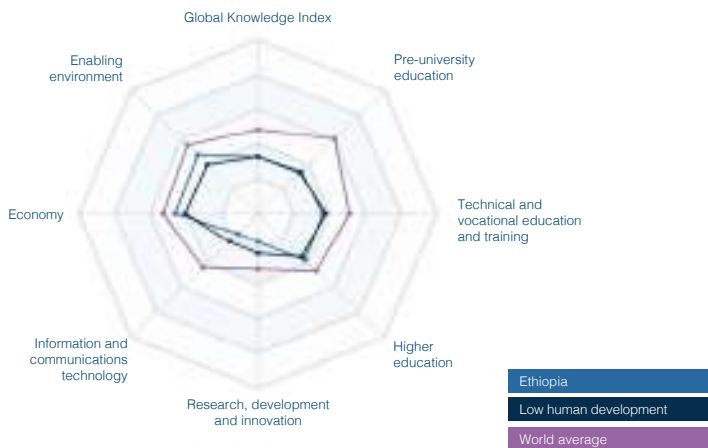
- ISO 14001 environmental certificates (% GDP)
- Computer software spending (% GDP)
- Fixed-broadband subscriptions by speed per hundred people
- International Internet bandwidth per user
- Extent of corporate transparency

### KEY INDICATORS

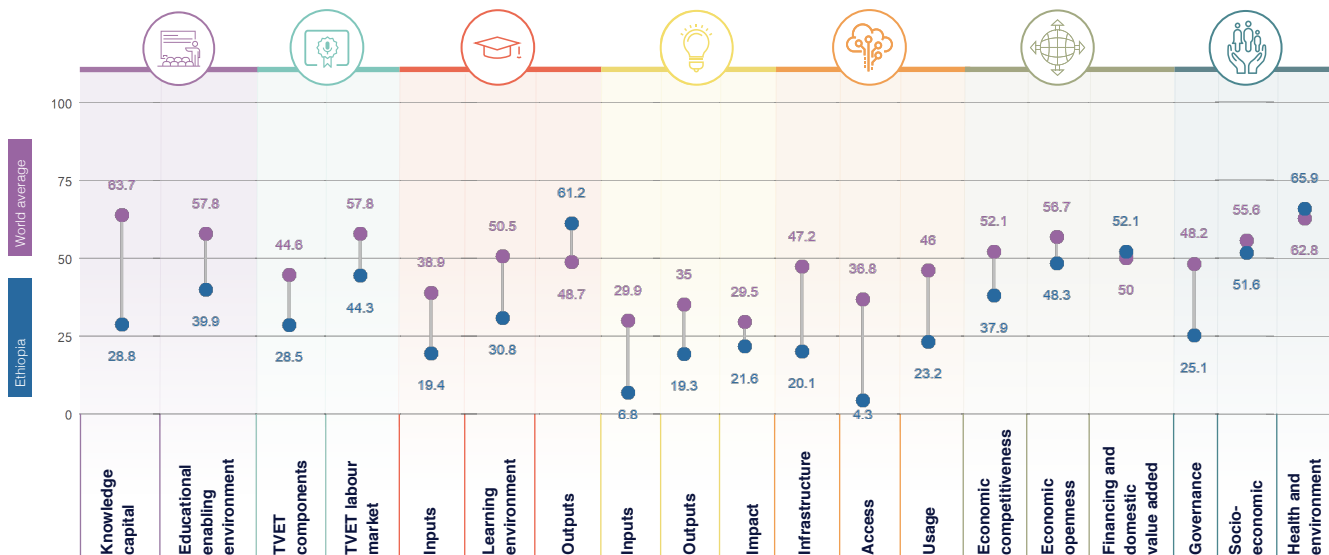
**GDP US\$ billions** 264.052  
**Population** 114,963,583  
**HDI** 0.485

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	140	34.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	138	36.4
HIGHER EDUCATION	119	37.2
RESEARCH, DEVELOPMENT AND INNOVATION	150	15.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	154	15.9
ECONOMY	108	46.1
ENABLING ENVIRONMENT	108	47.5



## GKI PILLARS





# ETHIOPIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	144	54.3
Enrollment	139	33.5
Net enrolment rate in primary education	118	81.1
Net enrolment rate in lower secondary education	125	34.4
Net enrolment rate in upper secondary education	138	14.1
Completion	131	23.5
Years of compulsory education in primary and secondary	119	81.5
Completion rate in upper secondary education	133	13.1
Success rate rate in the last grade of lower secondary education	127	14.3
Completion	137	20.2
Assessment of 15-year-old students in math, science and reading	114	114
Learning-adjusted years of schooling	137	20.2
<b>Educational enabling environment</b>		
Expenditure	105	21.5
Government expenditure on primary education (% GDP)	81	26.2
Government expenditure on secondary education (% GDP)	100	15.5
Government funding per primary student (% GDP per capita)	112	18.5
Government funding per secondary student (% GDP per capita)	75	24.4
Resources	88	16
Pupil-based teacher ratio in primary education	114	114
Pupil-based teacher ratio in secondary education	114	114
Schools with access to computers in primary education (%)	114	114
Schools with access to computers in secondary education (%)	72	76
<b>Early learning</b>		
Class attendance rate in early childhood education	81	24.2
Proportion of children who are developmentally on track	114	114
Proportion of children with stimulating home learning environments	114	114
Pupil-based teacher ratio in preprimary education	114	114
<b>Quality and inclusiveness</b>		
Completion rate in upper secondary education, gender parity	89	89.4
Completion rate in upper secondary education, wealth parity	100	4.5
Completion rate in upper secondary education, location parity	115	13.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communicable disease monitoring	143	14.5
Firms offering formal training (%)	85	24.5
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	87	4.8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	28	40.1
Share of students enrolled in secondary vocational programmes	52	11.1
Share of students enrolled in postsecondary vocational programmes	114	114
<b>TVET quality and inclusiveness</b>		
Extent of staff training	100	44.8
Quality of vocational training	122	40.1
Ratio of high-skill TVET occupations earnings to average wage	39	26.7
Ratio of medium-skill TVET occupations earnings to average wage	15	60.1
<b>TVET labour market</b>		
Efficiency of the labour market	85	85
Firms considered well-integrated with workforce (%)	6	83.7
Employment educational mismatch (%)	114	21.3
Proportion of skilled production workers	17	33.5
Unemployment rate with vocational education	80	39.6
Real TVET unemployment	114	11.6
Share of TVET occupations	145	12.1
Manufacturing employment (%)	134	13.5
<b>Quality and inclusiveness</b>		
Enrollment in vocational education, gender parity	30	89.1
Useable employment rate	144	11.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	86	18.5
Government expenditure per tertiary student	84	14.7
Teaching staff compensation (% tertiary expenditure)	88	22.4
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	121	2.8
Enrollment in masters, doctoral or equivalent (%)	126	1.1
<b>Resources</b>		
Rapit teacher ratio in tertiary education	118	41.5
Research staff in higher education (%)	75	34.1
<b>Learning environment</b>		
<b>Timely and academic freedom</b>		
Teachers in tertiary education, gender parity	112	13.3
Labour mobility rate	114	114
Academic freedom	104	47.9
<b>Quality and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	42	88.4
Class attendance rate in tertiary education, wealth parity	79	8
Class attendance rate in tertiary education, location parity	55	8.8
<b>Outputs</b>		
<b>Enrollment</b>		
Educational attainment rate, bachelor's or equivalent	114	114
Educational attainment rate, master's or equivalent	114	114
Educational attainment rate, doctoral or equivalent	114	114
<b>Employment</b>		
Labour force participation rate with advanced education	3	88.9
Unemployment rate with advanced education	57	85.2
<b>Impact</b>		
University tertiary enrollment in R&D	79	28.8
OECD indicators per 100 personnel in higher education	76	21.2
<b>Government expenditure and financing data</b>		
<b>Inputs</b>		
Government expenditure	102	2.8
Government expenditure	102	2.8
GDP (% GDP)	80	5.3
GERD per researcher	88	9.8
Researchers per thousand labour force	80	1.1
Tertiary graduates from STEM programmes (%)	114	114
<b>Government expenditure and financing data</b>		
GERD performed by business enterprises (%)	89	0.2
GERD financed by business enterprises (%)	94	1.8
Researchers in business enterprises (%)	73	2.3
Firms that spend on R&D (%)	106	7.3
<b>Quality and inclusiveness</b>		
High-skill employment (%)	81	3.8
Intellectual property payments (% total trade)	122	0.8
State of double development	112	30.7
<b>Outputs</b>		
<b>Government expenditure and financing data</b>		
Average documents per researcher	87	45.8
Citations per document	128	8.3
Patent applications (per 100 billion GDP)	124	13.7
<b>Government expenditure and financing data</b>		
Intellectual property receipts (% total trade)	113	0.3
Research and development expenditure (per 100 billion GDP)	94	114
PCT applications (per 100 billion GDP)	130	15.2
Firms producing new goods and services (%)	82	25.7





# ETHIOPIA

	Rank	Value
<b>Consumer electronics</b>	95	27.7
Treatment applications per 100 million GDP	113	3.1
Cultural goods exports (% exports)	99	4.3
Printing and publishing output (% manufactured output)	22	40.0
<b>Energy</b>	110	21.0
<b>Finance</b>	20	10.0
Access to investors' protection	86	12.4
Depth of innovative companies	119	40.4
ISO 9001 quality certificates (% GDP)	104	0.3
ISO 14001 environmental certificates (% GDP)	149	0.1
<b>Infrastructure</b>	70	10.1
CERD received from abroad (%)	23	36.4
Cost indexes per strategic storage deals (% GDP)	109	0.8
Computer software spending (% GDP)	125	0
<b>Internationalization</b>	71	0.0
New business density per thousand population	104	2.4
Firms with new products/services (%)	99	23.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	184	10.0
<b>Infrastructure</b>	188	20.0
<b>Coverage</b>	100	21.1
3G/4G mobile network coverage (% population)	141	28.0
Secure Internet servers per 1 million population	102	0.2
Investment in telecommunication services (% GDP)	35	43.0
<b>Quality</b>	110	0.8
Mobile upload and download speeds	81	15.1
Fixed broadband upload and download speeds	89	4.7
Fixed broadband subscriptions (y speed) per hundred people	118	0
<b>Availability</b>	100	20.7
Fixed broadband latency (% QM per usage)	108	46.0
Mobile broadband basket (% QM per capita)	141	20.0
Internet and telephony competition	100	0.7
<b>Access</b>	100	4.3
<b>Subscriptions</b>	101	1.0
Active mobile-broadband subscriptions per fixed-line inhabitants	149	0
International Internet bandwidth per user	100	0
Households with Internet access at home (%)	102	17.0
<b>Skills and employment</b>	101	1
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	104	19
ICT employment (%)	124	1
<b>Usage</b>	100	23.2
<b>Services</b>	110	10.0
Government online services	107	30.0
Fixed broadband Internet traffic per subscription	104	1.8
Mobile broadband Internet traffic per subscription	80	21.0
Internet users (%)	101	20.0
<b>Commerce</b>	100	0
ICT FDI parent applications (per 100 million GDP)	104	19
E-participation	100	33.0
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	144	0.7
<b>ECONOMY</b>	104	60.1
<b>Economic complexity/structure</b>	101	37.0
<b>Manufacturing</b>	90	41.0
Open fixed capital formation (% GDP)	11	80.0
Logistics performance	120	34.4
Transport productive capacity	100	20.7
Building quality control	25	73.0

	Rank	Value
<b>Business agility</b>	100	20.0
Ease of starting a business	140	21.7
Recovery recovery rate	100	29.0
Entrepreneurial employee activity rate	77	0.8
Growth of corporate transactions	118	0
<b>Corporate openness</b>	100	40.0
<b>Trade and investment</b>	70	10.7
Trade (% GDP)	147	0.0
High-technology trade (% total trade)	10	65.1
Market concentration	85	88.7
Market concentration	30	80.0
<b>Product openness</b>	100	37.0
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	42	47.1
Out dynamics	80	0
<b>Financing and domestic value added</b>	88	10.1
<b>Financing and loans</b>	0	0
Domestic credit to private sector (% GDP)	104	19
IMRS financing gap (% GDP)	12	87.0
Tax and contribution rate (% profit)	84	89.0
Bank nonperforming loans (%)	90	80.0
<b>Unmet needs index</b>	144	10.0
Medium- and high-tech activities value added	89	18.0
Industry and services value added (% GDP)	140	31
Labour underutilization rate	108	41.0
Output per worker	140	1.0
<b>ENABLING ENVIRONMENT</b>	100	47.0
<b>Governance</b>	100	20.0
<b>Political environment</b>	140	13.4
Peace and stability	140	0.0
View and accountability	100	20.0
Quality of institutions	90	10.7
Rule of law	80	30
Control of corruption	80	40.0
Government effectiveness	100	31.0
<b>Socio-economic</b>	90	21.0
<b>Gender equity</b>	20	70.4
Female-to-male ratio in parliament	90	34.0
Female-to-male labour force participation	80	88.0
Female-to-male ratio in internal usage	100	19
<b>Gender equality</b>	101	41
Social protection coverage (% population)	100	4.7
Adult literacy rate	110	17.0
Youth not in employment, education or training (%)	42	80.0
<b>Standard of living</b>	100	11.0
Poverty headcount ratio (% population)	80	87.0
GDP per capita	100	1.4
<b>Health and environment</b>	87	60.0
<b>Health</b>	100	10.7
Universal health coverage	144	30
Healthy life expectancy (years)	100	51.4
Under-five mortality rate	107	57.7
<b>Environmental performance</b>	0	30
Renewable energy consumption (%)	0	80.0
Household footprint per capita	20	88.7
Natural hazard exposure	81	90

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# FINLAND

**GKI RANK** 4/154

**GKI SCORE** 69.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Finland is a leading performer in terms of its knowledge infrastructure. It ranks 4th out of 154 countries in the Global Knowledge Index 2021 and 4th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Firms that spend on R&D (%)
- + Firms producing new goods and services (%)
- + Rule of law
- + Natural hazard exposure
- + Voice and accountability

### AREAS OF IMPROVEMENT

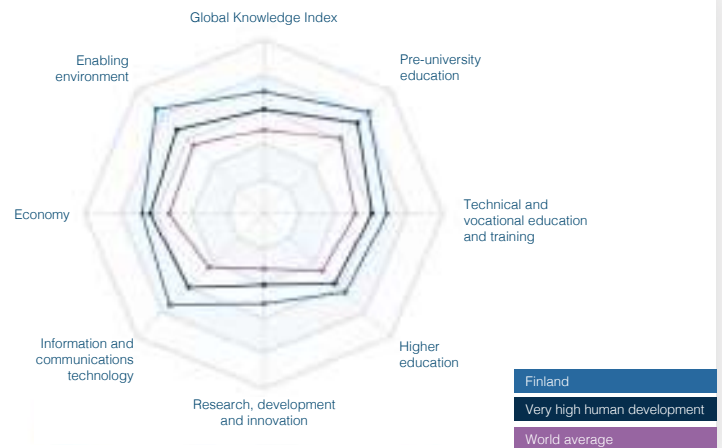
- Years of compulsory education in primary and secondary
- Investment in telecommunication services (% GDP)
- Labour force with short-cycle tertiary education (%)
- Ratio of high-skill TVET occupations earnings to average wage
- Ecological footprint per capita

### KEY INDICATORS

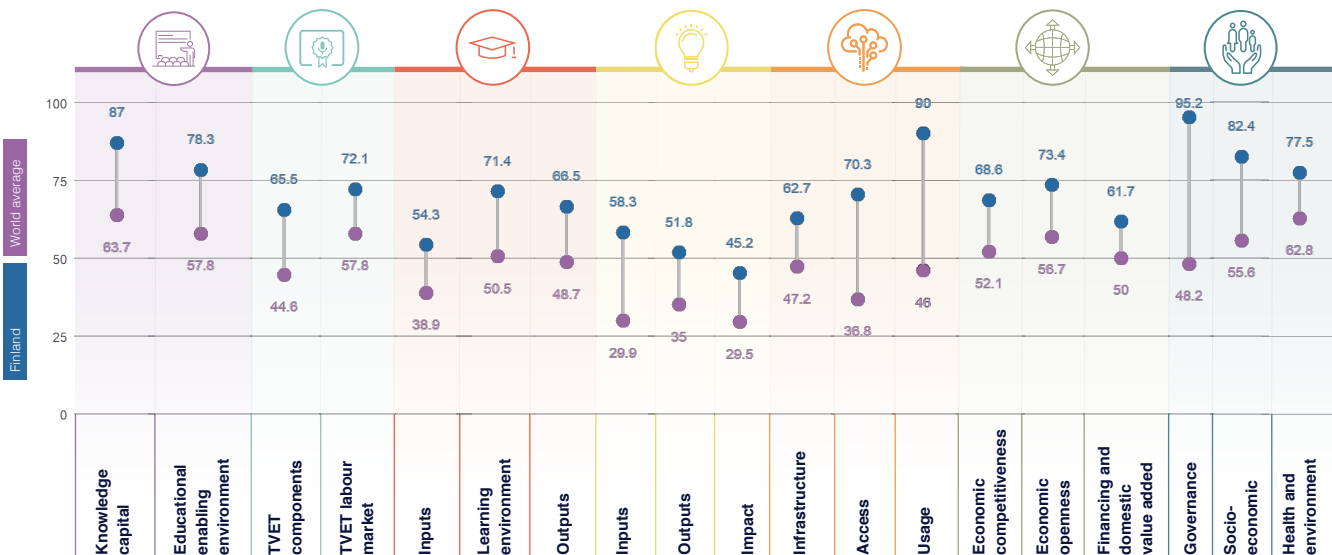
**GDP US\$ billions** 260.446  
**Population** 5,540,718  
**HDI** 0.938

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	1	82.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	10	68.8
HIGHER EDUCATION	15	64.1
RESEARCH, DEVELOPMENT AND INNOVATION	7	51.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	1	74.3
ECONOMY	19	67.9
ENABLING ENVIRONMENT	4	85



## GKI PILLARS





# FINLAND

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	1	92.7
Enrollment	8	87
Net enrolment rate in primary education	64	94.2
Net enrolment rate in lower secondary education	7	99.6
Net enrolment rate in upper secondary education	24	83.7
Completion	37	82.1
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	22	83.1
Success rate rate in the last grade of lower secondary education	23	81.8
Completion	7	82.2
Assessment of 15-year-old students in math, science and reading	1	74.4
Learning-adjusted years of schooling	3	82.0
<b>Educational enabling environment</b>		
Enrollment	10	85.0
Government expenditure on primary education (% GDP)	19	53.2
Government expenditure on secondary education (% GDP)	14	47.4
Government funding per primary student (% GDP per capita)	23	53.2
Government funding per secondary student (% GDP per capita)	20	41.4
Resources	1	100
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
<b>Early learning</b>		
Class attendance rate in early childhood education	25	87.9
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
<b>Quality and inclusiveness</b>		
Completion rate in upper secondary education, gender parity	24	81.0
Completion rate in upper secondary education, wealth parity	2	86.2
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	35	84.0
Firms offering formal training (%)	35	82.5
Labour force with short-cycle tertiary education (%)	73	85.0
Participation rate in formal and non-formal education and training	12	73.9
<b>TVET resources</b>		
Government expenditure on vocational education (%)	7	88.8
Share of students enrolled in secondary vocational programmes	2	70.1
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and inclusiveness</b>		
Extent of staff training	2	71.5
Quality of vocational training	5	76.4
Ratio of high-skill TVET occupations earnings to average wage	85	79.7
Ratio of medium-skill TVET occupations earnings to average wage	71	89.0
<b>TVET labour market</b>		
Efficiency of the labour market	27	76.2
Firms considered with inappropriately educated workforce (%)	89	74.2
Employment educational mismatch (%)	23	80.6
Proportion of skilled production workers	35	70
Unemployment rate with vocational education	68	77.0
High TVET unemployment	85	88.5
Share of TVET occupations	27	86.0
Manufacturing employment (%)	44	84.7
<b>Quality and inclusiveness</b>		
Enrollment in vocational education, gender parity	85	77.0
Useable employment rate	30	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrollment	21	40
Government expenditure per tertiary student	18	57.3
Teaching staff compensation (% tertiary expenditure)	60	24.7
Enrollment	2	71.0
Enrollment in bachelor's or equivalent level (%)	6	86.4
Enrollment in masters, doctoral or equivalent (%)	3	83.0
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	62	88.8
Research staff in higher education (%)	78	33.4
<b>Learning environment</b>		
Directly paid academic freedom	21	71.0
Teachers in tertiary education, gender parity	18	81.0
Labour mobility rate	30	28.4
Academic freedom	12	84.7
<b>Quality and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>		
Retention	11	58.1
Educational attainment rate, bachelor's or equivalent	26	87.0
Educational attainment rate, master's or equivalent	24	84.1
Educational attainment rate, doctoral or equivalent	9	58.6
Employment	44	74.7
Labour force participation rate with advanced education	78	73.7
Unemployment rate with advanced education	86	88.0
<b>Impact</b>		
University tertiary enrollment in R&D	3	71.8
OECD students per 1000 personnel in higher education	26	47.0
<b>Government's contribution to economic growth</b>		
Impact	11	10.3
Share of GDP expenditure	11	51.2
GDP (% GDP)	11	55.7
OEFD per researcher	38	32.1
Researchers per thousand labour force	4	30
Tertiary graduates from STEM programmes (%)	80	52.4
<b>Government's contribution to innovation</b>		
OEFD performed by business enterprises (%)	11	48.6
OEFD financed by business enterprises (%)	14	71.0
Researchers in business enterprises (%)	13	65.0
Firms that spend on R&D (%)	1	100
<b>Quality of innovation</b>		
High-skill employment (%)	106	106
Intellectual property payments (% total trade)	50	20
State of cluster development	20	84
<b>Outputs</b>		
Share of GDP expenditure	11	51.2
Average documents per researcher	60	58.0
Citations per document	38	23.2
Patent applications (per 100 billion GDP)	7	80.1
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	6	67.0
Research design applications (per 100 billion GDP)	27	36
PCT applications (per 100 billion GDP)	6	94.0
Firms producing new goods and services (%)	1	100

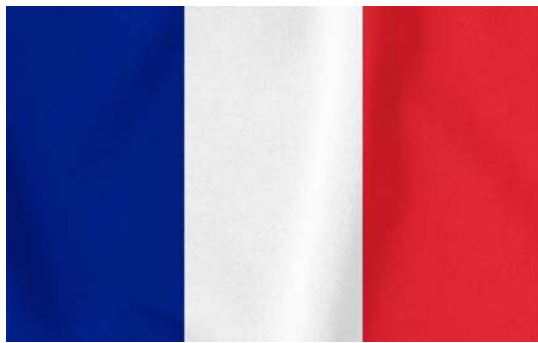


# FINLAND

	Rank	Value
<b>Consumer Electronics</b>	50	31.0
Treatment applications per 100 million GDP	50	31.0
Cultural goods exports (% exports)	89	4.1
Printing and publishing output (% manufactured output)	60	22.7
<b>Energy</b>	75	45.2
<b>Finance</b>	35	40.7
Ratio of institutions' provisions	26	34.4
Depth of innovative companies	17	65.7
ISO 9001 quality certificates (% GDP)	29	41.5
ISO 14001 environmental certificates (% GDP)	17	61.2
<b>Industry</b>	11	69.0
CERD forecast from abroad (%)	43	26.5
Cost reduction per strategic alliance deals (% GDP)	10	69.6
Computer software spending (% GDP)	20	40.5
<b>Government Services</b>	55	34.1
New business density per thousand population	30	21.5
Firms with new products/services (%)	72	44.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	1	74.2
<b>Infrastructure</b>	29	61.7
<b>Coverage</b>	22	55
3G/4G mobile network coverage (% population)	17	60.0
Secure Internet servers per 1 million population	63	54.2
Investment in telecommunication services (% GDP)	128	12.0
<b>Quality</b>	37	44.0
Mobile speed and download speeds	20	44.0
Fixed broadband upload and download speeds	29	30.0
Fixed broadband subscriptions (by speed) per hundred people	25	58.6
<b>Availability</b>	11	67.1
Fixed broadband bandwidth (% Gbps per capita)	20	66.4
Mobile broadband basket (% Gbps per capita)	44	32
Internet and telephony competition	1	100
<b>Access</b>	6	70.2
<b>Subscriptions</b>	14	60
Active mobile-broadband subscriptions per hundred inhabitants	5	60.1
International Internet bandwidth per user	28	45.6
Households with Internet access at home (%)	27	61.0
<b>Skills and employment</b>	0	72.0
Individuals with standard ICT skills (%)	63	34.9
Tertiary graduates from ICT programmes (%)	20	63.1
ICT employment (%)	8	60.7
<b>Usage</b>	1	80
<b>Services</b>	4	66.6
Government online services	3	67.1
Fixed broadband Internet traffic per subscription	116	1.4
Mobile broadband Internet traffic per subscription	3	80
Internet users (%)	64	61.7
<b>Commerce</b>	1	60.0
ICT/FIT patent applications (per 100,000 GDP)	4	60.1
E-participation	14	65.2
Internet activities by individuals (%)	2	66.1
Trade in digitally deliverable services (% total trade)	7	75.0
<b>ECONOMY</b>	14	67.9
<b>Economic Competitiveness</b>	11	65.8
REGULATORY BURDEN	21	55.4
Overhead capital formation (% GDP)	66	61.6
Logistics performance	65	34.2
Transport productive capacity	63	32.0
Building quality control	60	36.7

	Rank	Value
<b>Business Agility</b>	54	30.7
Time of starting a business	27	60.6
Recovery recovery rate	8	65.5
Entrepreneurial employee activity rate	19	48.2
Growth of corporate transactions	18	65.7
<b>Employee experience</b>	23	71.4
Trust and disaffection	17	60
Tax (% GDP)	75	26.5
High-technology trade (% total trade)	45	52.0
Market concentration	31	67.2
Market concentration	14	65.0
Product diversity	19	60.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	65	42.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	21	61.7
<b>Financing and costs</b>	27	50.1
Domestic credit to private sector (% GDP)	27	50.0
ISDS financing gap (% GDP)	116	1.4
Tax and contribution rate (% profit)	75	30.0
Bank nonperforming loans (%)	15	66
Unmet loan demand	14	60.2
Medium- and high-tech activities value added	21	61.0
Industry and services value added (% GDP)	75	62.2
Labour underutilization rate	60	61.4
Output per worker	19	42.0
<b>ENABLING ENVIRONMENT</b>	4	80
<b>Governance</b>	8	65.2
Political environment	7	60.0
Peace and stability	17	62.1
View and accountability	2	60.0
Quality of institutions	1	60.0
Rule of law	1	100
Control of corruption	2	60.0
Government effectiveness	3	60
<b>Socio-economic</b>	6	62.4
Gender equity	9	60.0
Female-to-male ratio in parliament	90	65.2
Female-to-male labour force participation	27	67.4
Female-to-male ratio in internal wage	40	60.0
Gender inequality	14	60.0
Social protection coverage (% population)	1	100
Adult literacy rate	116	1.4
Youth not in employment, education or training (%)	25	67.0
Standard of living	10	60.0
Poverty headcount ratio (% population)	22	65.0
GDP per capita	29	42.0
<b>Health and environment</b>	5	77.5
Health	11	60.1
Universal health coverage	30	70
Healthy life expectancy (years)	23	60.0
Under-five mortality rate	5	60.0
Environmental performance	18	60
Renewable energy consumption (%)	42	45.0
Household footprint per capita	128	12.1
Natural hazard exposure	1	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# FRANCE

**GKI RANK** 17/154

**GKI SCORE** 64.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

France is a leading performer in terms of its knowledge infrastructure. It ranks 17th out of 154 countries in the Global Knowledge Index 2021 and 17th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Enrolment in master's, doctoral or equivalent (%)
- + Fixed-broadband subscriptions by speed per hundred people
- + Net enrolment rate in primary education
- + Gross enrolment ratio in early childhood education
- + Labour force participation rate with advanced education

### AREAS OF IMPROVEMENT

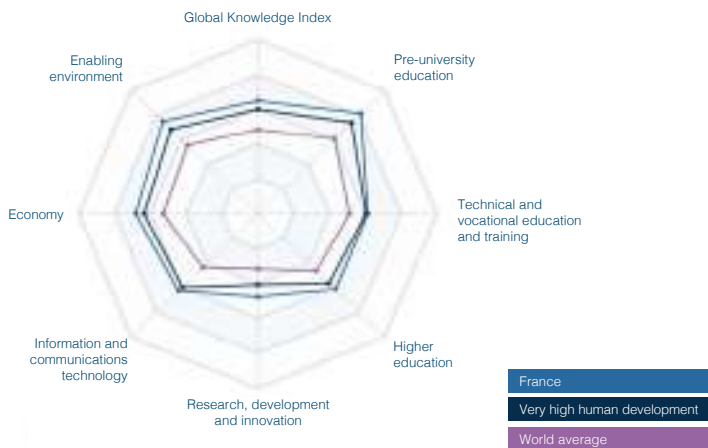
- Ecological footprint per capita
- Ratio of medium-skill TVET occupations earnings to average wage
- Share of students enrolled in post-secondary vocational programmes
- Ratio of high-skill TVET occupations earnings to average wage
- Tax and contribution rate (% profit)

### KEY INDICATORS

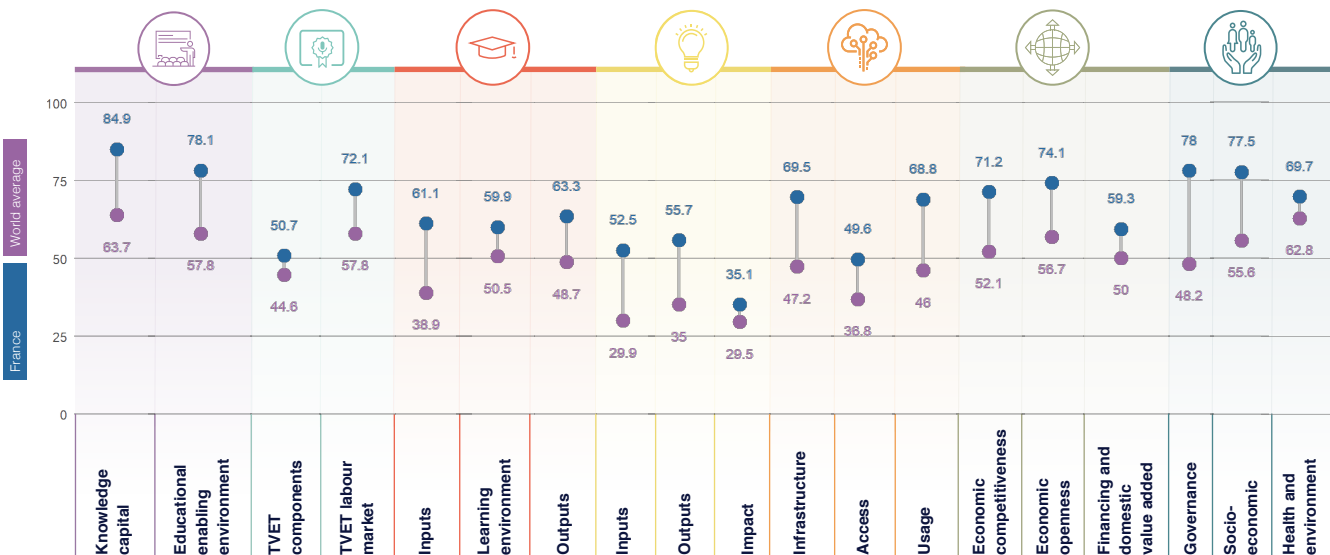
**GDP US\$ billions** 2,851.553  
**Population** 65,273,512  
**HDI** 0.901

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	3	81.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	36	61.4
HIGHER EDUCATION	19	61.5
RESEARCH, DEVELOPMENT AND INNOVATION	16	47.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	22	62.6
ECONOMY	17	68.2
ENABLING ENVIRONMENT	19	75.1



## GKI PILLARS





# FRANCE

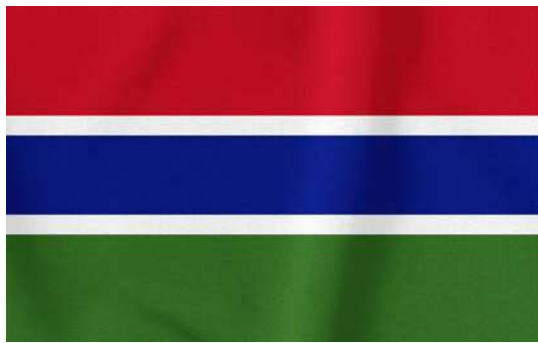
	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	18	84.8
Enrollment	9	93.4
Net enrolment rate in primary education	2	100
Net enrolment rate in lower secondary education	19	90.4
Net enrolment rate in upper secondary education	9	90.0
Completion	40	87
Years of compulsory education in primary and secondary	42	76.0
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	20	83
Completion	21	73.0
Assessment of PISA students in math, science and reading	23	62.1
Learning-adjusted years of schooling	15	85.4
<b>Educational enabling environment</b>		
Expenditure	18	40.0
Government expenditure on primary education (% GDP)	25	46.0
Government expenditure on secondary education (% GDP)	17	45
Government funding per primary student (% GDP per capita)	9	80.1
Government funding per secondary student (% GDP per capita)	13	45.1
Resources	11	80.0
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	20	80
Schools with access to computers in secondary education (%)	1	100
Early learning	9	84.0
Class attendance rate in early childhood education	4	84.0
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	11	11.0
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	41	75.4
Participation rate in formal and non-formal education and training	16	69.4
TVET resources	10	33.0
Government expenditure on vocational education (%)	21	34.7
Share of students enrolled in secondary vocational programmes	49	27.7
Share of students enrolling in postsecondary vocational programmes	81	47.3
TVET quality and infrastructure	10	42.7
Extent of staff training	25	62.8
Quality of vocational training	25	62.1
Ratio of high-skill TVET occupations earnings to average wage	109	11.6
Ratio of medium-skill TVET occupations earnings to average wage	100	10.1
<b>TVET labour market</b>		
Efficiency of the labour market	10	70
Firms considered with inequality educated workforce (%)	116	116
Employment educational mismatch (%)	42	74.0
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	70	71.1
Real TVET unemployment	10	10.1
Share of TVET occupations	16	72.0
Manufacturing employment (%)	80	39
Quality and infrastructure	10	64.0
Enrollment in vocational education, gender parity	80	71.0
Useable employment rate	23	81.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	10	44.0
Government expenditure per tertiary student	17	92.0
Teaching staff compensation (% tertiary expenditure)	45	34.7
Enrollment	9	93.7
Enrollment in bachelor's or equivalent level (%)	76	21.6
Enrollment in master's, doctoral or equivalent (%)	1	100
Resources	27	76.1
Pupil-teacher ratio in tertiary education	81	68.1
Research staff in higher education (%)	12	68.1
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	72	69.0
Labour mobility rate	31	32.0
Academic freedom	42	68.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Retention	10	50.0
Educational attainment rate, bachelor's or equivalent	18	77.4
Educational attainment rate, master's or equivalent	81	34.0
Educational attainment rate, doctoral or equivalent	23	43.0
Employment	9	69.7
Labour force participation rate with advanced education	4	92.0
Unemployment rate with advanced education	102	89
Impact	43	47.0
University tertiary enrollment in R&D	26	68.0
OECD students per 1000 personnel in higher education	50	37
<b>Government's contribution and economic role</b>		
Science	10	11.0
Share of GDP expenditure	11	10
GDP (% GDP)	12	44.0
OEFD per researcher	26	37.1
Researchers per thousand labour force	12	67
Tertiary graduates from STEM programmes (%)	42	47.0
<b>Government's contribution and economic role</b>		
OEFD performed by business enterprises (%)	19	34.0
OEFD financed by business enterprises (%)	13	69.8
Researchers in business enterprises (%)	9	75.0
Firms that spend on R&D (%)	116	116
Quality of research environment	22	70.0
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	25	35.0
State of cluster development	102	61.1
<b>Science</b>		
<b>Government's contribution and economic role</b>		
Average documents per researcher	73	50.0
Citations per document	14	28.7
Patent applications (per 100 billion GDP)	13	79.0
<b>Government's contribution and economic role</b>		
Intellectual property receipts (% total trade)	14	52.0
Research design applications (per 100 billion GDP)	4	76.8
PCT applications (per 100 billion GDP)	13	63.7
Firms producing new goods and services (%)	116	116

# FRANCE

	Rank	Value		Rank	Value
<b>Consumer Electronics</b>			<b>Business agility</b>	51	17.7
Treatment applications per 100 billion GDP	33	75.4	Cost of starting a business	34	83.1
Cultural goods exports (% exports)	15	46.1	Recovery recovery rate	25	81.2
Printing and publishing output (% manufactured output)	90	24.5	Entrepreneurial employee activity rate	25	36.0
<b>Energy</b>	35	25.5	Growth of corporate transactions	1	100
<b>Finance</b>	17	100	<b>Employee openness</b>	17	14.3
Access to venture capital	1	100	Trust and dissatisfaction	20	90
Depth of innovative companies	29	59.5	Taxs (% GDP)	97	22.4
ISO 9001 quality certificates (% GDP)	39	30.0	High-technology trade (% total trade)	10	86.4
ISO 14001 environmental certificates (% GDP)	42	15.4	Market concentration	19	82
<b>Industry</b>	10	80	Market concentration	13	85.0
CERD forecast from abroad (%)	52	14.0	Product ownership	10	10.1
Cost savings per strategic alliance deals (% GDP)	30	21.6	Charitable financial openness	1	100
Computer software spending (% GDP)	6	47.0	Foreign direct investment, net inflows (% GDP)	85	37.7
<b>Government</b>	100	0	Gov dynamics	20	86.7
New business density per thousand population	34	34	<b>Financing and domestic value added</b>	32	80.0
Firms with new products/services (%)	106	106	Financing and costs	10	91.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	22	62.0	Domestic credit to private sector (% GDP)	20	40.7
<b>Infrastructure</b>	19	85.0	FDI financing gap (% GDP)	106	106
<b>Connectivity</b>	32	10.1	Tax and contribution rate (% profit)	102	45.4
30MHz mobile network coverage (% population)	42	80.0	Bank nonperforming loans (%)	43	80.0
Secure Internet servers per 1 million population	22	30	Unemployed young women	11	87.7
Investment in telecommunication services (% GDP)	80	27.8	Medium- and high-tech activities value added	16	59.1
<b>Quality</b>	11	83.0	Industry and services value added (% GDP)	45	85.0
Mobile speed and download speeds	25	41.0	Labour underutilization rate	101	88.0
Fixed-broadband upload and download speeds	11	55.0	Output per worker	16	45.0
Fixed-broadband subscriptions (by speed) per hundred people	2	80	<b>ENABLING ENVIRONMENT</b>	19	76.1
<b>Availability</b>	10	16.0	<b>Governance</b>	20	70
Fixed broadband bandwidth (% Gbps per capita)	20	80.0	Political environment	10	83.0
Mobile broadband basket (% Gbps per capita)	27	80.7	Peace and stability	52	50.0
Internet and telephone competition	1	100	View and accountability	20	82.0
<b>Access</b>	81	60.0	Quality of institutions	10	80.4
<b>Subscriptions</b>	10	11.0	Rule of law	21	80
Active mobile-broadband subscriptions per fixed-line inhabitants	40	43.0	Control of corruption	25	84.0
International Internet bandwidth per user	75	30.0	Government effectiveness	20	86.0
Households with Internet access at home (%)	46	84.1	<b>Socio-economic</b>	18	77.0
<b>Skills and employment</b>	10	43.0	Gender equity	16	67
Individuals with standard ICT skills (%)	25	47.4	Female-to-male ratio in parliament	26	85.0
Tertiary graduates from ICT programmes (%)	80	20.0	Female-to-male labour force participation	45	83.0
ICT employment (%)	20	57.0	Female-to-male ratio in internal wage	50	87.1
<b>Usage</b>	17	60.0	Government openness	21	81
<b>Services</b>	10	11.0	Social protection coverage (% population)	1	100
Government online services	18	85.0	Adult literacy rate	106	106
Fixed broadband internet traffic per subscription	106	106	Youth not in employment, education or training (%)	38	81.0
Mobile broadband internet traffic per subscription	25	20	Standard of living	11	80.7
Internet users (%)	44	80.4	Poverty headcount ratio (% population)	25	81.0
<b>Commerce</b>	10	70.1	GDP per capita	23	36
ICT FDI patent applications (per 100 billion GDP)	17	80.0	<b>Health and environment</b>	28	80.7
E-participation	17	80.0	Health	11	80.7
Internet activities by individuals (%)	28	89.0	Universal health coverage	30	70
Trade in digitally deliverable services (% total trade)	27	50.0	Healthy life expectancy (years)	8	83.0
<b>ECONOMY</b>	17	80.0	Under-five mortality rate	32	87.0
<b>Economic Competitiveness</b>	12	71.2	Government performance	10	80.7
Manufacturing innovation	12	60.0	Renewable energy consumption (%)	90	15.0
Overhead capital formation (% GDP)	65	49.0	Household budget per capita	110	87.0
Logistics performance	15	71.1	Natural hazard exposure	45	80
Transport productive capacity	12	80.0			
Building quality control	20	80.7			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# GAMBIA

**GKI RANK** 125/154

**GKI SCORE** 37.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Gambia is a weak performer in terms of its knowledge infrastructure. It ranks 125th out of 154 countries in the Global Knowledge Index 2021 and 6th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Tertiary graduates from STEM programmes (%)
- + Tertiary graduates from ICT programmes (%)
- + Average documents per researcher
- + Ecological footprint per capita
- + Cultural goods exports (% exports)

### AREAS OF IMPROVEMENT

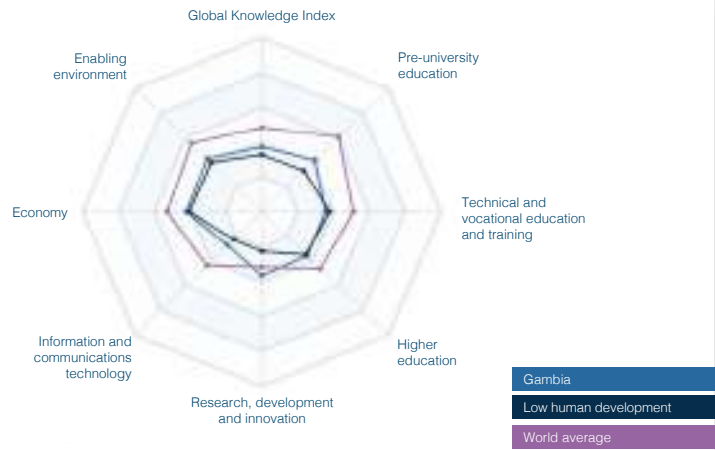
- Proportion of children with stimulating home learning environment
- Government expenditure on vocational education (%)
- GERD performed by business enterprises (% GDP)
- Joint ventures per strategic alliance deals (% GDP)
- Extent of corporate transparency

### KEY INDICATORS

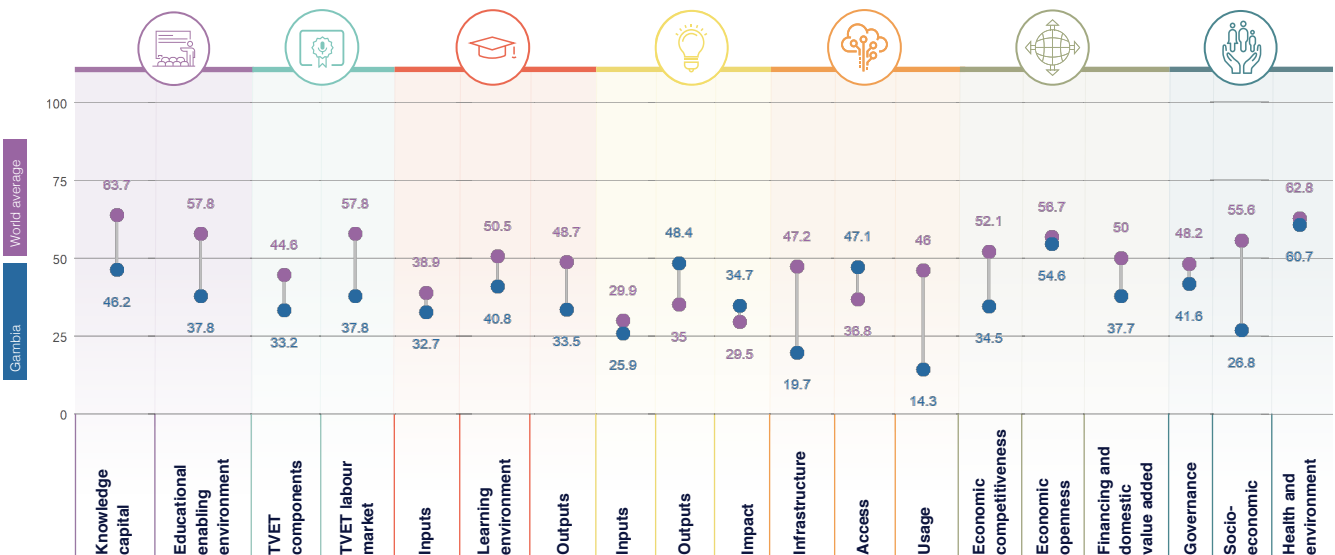
**GDP** US\$ billions ..... **5.219**  
**Population** ..... **2,416,664**  
**HDI** ..... **0.496**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	125	42
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	143	35.5
HIGHER EDUCATION	127	35.7
RESEARCH, DEVELOPMENT AND INNOVATION	43	36.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	119	27
ECONOMY	128	42.2
ENABLING ENVIRONMENT	122	43.1



## GKI PILLARS







# GAMBIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	121	42.3
Enrollment	115	60.0
Net enrolment rate in primary education	115	60.0
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	112	47.5
Years of compulsory education in primary and secondary	67	65.0
Completion rate in upper secondary education	100	25.0
Success rate rate in the last grade of lower secondary education	115	46
Completion	112	29.0
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	119	20.0
<b>Educational enabling environment</b>		
Expenditure	115	17.0
Government expenditure on primary education (% GDP)	89	25.1
Government expenditure on secondary education (% GDP)	121	5.8
Government funding per primary student (% GDP per capita)	105	20
Government funding per secondary student (% GDP per capita)	116	116
Resources	102	23.2
Pupil-based teacher ratio in primary education	74	82.0
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	75	22.0
Schools with access to computers in secondary education (%)	81	45.0
<b>Early learning</b>		
Class attendance rate in early childhood education	116	116
Proportion of children who are developmentally on track	44	47.6
Proportion of children with stimulating home learning environments	69	0
Pupil-based teacher ratio in preprimary education	71	58.7
<b>Quality and inclusiveness</b>		
Completion rate in upper secondary education, gender parity	50	61.0
Completion rate in upper secondary education, wealth parity	70	35.2
Completion rate in upper secondary education, location parity	82	46.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	41	51.0
Firms offering formal training (%)	76	31.1
Labour force with short-cycle tertiary education (%)	24	81.0
Participation rate in formal and non-formal education and training	116	116
<b>TVET resources</b>		
Government expenditure on vocational education (%)	72	8
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and inclusiveness</b>		
Extent of staff training	81	47.7
Quality of vocational training	87	52.4
Ratio of high-skil TVET occupations earnings to average wage	59	25.7
Ratio of medium-skil TVET occupations earnings to average wage	41	45.7
<b>TVET labour market</b>		
Efficiency of the labour market	116	11.0
Firms considered with inappropriately educated workforce (%)	62	85.1
Employment educational mismatch (%)	100	27.7
Proportion of skilled production workers	20	36.4
Unemployment rate with vocational education	90	59.0
Real TVET unemployment	100	59.0
Share of TVET occupations	125	31.4
Manufacturing employment (%)	86	30.2
<b>Quality and inclusiveness</b>		
Enrollment in vocational education, gender parity	116	116
Useable employment rate	126	25.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	111	5.8
Government expenditure per tertiary student	100	5.8
Teaching staff compensation (% tertiary expenditure)	116	116
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
<b>Resources</b>		
Rp/teacher ratio in tertiary education	88	59.5
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
<b>Timely and academic freedom</b>		
Teachers in tertiary education, gender parity	121	6.0
Student mobility rate	116	116
Academic freedom	62	82.0
<b>Quality and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	38	80.0
Class attendance rate in tertiary education, wealth parity	67	16.0
Class attendance rate in tertiary education, location parity	41	9.6
<b>Outputs</b>		
<b>Attainment</b>		
Educational attainment rate, bachelor's or equivalent	100	3.1
Educational attainment rate, master's or equivalent	65	2.3
Educational attainment rate, doctoral or equivalent	116	116
<b>Employment</b>		
Labour force participation rate with advanced education	67	73.1
Unemployment rate with advanced education	72	82.0
<b>Impact</b>		
University tertiary enrollment in R&D	101	21.0
CRIDE indicators per 100 personnel in higher education	116	116
<b>TECHNOLOGY INNOVATION AND SERVICES</b>		
<b>Inputs</b>		
Government R&D expenditure	11	10.0
GDP (% GDP)	112	1.2
GERD per researcher	100	3.1
Researchers per thousand labour force	92	0.9
Tertiary graduates from STEM programmes (%)	1	100
<b>Quality and inclusiveness</b>		
GERD performed by business enterprises (%)	67	0
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	68	20.0
<b>Quality and inclusiveness</b>		
High-skilled employment (%)	42	30.2
Intellectual property payments (% total trade)	116	116
State of digital development	52	49.1
<b>Outputs</b>		
<b>Quality and inclusiveness</b>		
Average documents per researcher	13	75.0
Citations per document	86	20.1
Patent applications (per 100 billion GDP)	116	116
<b>Quality and inclusiveness</b>		
Intellectual property receipts (% total trade)	116	116
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	34	67.0



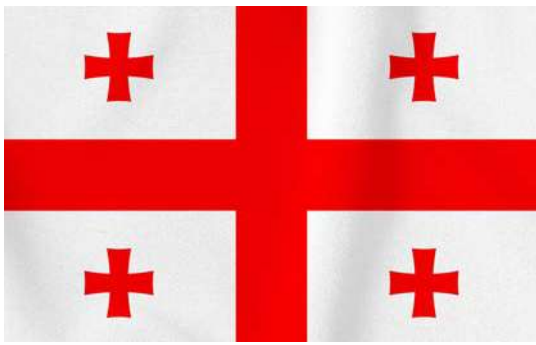


# GAMBIA

	Rank	Value
<b>Business environment</b>	95	57.7
Treatment applications (per 100 million GDP)	196	196
Cultural goods exports (% exports)	25	37.3
Printing and publishing output (% manufactured output)	196	196
<b>Energy</b>	85	55.7
<b>Finance</b>	95	57.7
Access to venture capital	81	63
Depth of innovative companies	37	55.3
ISO 9001 quality certificates (% GDP)	147	0.5
ISO 14001 environmental certificates (% GDP)	196	196
<b>Infrastructure</b>	75	61.1
CERD received from abroad (%)	24	50.3
Cost savings per storage volume deals (% GDP)	102	8
Computer software spending (% GDP)	196	196
<b>Government services</b>	75	61.1
New business density per thousand population	196	196
Firms with web presence (%)	87	87.4
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	111	37
<b>Infrastructure</b>	101	33.7
<b>Coverage</b>	144	33
3G/LTE mobile network coverage (% population)	142	40.8
Secure Internet servers per 1 million population	132	0.8
Investment in telecommunication services (% GDP)	108	21.6
<b>Quality</b>	119	31
Mobile upload and download speeds	196	196
Fixed broadband upload and download speeds	196	196
Fixed broadband subscriptions (y speed) per hundred people	107	0.1
<b>Availability</b>	145	30
Fixed broadband latency (% QM per capita)	196	196
Mobile broadband basket (% QM per capita)	108	30
Internet and telephone competition	131	30
<b>Access</b>	84	47.5
<b>Subscriptions</b>	97	31.1
Active mobile-broadband subscriptions per fixed-line inhabitants	109	17.5
International Internet bandwidth per user	186	30.0
Households with Internet access at home (%)	63	63.3
<b>Skills and employment</b>	95	57.7
Individuals with standard ICT skills (%)	196	196
Tertiary graduates from ICT programmes (%)	1	100
ICT employment (%)	70	100
<b>Usage</b>	184	14.3
<b>Services</b>	100	25.5
Government online services	152	2.8
Fixed broadband Internet traffic per subscription	196	196
Mobile broadband Internet traffic per subscription	196	196
Internet users (%)	100	45.3
<b>Commerce</b>	100	0
ICT FDI parent applications (per 100 million GDP)	196	196
E-participation	102	3.8
Internet activities by individuals (%)	196	196
Trade in digitally deliverable services (% total trade)	102	2.8
<b>ECONOMY</b>	109	42.2
<b>Economic complexity indexes</b>	142	34.3
<b>Manufacturing</b>	111	31.1
Overhead capital formation (% GDP)	73	40.9
Logistics performance	123	35
Transport productive capacity	128	15.5
Building quality control	160	23.3

	Rank	Value
<b>Business agility</b>	100	32.3
Cost of starting a business	103	84.6
Recovery time	100	30.3
Entrepreneurial employee activity rate	196	196
Growth of corporate transactions	118	8
<b>Customer experience</b>	71	54.8
<b>Trade and investment</b>	101	33.3
Trade (% GDP)	104	21.3
High-technology trade (% total trade)	102	21.0
Market concentration	75	34.7
Market concentration	108	35.0
<b>Product innovation</b>	97	30.5
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	118	34.5
Cost dynamics	110	40
<b>Financing and domestic value added</b>	108	37.7
<b>Financing and costs</b>	97	30
Domestic credit to private sector (% GDP)	140	1.4
MSME financing gap (% GDP)	30	76.5
Tax and contribution rate (% profit)	118	88.0
Bank nonperforming loans (%)	72	81.3
<b>Unmet needs index</b>	144	33.0
Medium- and high-tech activities value added	104	4.4
Industry and services value added (% GDP)	100	44.5
Labour underutilization rate	127	30.2
Output per worker	100	2.8
<b>ENABLING ENVIRONMENT</b>	105	41.1
<b>Governance</b>	83	41.8
<b>Political environment</b>	88	40.0
Peace and stability	85	88.2
View and accountability	80	38.0
Quality of institutions	89	36.4
Rule of law	81	39.4
Control of corruption	84	43.3
Government effectiveness	117	34.4
<b>Socio-economic</b>	121	26.8
<b>Gender equity</b>	126	41.3
Female-to-male ratio in parliament	143	0.4
Female-to-male labour force participation	86	73.1
Female-to-male ratio in internal wage	196	196
<b>Gender equality</b>	107	22.0
Social protection coverage (% population)	105	3.4
Adult literacy rate	110	34.0
Youth not in employment, education or training (%)	143	27.0
<b>Standard of living</b>	102	18.0
Poverty headcount ratio (% population)	110	31.5
GDP per capita	140	1.3
<b>Health and environment</b>	101	60.7
<b>Health</b>	107	47.0
Universal health coverage	102	44
Healthy life expectancy (years)	107	42.0
Under-five mortality rate	128	80.8
<b>Environmental performance</b>	81	25.0
Renewable energy consumption (%)	37	54.3
Household footprint per capita	79	87.8
Natural hazard exposure	37	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# GEORGIA

**GKI RANK** 60/154

**GKI SCORE** 51.3

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Georgia is a strong performer in terms of its knowledge infrastructure. It ranks 60th out of 154 countries in the Global Knowledge Index 2021 and 56th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Educational attainment rate, master's or equivalent
- + Tax and contribution rate (% profit)
- + Ease of starting a business
- + Gross intake ratio to the last grade of lower secondary education
- + Pupil-teacher ratio in tertiary education

### AREAS OF IMPROVEMENT

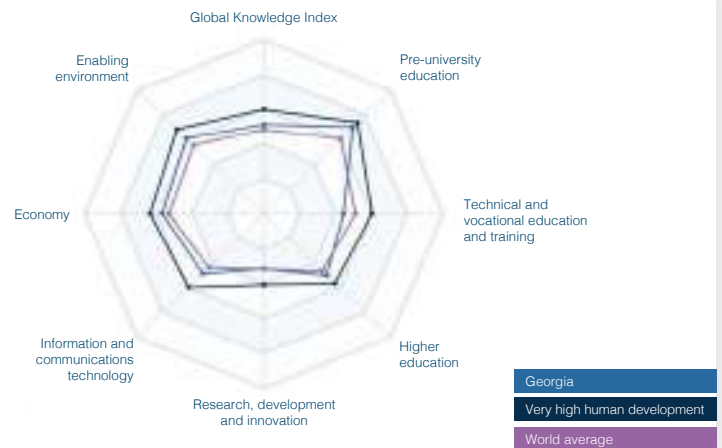
- Entrepreneurial employee activity rate
- Government expenditure on primary education (% of GDP)
- Firms constrained with inadequately educated workforce (%)
- Quality of vocational training
- GERD per researcher

### KEY INDICATORS

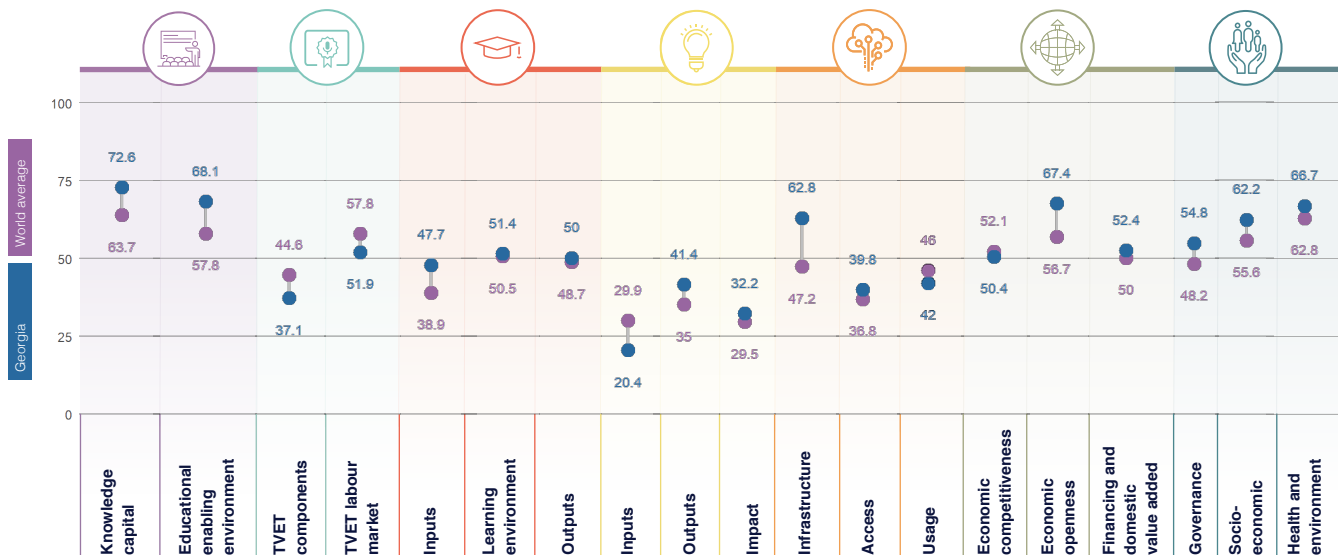
**GDP** US\$ billions ..... **52.328**  
**Population** ..... **3,989,175**  
**HDI** ..... **0.812**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	62	70.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	109	44.5
HIGHER EDUCATION	51	49.7
RESEARCH, DEVELOPMENT AND INNOVATION	67	31.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	65	48.2
ECONOMY	57	56.7
ENABLING ENVIRONMENT	48	61.2



## GKI PILLARS





# GEORGIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	82	70.4
Enrolment	87	72.8
Net enrolment rate in primary education	39	90.1
Net enrolment rate in lower secondary education	52	85.8
Net enrolment rate in upper secondary education	29	94.3
Completion	35	91.5
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	30	90.4
Success rate rate in the last grade of lower secondary education	3	95.9
Completion	30	91.0
Assessment of 15-year-old students in math, science and reading	69	21.9
Learning-adjusted years of schooling	76	57.2
<b>Educational enabling environment</b>	<b>84</b>	<b>88.5</b>
Expenditure	120	14.0
Government expenditure on primary education (% GDP)	123	16.1
Government expenditure on secondary education (% GDP)	123	6.7
Government funding per primary student (% GDP per capita)	104	20
Government funding per secondary student (% GDP per capita)	108	108
Resources	1	100
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	52	82.1
Class attendance rate in early childhood education	106	106
Proportion of children who are developmentally on track	6	86.0
Proportion of children with stimulating home learning environments	25	71.4
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	88	75.0
Completion rate in upper secondary education, gender parity	52	82.1
Completion rate in upper secondary education, wealth parity	51	87.0
Completion rate in upper secondary education, location parity	53	85.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>114</b>	<b>87.0</b>
Companies training apprentices	100	80.0
Firms offering formal training (%)	58	38.8
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	70	3
TVET enrolment	81	37
Government expenditure on vocational education (%)	106	106
Share of students enrolled in secondary vocational programmes	100	5.8
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	104	30
Extent of staff training	100	41.1
Quality of vocational training	150	34.0
Ratio of high-skill TVET occupations earnings to average wage	106	106
Ratio of median-skill TVET occupations earnings to average wage	106	106
<b>TVET labour market</b>	<b>109</b>	<b>81.9</b>
Efficiency of the labour market	117	10.7
Firms considered well-integrated with workforce (%)	129	19.0
Employment educational mismatch (%)	91	82.0
Proportion of skilled production workers	88	82.1
Unemployment rate with vocational education	100	46.0
Real TVET unemployment	119	11.1
Share of TVET occupations	100	39.0
Manufacturing employment (%)	100	26.4
Quality and infrastructure	54	64.0
Enrolment in vocational education, gender parity	25	80.2
Useable employment rate	100	40.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>41</b>	<b>47.7</b>
Expenditure	116	6.4
Government expenditure per tertiary student	100	5.4
Teaching staff compensation (% tertiary expenditure)	106	106
Enrolment	27	43.0
Enrolment in bachelor's or equivalent level (%)	28	37.0
Enrolment in masters, doctoral or equivalent (%)	31	50.0
Resources	9	93.0
Pupil-teacher ratio in tertiary education	9	87.9
Research in higher education (%)	30	80.4
<b>Learning environment</b>	<b>71</b>	<b>51.4</b>
Timely and academic freedom	47	80.0
Teachers in tertiary education, gender parity	60	88.1
Labour mobility rate	30	30.7
Academic freedom	41	82.0
Quality and infrastructure	102	43.0
Class attendance rate in tertiary education, gender parity	41	78.0
Class attendance rate in tertiary education, wealth parity	48	12.1
Class attendance rate in tertiary education, location parity	38	10.0
<b>Outputs</b>	<b>54</b>	<b>89</b>
Efficiency	9	38.0
Educational attainment rate, bachelor's or equivalent	31	85.1
Educational attainment rate, master's or equivalent	1	100
Educational attainment rate, doctoral or equivalent	55	24.0
Employment	111	10.7
Labour force participation rate with advanced education	98	81.7
Unemployment rate with advanced education	115	65.0
Impact	100	20.8
University tertiary enrolment in R&D	111	32
OECD indicators per 100 persons in higher education	54	0.7
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>114</b>	<b>10.4</b>
Access to credit resources	100	0
GDP (% GDP)	81	5.0
GERD per researcher	100	2.8
Researchers per thousand labour force	47	17.1
Tertiary graduates from STEM programmes (%)	85	34.0
Quality and infrastructure	108	11.1
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	81	2.1
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	67	20.0
Quality and infrastructure	90	10.0
High-skill employment (%)	9	60
Intellectual property payments (% total trade)	55	18.4
State of cluster development	120	34.0
<b>Outputs</b>	<b>37</b>	<b>60.8</b>
Access to credit resources	100	100.0
Average documents per researcher	80	40.1
Citations per document	12	81.1
Patent applications (per 100 billion GDP)	40	66.7
Quality and infrastructure	100	10.0
Intellectual property receipts (% total trade)	14	4.5
Research design applications (per 100 billion GDP)	39	14.8
PCT applications (per 100 billion GDP)	70	49.5
Firms producing new goods and services (%)	42	36





# GEORGIA

	Rank	Value
<b>Consumer Innovation Indicators</b>		
Treatment applications per 100 million GDP	49	34.0
Cultural goods exports (% exports)	104	1.1
Printing and publishing output (% manufactured output)	30	35.0
<b>Health</b>	<b>86</b>	<b>55.3</b>
<b>Energy</b>	<b>75</b>	<b>77.7</b>
Risks of institutions' persistence	73	11.1
Depth of innovative companies	106	4.3
ISO 9001 quality certificates (% GDP)	72	15.1
ISO 14001 environmental certificates (% GDP)	107	2.4
<b>Industry</b>	<b>57</b>	<b>76</b>
CERD forecast from abroad (%)	42	19.6
Joint ventures per strategic industry deals (% GDP)	33	31
Computer software spending (% GDP)	60	7.3
<b>Government Indicators</b>	<b>55</b>	<b>65.4</b>
New business density per thousand population	9	51.5
Firms with new products/services (%)	85	23.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>64</b>	<b>66.2</b>
<b>Infrastructure</b>	<b>44</b>	<b>60.8</b>
<b>Coverage</b>	<b>22</b>	<b>54.5</b>
3G/4G mobile network coverage (% population)	27	60.0
Secure Internet servers per 1 million population	30	11.1
Investment in telecommunication services (% GDP)	23	62.3
<b>Speed</b>	<b>11</b>	<b>60.0</b>
Mobile spread and download speeds	114	114
Fixed broadband upload and download speeds	114	114
Fixed broadband subscriptions (y-speed) per hundred people	63	69.0
<b>Availability</b>	<b>41</b>	<b>56.3</b>
Fixed broadband latency (% QM per capita)	74	75.1
Mobile broadband basket (% QM per capita)	33	75.1
Internet and telephone competition	1	100
<b>Access</b>	<b>66</b>	<b>36.8</b>
<b>Subscribers</b>	<b>61</b>	<b>57.1</b>
Active mobile-broadband subscriptions per fixed-line inhabitants	74	35.0
International Internet bandwidth per user	27	61.0
Households with Internet access at home (%)	40	61
<b>Skills and employment</b>	<b>57</b>	<b>23.5</b>
Individuals with standard ICT skills (%)	63	15.7
Tertiary graduates from ICT programmes (%)	61	33.2
ICT employment (%)	62	16.0
<b>Usage</b>	<b>69</b>	<b>42</b>
<b>Services</b>	<b>67</b>	<b>46</b>
Government online services	69	55.0
Fixed broadband Internet traffic per subscription	26	35
Mobile broadband Internet traffic per subscription	62	73
Internet users (%)	72	71
<b>Commerce</b>	<b>50</b>	<b>61.1</b>
ICT FDI patent applications (per 100 million GDP)	47	49.0
E-participation	79	64.3
Internet activities by individuals (%)	58	24.4
Trade in digitally deliverable services (% total trade)	127	37
<b>ECONOMY</b>	<b>67</b>	<b>56.7</b>
<b>Economic Competitiveness</b>	<b>62</b>	<b>56.4</b>
<b>Infrastructure Investment</b>	<b>111</b>	<b>61.3</b>
Overhead capital formation (% GDP)	49	63.0
Logistics performance	119	36.1
Transport productive capacity	100	20.0
Building quality control	115	60

	Rank	Value
<b>Business Agility</b>	<b>65</b>	<b>36</b>
Ease of starting a business	3	93.6
Recovery recovery time	64	44
Entrepreneurial employee activity rate	84	2.7
Growth of corporate transactions	13	65.7
<b>Corporate openness</b>	<b>41</b>	<b>57.4</b>
<b>Trust and development</b>	<b>51</b>	<b>60.0</b>
Trade (% GDP)	43	35.7
High-technology trade (% total trade)	100	38.0
Market concentration	61	34.1
Market concentration	59	62.0
Product diversity	51	11.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	12	72
Cost dynamics	69	49.7
<b>Financing and domestic value added</b>	<b>61</b>	<b>52.4</b>
<b>Financing and costs</b>	<b>10</b>	<b>70.0</b>
Domestic credit to private sector (% GDP)	65	25.3
MSME financing gap (% GDP)	62	66.0
Tax and contribution rate (% profit)	3	88.1
Bank nonperforming loans (%)	38	81.0
Unmet loan demand	102	34.0
Medium- and high-tech activities value added	86	14.6
Industry and services value added (% GDP)	69	57.0
Labour underutilization rate	100	54
Output per worker	84	12.0
<b>ENABLING ENVIRONMENT</b>	<b>64</b>	<b>61.3</b>
<b>Governance</b>	<b>57</b>	<b>54.8</b>
Political environment	66	41.2
Peace and stability	69	30.7
View and accountability	72	48.6
Quality of institutions	45	63.4
Rule of law	66	61.1
Control of corruption	40	71.0
Government effectiveness	38	75.0
<b>Socio-economic</b>	<b>55</b>	<b>62.2</b>
Gender equity	76	35
Female-to-male ratio in parliament	104	24
Female-to-male labour force participation	66	73.1
Female-to-male ratio in internal wage	51	85
Gender inequality	41	61.0
Social protection coverage (% population)	17	67
Adult literacy rate	14	66.4
Youth not in employment, education or training (%)	110	44.0
Standard of living	11	61.0
Poverty headcount ratio (% population)	60	20.0
GDP per capita	71	12.0
<b>Health and environment</b>	<b>48</b>	<b>66.7</b>
<b>Health</b>	<b>60</b>	<b>36</b>
Universal health coverage	50	65
Healthy life expectancy (years)	62	68.0
Under-five mortality rate	60	63.4
Environmental performance	58	67.4
Renewable energy consumption (%)	65	20
Household footprint per capita	64	67.1
Natural hazard exposure	61	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# GERMANY

**GKI RANK** 13/154

**GKI SCORE** 66.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Germany is a leading performer in terms of its knowledge infrastructure. It ranks 13th out of 154 countries in the Global Knowledge Index 2021 and 13th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Logistics performance
- + Years of compulsory education in primary and secondary
- + State of cluster development
- + Share of TVET occupations
- + Market concentration

### AREAS OF IMPROVEMENT

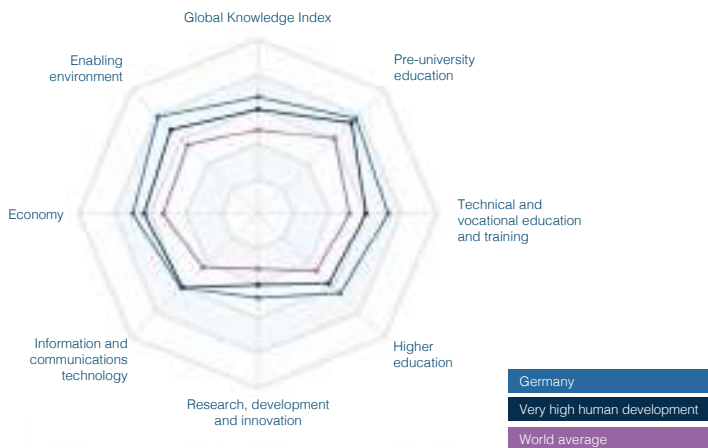
- Share of students enrolled in post-secondary vocational programmes
- Ecological footprint per capita
- Tax and contribution rate (% profit)
- Investment in telecommunication services (% GDP)
- Researchers in higher education (%)

### KEY INDICATORS

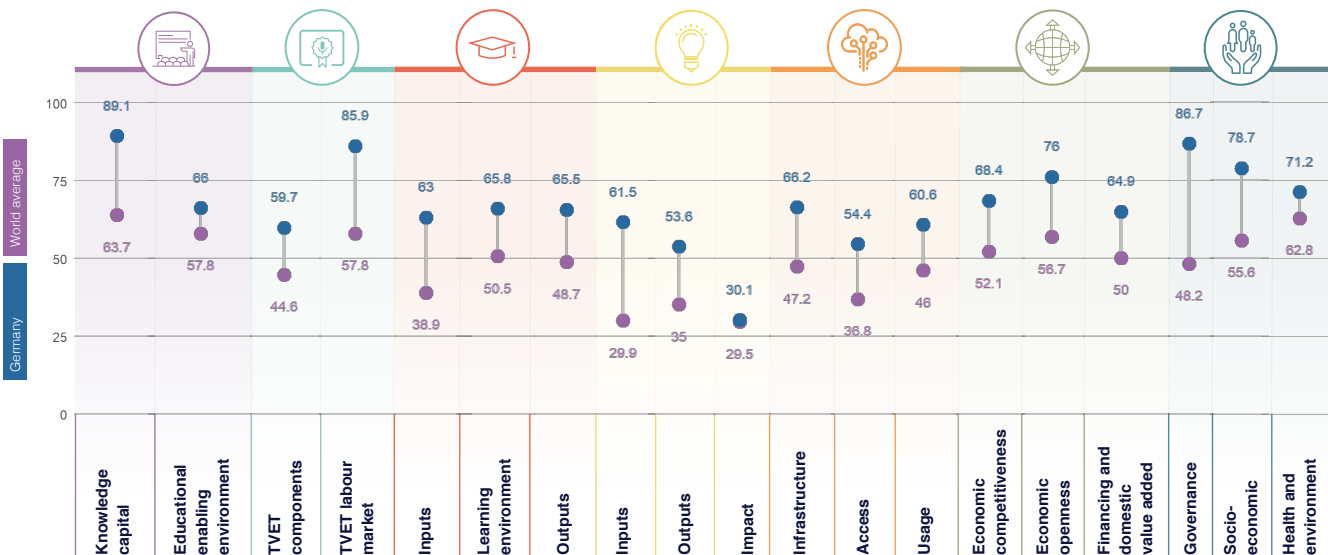
**GDP US\$ billions** 4,266.846  
**Population** 83,783,945  
**HDI** 0.947

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	29	77.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	2	72.8
HIGHER EDUCATION	14	64.8
RESEARCH, DEVELOPMENT AND INNOVATION	14	48.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	28	60.4
ECONOMY	12	69.8
ENABLING ENVIRONMENT	13	78.9



## GKI PILLARS





# GERMANY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	1	86.1
Enrollment	33	81.2
Net enrolment rate in primary education	49	97
Net enrolment rate in lower secondary education	82	94
Net enrolment rate in upper secondary education	27	84.6
Completion	5	80.5
Years of compulsory education in primary and secondary	1	109
Completion rate in upper secondary education	25	83.1
Success rate rate in the last grade of lower secondary education	104	104
Completion	25	75.0
Assessment of TIMSS/PIAAC students in math, science and reading	16	87.9
Learning-adjusted years of schooling	25	85.2
<b>Educational enabling environment</b>	<b>88</b>	<b>88</b>
Expenditure	43	31.5
Government expenditure on primary education (% GDP)	57	36.6
Government expenditure on secondary education (% GDP)	30	36.4
Government funding per primary student (% GDP per capita)	49	33
Government funding per secondary student (% GDP per capita)	34	33.3
Resources	104	104
Pupil-based teacher ratio in primary education	104	104
Pupil-based teacher ratio in secondary education	104	104
Schools with access to computers in primary education (%)	104	104
Schools with access to computers in secondary education (%)	104	104
Early learning	83	83.8
Class attendance rate in early childhood education	92	85.6
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	14	81
Completion rate in upper secondary education, gender parity	26	86.0
Completion rate in upper secondary education, wealth parity	25	82.6
Completion rate in upper secondary education, location parity	1	103
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>14</b>	<b>86.2</b>
Communications training and learning	18	81.0
Firms offering formal training (%)	104	104
Labour force with short-cycle tertiary education (%)	55	71.5
Participation rate in formal and non-formal education and training	15	70.4
TVET resources	22	68.1
Government expenditure on vocational education (%)	16	60.9
Share of students enrolled in secondary vocational programmes	43	31
Share of students enrolling in postsecondary vocational programmes	70	82.9
TVET quality and infrastructure	44	81
Extent of staff training	20	83.3
Quality of vocational training	7	71.7
Ratio of high-skill TVET occupations earnings to average wage	73	21.4
Ratio of median-skill TVET occupations earnings to average wage	59	41.0
<b>TVET labour market</b>	<b>1</b>	<b>86.9</b>
Efficiency of the labour market	3	81.0
Firms considered with inappropriately educated workforce (%)	104	104
Employment educational mismatch (%)	104	104
Proportion of skilled production workers	104	104
Unemployment rate with vocational education	8	81.0
Real TVET unemployment	9	75.6
Share of TVET occupations	4	66.7
Manufacturing employment (%)	8	70.4
Quality and infrastructure	14	81.0
Enrollment in vocational education, gender parity	64	76.1
Useable employment rate	11	84.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>6</b>	<b>83</b>
Expenditure	6	83.0
Government expenditure per tertiary student	12	86.3
Teaching staff compensation (% tertiary expenditure)	104	104
Enrollment	6	83.0
Enrollment in bachelor's or equivalent level (%)	32	74.1
Enrollment in masters, doctoral or equivalent (%)	5	80.0
Resources	91	89.4
Pupil-teacher ratio in tertiary education	7	81
Research in higher education (%)	66	25.8
<b>Learning environment</b>	<b>23</b>	<b>82.8</b>
<b>Quality and academic freedom</b>	<b>31</b>	<b>83.8</b>
Teachers in tertiary education, gender parity	64	63.0
Labour mobility rate	27	36.0
Academic freedom	3	80.0
Quality and infrastructure	104	104
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>	<b>28</b>	<b>85.9</b>
<b>Attainment</b>	<b>14</b>	<b>83.0</b>
Educational attainment rate, bachelor's or equivalent	27	85.2
Educational attainment rate, master's or equivalent	23	42.6
Educational attainment rate, doctoral or equivalent	6	60
Employment	16	81.0
Labour force participation rate with advanced education	75	73.8
Unemployment rate with advanced education	15	84.8
Impact	22	86
University tertiary enrollment in R&D	6	76.7
OECD students per 1000 personnel in higher education	39	45.3
<b>Entrepreneurship, innovation and services trade</b>		
<b>Inputs</b>	<b>7</b>	<b>81.3</b>
Access to credit resources	3	80.0
GDP (% GDP)	7	63.0
GERD per researcher	12	86
Researchers per thousand labour force	15	84
Tertiary graduates from STEM programmes (%)	6	87.9
<b>Quality and infrastructure</b>	<b>9</b>	<b>80.0</b>
GERD performed by business enterprises (%)	6	86.5
GERD financed by business enterprises (%)	7	81.8
Researchers in business enterprises (%)	14	73.0
Firms that spend on R&D (%)	104	104
<b>Quality and infrastructure</b>	<b>17</b>	<b>80.0</b>
High-skilled employment (%)	104	104
Intellectual property payments (% total trade)	42	25.4
State of cluster development	3	73.5
<b>Outputs</b>	<b>11</b>	<b>80.8</b>
<b>Access to credit resources</b>	<b>11</b>	<b>81.3</b>
Average documents per researcher	72	52.2
Citations per document	67	26.0
Patent applications (per 100 billion GDP)	4	82.2
<b>Quality and infrastructure</b>	<b>9</b>	<b>80.0</b>
Intellectual property receipts (% total trade)	13	58.2
Research design applications (per 100 billion GDP)	7	78.5
PCT applications (per 100 billion GDP)	10	80.7
Firms producing new goods and services (%)	104	104



# GERMANY

	Rank	Value
<b>Consumer Electronics</b>	25	51.1
Treatment applications per 100 million GDP	20	50.5
Cultural goods exports (% exports)	85	25.1
Printing and publishing output (% manufactured output)	70	10.7
<b>Energy</b>	15	25.5
<b>Finance</b>	10	10.1
Access to venture's provisions	1	100
Depth of innovative companies	6	65.2
ISO 9001 quality certificates (% GDP)	27	46.5
ISO 14001 environmental certificates (% GDP)	42	19.0
<b>Language</b>	10	10.1
CERD freedom from abuse (%)	62	11
Cost savings per strategic alliance deals (% GDP)	39	22
Computer software spending (% GDP)	65	42.5
<b>Science and Innovation</b>	10	10
New business density per thousand population	80	5.8
Firms with new products/services (%)	146	146
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>22</b>	<b>66.4</b>
<b>Infrastructure</b>	21	66.2
<b>Coverage</b>	10	10.5
3G/LTE mobile network coverage (% population)	74	81.1
Secure Internet servers per 1 million population	6	59.2
Investment in telecommunication services (% GDP)	119	17.5
<b>Quality</b>	21	66.0
Mobile speed and download speeds	23	14.7
Fixed-broadband upload and download speeds	27	26.0
Fixed-broadband subscriptions (y-speed) per hundred people	8	80
<b>Availability</b>	11	10.7
Fixed broadband latency (% QM per capita)	29	68.8
Mobile broadband basket (% QM per capita)	22	80.7
Internet and telephone competition	1	100
<b>Access</b>	24	56.6
<b>Subscribers</b>	41	31
Active mobile-broadband subscriptions per fixed-line inhabitants	55	39.7
International Internet bandwidth per user	77	30
Households with Internet access at home (%)	23	82.9
<b>Skills and employment</b>	22	11.8
Individuals with standard ICT skills (%)	16	64.2
Tertiary graduates from ICT programmes (%)	62	32.0
ICT employment (%)	40	50.4
<b>Usage</b>	21	60.8
<b>Services</b>	22	10.1
Government online services	65	73.0
Fixed broadband internet traffic per subscriber	42	25.0
Mobile broadband internet traffic per subscriber	87	12.1
Internet users (%)	20	60.0
<b>Commerce</b>	21	11.1
ICT/FIT patent applications (per 100,000 GDP)	13	74.1
E-participation	60	70
Internet activities by individuals (%)	24	71
Trade in digitally deliverable services (% total trade)	92	54.4
<b>ECONOMY</b>	<b>13</b>	<b>60.3</b>
<b>Economic Competitiveness</b>	15	55.4
<b>Efficiency</b>	22	61
Overhead capital formation (% GDP)	72	41.0
Logistics performance	1	80
Transport productive capacity	14	48.0
Building quality control	112	82.0

	Rank	Value
<b>Business Agility</b>	11	10.1
Cost of starting a business	100	83.7
Recovery recovery rate	19	85.0
Entrepreneurial employee activity rate	15	60.0
Growth of corporate transactions	13	65.7
<b>Customer experience</b>	12	70
<b>Trust and innovation</b>	20	71.2
Trade (% GDP)	69	33.4
High-technology trade (% total trade)	21	82.0
Market concentration	17	81.3
Market concentration	3	96.0
Product diversity	11	60.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	84	42.5
Cost dynamics	1	100
<b>Financing and domestic value added</b>	<b>18</b>	<b>64.0</b>
<b>Financing and costs</b>	21	62.0
Domestic credit to private sector (% GDP)	37	32.5
MSME financing gap (% GDP)	146	146
Tax and contribution rate (% profit)	102	88.0
Bank nonperforming loans (%)	13	60.0
Unmet loan demand	9	87.0
Medium- and high-tech activities value added	6	71.2
Industry and services value added (% GDP)	24	80.0
Labour underutilization rate	20	85.1
Output per worker	16	42.0
<b>ENABLING ENVIRONMENT</b>	<b>13</b>	<b>76.8</b>
<b>Governance</b>	14	60.7
<b>Political environment</b>	19	81.5
Peace and stability	34	80.0
View and accountability	12	84.0
Quality of institutions	11	81.0
Rule of law	18	81.0
Control of corruption	10	85.2
Government effectiveness	18	88.0
<b>Socio-economic</b>	<b>18</b>	<b>70.7</b>
Gender equity	20	76.5
Female-to-male ratio in parliament	40	83.7
Female-to-male labour force participation	52	81.4
Female-to-male ratio in internal wage	75	84.5
Gender inequality	9	10.7
Social protection coverage (% population)	12	80.0
Adult literacy rate	146	146
Youth not in employment, education or training (%)	10	83.0
Standard of living	11	82.0
Poverty headcount ratio (% population)	20	79.7
GDP per capita	18	46.1
<b>Health and environment</b>	<b>18</b>	<b>71.2</b>
<b>Health</b>	18	80.0
Universal health coverage	12	85
Healthy life expectancy (years)	24	83.0
Under-five mortality rate	27	60.4
Environmental performance	61	52.0
Renewable energy consumption (%)	60	16.4
Household footprint per capita	119	88.8
Natural hazard exposure	27	74

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# GHANA

**GKI RANK** 107/154

**GKI SCORE** 41.3

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Ghana is a modest performer in terms of its knowledge infrastructure. It ranks 107th out of 154 countries in the Global Knowledge Index 2021 and 9th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Ratio of medium-skill TVET occupations earnings to average wage
- + Employment educational mismatch (%)
- + Trade in digitally deliverable services (% total trade)
- + Foreign direct investment, net inflows (% GDP)
- + Completion rate in upper secondary education, gender parity

### AREAS OF IMPROVEMENT

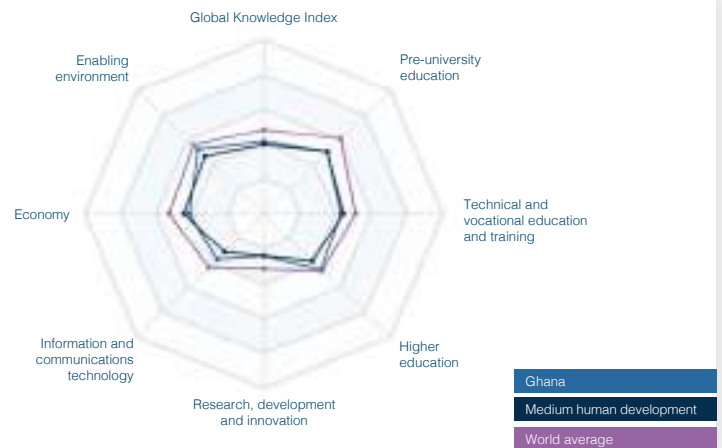
- Debt dynamics
- Trademark applications (per 100 billion GDP)
- Government funding per primary student (% of GDP per capita)
- Computer software spending (% GDP)
- Chinn-Ito financial openness

### KEY INDICATORS

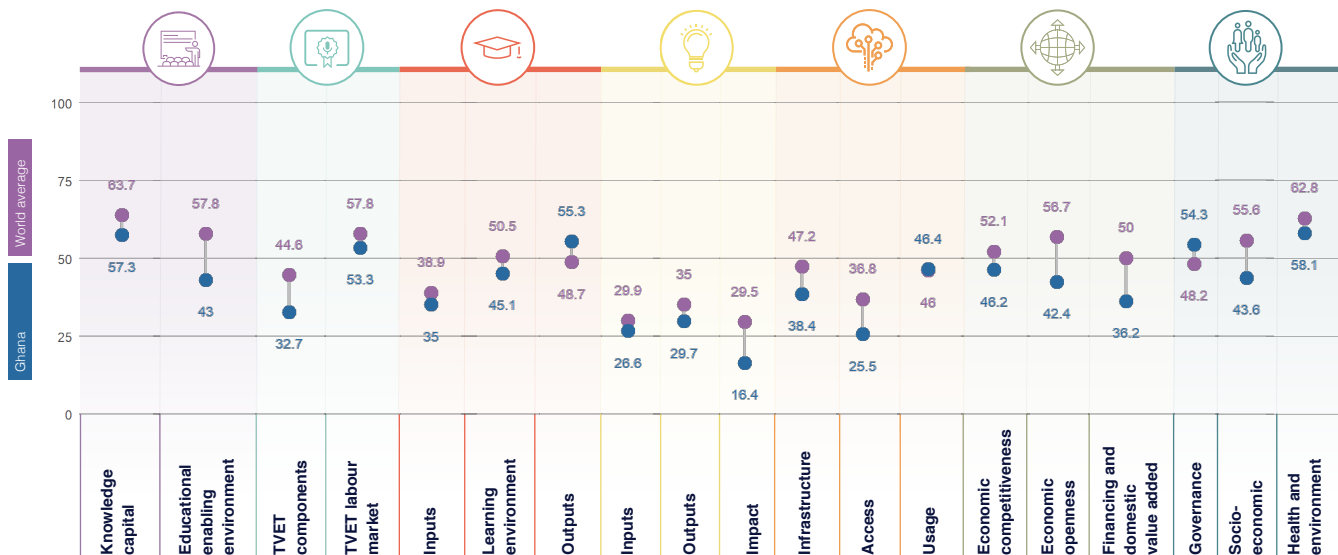
**GDP** US\$ billions ..... **165.27**  
**Population** ..... **31,072,945**  
**HDI** ..... **0.611**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	114	50.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	118	43
HIGHER EDUCATION	79	45.1
RESEARCH, DEVELOPMENT AND INNOVATION	113	24.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	95	36.8
ECONOMY	131	41.6
ENABLING ENVIRONMENT	86	52



## GKI PILLARS







# GHANA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	163	87.3
Enrollment	89	89.0
Net enrolment rate in primary education	97	81.0
Net enrolment rate in lower secondary education	77	89.4
Net enrolment rate in upper secondary education	85	71.3
Completion	106	10.7
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	97	35.7
Success rate rate in the last grade of lower secondary education	88	82.1
Completion	100	35.4
Assessment of 15-year-old students in math, science and reading	106	106
Learning-adjusted years of schooling	119	25.4
<b>Educational enabling environment</b>	<b>128</b>	<b>33</b>
Expenditure	71	30.0
Government expenditure on primary education (% GDP)	68	36
Government expenditure on secondary education (% GDP)	21	43.4
Government funding per primary student (% GDP per capita)	119	14.1
Government funding per secondary student (% GDP per capita)	61	17.3
Resources	108	63.8
Pupil-based teacher ratio in primary education	65	87.0
Pupil-based teacher ratio in secondary education	39	71.8
Schools with access to computers in primary education (%)	85	3.5
Schools with access to computers in secondary education (%)	50	14.0
Early learning	100	47.0
Class attendance rate in early childhood education	67	46.6
Proportion of children who are developmentally on track	40	30
Proportion of children with stimulating home learning environments	69	29.7
Pupil-based teacher ratio in preprimary education	65	84.0
Quality and infrastructure	88	53.0
Completion rate in upper secondary education, gender parity	16	87.0
Completion rate in upper secondary education, wealth parity	85	15.0
Completion rate in upper secondary education, location parity	86	46.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>139</b>	<b>107.7</b>
Companies training apprentices	10	31.1
Firms offering formal training (%)	37	49.6
Labour force with short-cycle tertiary education (%)	70	62.0
Participation rate in formal and non-formal education and training	77	2.3
TVET resources	100	6.1
Government expenditure on vocational education (%)	69	14.0
Share of students enrolled in secondary vocational programmes	111	4.8
Share of students enrolled in postsecondary vocational programmes	106	106
TVET quality and infrastructure	61	30.4
Extent of staff training	89	84.9
Quality of vocational training	77	50.1
Ratio of high-skil TVET occupations earnings to average wage	69	29.0
Ratio of medium-skill TVET occupations earnings to average wage	7	67.4
<b>TVET labour market</b>	<b>101</b>	<b>80.0</b>
Efficiency of the labour market	31	16.1
Firms considered with inappropriately educated workforce (%)	47	72.0
Employment educational mismatch (%)	13	87.0
Proportion of skilled production workers	76	64.7
Unemployment rate with vocational education	52	81.2
Real TVET unemployment	61	6.1
Share of TVET occupations	31	40.0
Manufacturing employment (%)	29	89.0
Quality and infrastructure	100	31.7
Enrollment in vocational education, gender parity	119	36.0
Useable employment rate	126	20.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>83</b>	<b>33</b>
Expenditure	89	33.0
Government expenditure per tertiary student	60	6.6
Teaching staff compensation (% tertiary expenditure)	18	87
Enrollment	100	6.4
Enrollment in bachelor's or equivalent level (%)	109	7.8
Enrollment in masters, doctoral or equivalent (%)	100	6.9
Resources	97	63.0
Pupil-teacher ratio in tertiary education	108	55
Research in higher education (%)	21	35.4
<b>Learning environment</b>	<b>84</b>	<b>45.1</b>
Directly and indirectly funded	115	31.7
Teachers in tertiary education, gender parity	106	30
Labour mobility rate	92	3.7
Academic freedom	68	78.0
Quality and infrastructure	27	63.0
Class attendance rate in tertiary education, gender parity	45	78.0
Class attendance rate in tertiary education, wealth parity	54	28.0
Class attendance rate in tertiary education, location parity	66	106
<b>Outputs</b>	<b>55</b>	<b>55.0</b>
Efficiency	106	106
Educational attainment rate, bachelor's or equivalent	109	106
Educational attainment rate, master's or equivalent	106	106
Educational attainment rate, doctoral or equivalent	106	106
Employment	11	73.0
Labour force participation rate with advanced education	100	58.0
Unemployment rate with advanced education	40	66.1
Impact	65	37.1
University tertiary enrollment in FTE	44	48.0
OECD indicators per FTE personnel in higher education	60	25.0
<b>INNOVATION, RESEARCH AND DEVELOPMENT</b>		
<b>Inputs</b>	<b>10</b>	<b>10.0</b>
Access to FDI resources	10	10.0
GDP (% GDP)	106	106
GERD per researcher	106	106
Researchers per thousand labour force	68	1.2
Tertiary graduates from STEM programmes (%)	100	24.1
<b>Quality of innovation environment</b>	<b>10</b>	<b>10.1</b>
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	18	47.1
<b>Quality of innovation environment</b>	<b>10</b>	<b>10.0</b>
High-skilled employment (%)	58	20.0
Intellectual property payments (% total trade)	64	17.0
State of cluster development	50	46.0
<b>Outputs</b>	<b>65</b>	<b>107.7</b>
Access to FDI resources	106	10.1
Average documents per researcher	34	64.4
Citations per document	123	13.0
Patent applications (per 100 billion GDP)	117	13.4
<b>Quality of innovation environment</b>	<b>10</b>	<b>10.1</b>
Intellectual property receipts (% total trade)	40	17.0
Research and development expenditure (per 100 billion GDP)	21	34.1
PCT applications (per 100 billion GDP)	122	29.4
Firms producing new goods and services (%)	25	67.0



# GHANA

	Rank	Value
<b>Consumer electronics</b>	100	100
Treatment applications per 100 million GDP	115	2.8
Cultural goods exports (% exports)	134	0.4
Printing and publishing output (% manufactured output)	29	40.7
<b>Media</b>	110	16.3
<b>Books</b>	75	7.7
Access to institutions' provisions	74	10
Depth of innovative corporates	88	52.0
ISO 9001 quality certificates (% GDP)	127	2.2
ISO 14001 environmental certificates (% GDP)	100	0.1
<b>Software</b>	100	0.8
CERD licensed from abroad (%)	116	114
Joint ventures per strategic industry deals (% GDP)	71	6.4
Computer software spending (% GDP)	122	0.7
<b>Government services</b>	100	010
New business density per thousand population	62	4.2
Firms with web portals/enterprise (%)	189	31
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>81</b>	<b>26.2</b>
<b>Infrastructure</b>	101	28.4
<b>Coverage</b>	111	32.5
3G/4G mobile network coverage (% population)	106	79.2
Secure Internet servers per 1 million population	123	1.3
Investment in telecommunication services (% GDP)	72	29.2
<b>Speed</b>	100	0
Mobile upload and download speeds	88	11.1
Fixed broadband upload and download speeds	91	15.0
Fixed broadband subscriptions (y-speed) per hundred people	118	0.1
<b>Availability</b>	88	60.5
Fixed broadband latency (% QM per capita)	122	88.0
Mobile broadband basket (% QM per capita)	82	51.5
Internet and telephony competition	1	100
<b>Access</b>	184	25.5
<b>Subscribers</b>	100	22.1
Active mobile-broadband subscriptions per hundred inhabitants	69	27.2
International Internet bandwidth per user	107	11.1
Households with Internet access at home (%)	100	29.0
<b>Skills and employment</b>	100	16.7
Individuals with standard ICT skills (%)	114	19
Tertiary graduates from ICT programmes (%)	89	23.4
ICT employment (%)	100	4
<b>Usage</b>	81	46.4
<b>Services</b>	80	41.2
Government online services	81	53.0
Fixed broadband Internet traffic per subscription	114	19
Mobile broadband Internet traffic per subscription	85	8.8
Internet users (%)	80	50.4
<b>Commerce</b>	80	51.9
ICT/FIT patent applications (per 100,000 GDP)	83	22.5
E-participation	81	63.1
Internet activities by individuals (%)	114	19
Trade in digitally deliverable services (% total trade)	21	81.5
<b>ECONOMY</b>	<b>101</b>	<b>81.8</b>
<b>Economic complexity/structure</b>	81	46.2
<b>Infrastructure investment</b>	114	41.1
Overhead capital formation (% GDP)	107	41.4
Logistics performance	104	29.1
Transport productive capacity	138	10.5
Building quality control	25	73.3

	Rank	Value
<b>Business agility</b>	80	81.0
Ease of starting a business	100	89
Recovery recovery rate	115	26.1
Entrepreneurial employee activity rate	116	114
Growth of corporate transactions	89	42.0
<b>Employee openness</b>	122	42.4
<b>Trust and development</b>	107	21.0
Trade (% GDP)	77	26.4
High-technology trade (% total trade)	101	29.4
Market concentration	122	66.6
Market concentration	71	60.0
Product diversity	100	21
Climate financial openness	124	6
Foreign direct investment, net inflows (% GDP)	24	54.2
Cost dynamics	127	26.0
<b>Financing and domestic value added</b>	124	26.2
<b>Financing and costs</b>	122	41.2
Domestic credit to private sector (% GDP)	141	3
MSME financing gap (% GDP)	30	25.4
Tax and contribution rate (% profit)	100	81.8
Bank nonperforming loans (%)	110	36.0
Unmet loan demand	120	21.0
Medium- and high-tech activities value added	100	11.5
Industry and services value added (% GDP)	100	85.0
Labour underutilization rate	100	21.2
Output per worker	100	4.8
<b>ENABLING ENVIRONMENT</b>	<b>84</b>	<b>52</b>
<b>Governance</b>	<b>88</b>	<b>54.3</b>
<b>Political environment</b>	85	29.3
Peace and stability	81	51.0
View and accountability	44	64.7
Quality of institutions	72	10.5
Rule of law	86	62.0
Control of corruption	72	50.5
Government effectiveness	88	48.0
<b>Socio-economic</b>	128	45.8
<b>Gender equity</b>	117	52.5
Female-to-male ratio in parliament	124	11
Female-to-male labour force participation	25	88.1
Female-to-male ratio in internal wage	114	114
<b>Gender balance</b>	120	12.0
Social protection coverage (% population)	98	23.1
Adult literacy rate	84	79
Youth not in employment, education or training (%)	127	20.0
<b>Standard of living</b>	80	23.0
Poverty headcount ratio (% population)	85	87.5
GDP per capita	112	6.2
<b>Health and environment</b>	117	55.1
<b>Health</b>	111	81.0
Universal health coverage	124	47
Healthy life expectancy (years)	121	46
Under-five mortality rate	123	81.7
<b>Environmental performance</b>	81	53.0
Renewable energy consumption (%)	44	43.0
Household footprint per capita	84	88.2
Natural hazard exposure	57	60

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# GREECE

**GKI RANK** 57/154

**GKI SCORE** 51.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Greece is a strong performer in terms of its knowledge infrastructure. It ranks 57th out of 154 countries in the Global Knowledge Index 2021 and 53rd out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Enrolment in bachelor's or equivalent level (%)
- + Market concentration
- + ISO 9001 quality certificates (% GDP)
- + Net enrolment rate in upper secondary education
- + Fixed-broadband subscriptions by speed per hundred people

### AREAS OF IMPROVEMENT

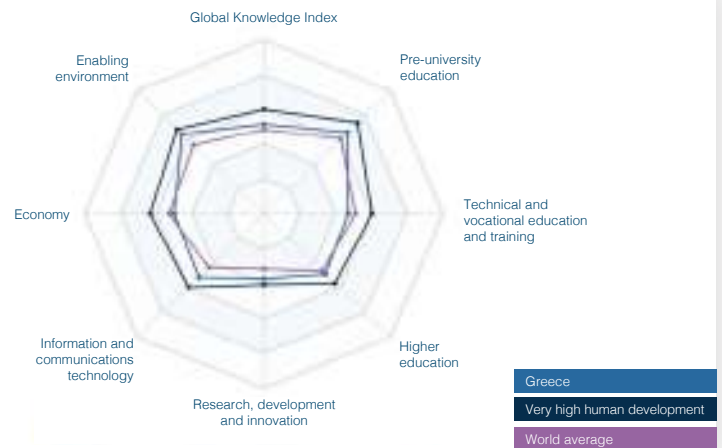
- Gross fixed capital formation (% GDP)
- Labour force with short-cycle tertiary education (%)
- Unemployment rate with vocational education
- Firms constrained with inadequately educated workforce (%)
- Bank non-performing loans (%)

### KEY INDICATORS

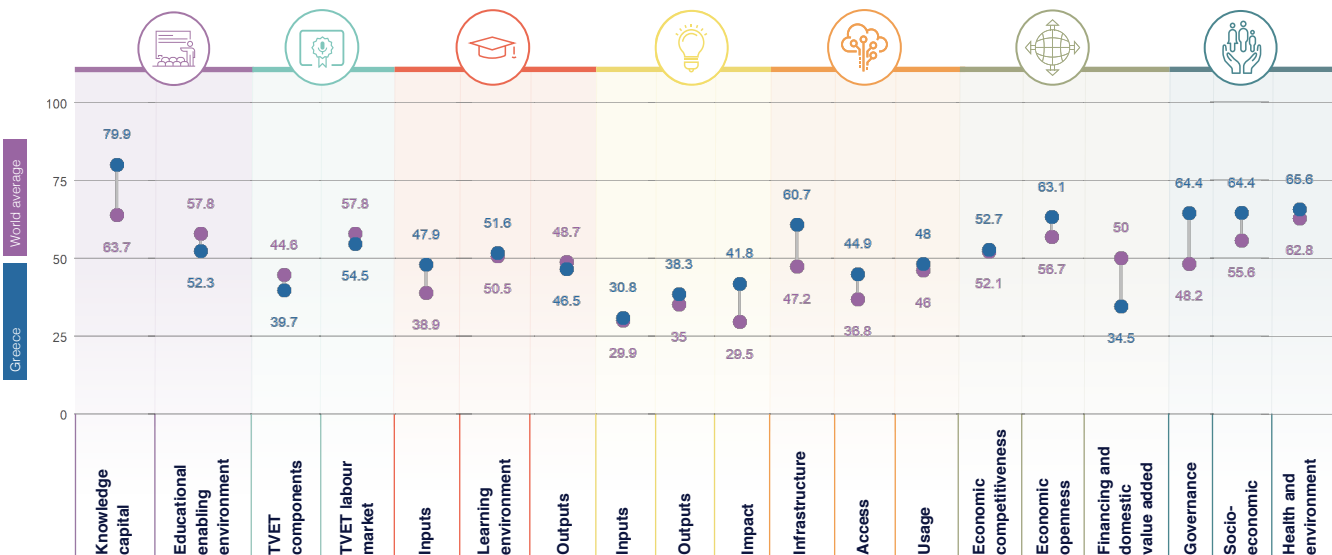
**GDP US\$ billions** 292.396  
**Population** 10,423,056  
**HDI** 0.888

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	79	66.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	95	47.1
HIGHER EDUCATION	58	48.7
RESEARCH, DEVELOPMENT AND INNOVATION	39	37
INFORMATION AND COMMUNICATIONS TECHNOLOGY	54	51.2
ECONOMY	83	50.1
ENABLING ENVIRONMENT	41	64.8



## GKI PILLARS







# GREECE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	89	79.9
Enrolment	27	97.3
Net enrolment rate in primary education	45	97.3
Net enrolment rate in lower secondary education	89	95.6
Net enrolment rate in upper secondary education	7	86
Completion	38	91.1
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	9	97.4
Success rate rate in the last grade of lower secondary education	23	77.6
Completion	40	80.0
Assessment of 15-year-old students in math, science and reading	41	48.7
Learning-adjusted years of schooling	35	73.1
<b>Educational enabling environment</b>	<b>103</b>	<b>50.3</b>
Expenditure	50	34.1
Government expenditure on primary education (% GDP)	89	27.4
Government expenditure on secondary education (% GDP)	79	24.5
Government funding per primary student (% GDP per capita)	85	48.5
Government funding per secondary student (% GDP per capita)	40	34.7
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	124	30.0
Class attendance rate in early childhood education	87	80.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	21	97
Completion rate in upper secondary education, gender parity	9	90
Completion rate in upper secondary education, wealth parity	22	82.9
Completion rate in upper secondary education, location parity	29	84.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>101</b>	<b>66.7</b>
Companies training apprentices	109	67.0
Firms offering formal training (%)	89	25.5
Labour force with short-cycle tertiary education (%)	85	31
Participation rate in formal and non-formal education and training	43	22.5
TVET enrolment	44	50.5
Government expenditure on vocational education (%)	29	37.5
Share of students enrolled in secondary vocational programmes	54	25.3
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	111	30.0
Extent of staff training	106	43.3
Quality of vocational training	106	42.4
Ratio of high-skill TVET occupations earnings to average wage	69	23.4
Ratio of medium-skill TVET occupations earnings to average wage	54	45
<b>TVET labour market</b>	<b>87</b>	<b>64.5</b>
Efficiency of the labour market	100	47
Firms considered with inequality educated workforce (%)	123	13.1
Employment educational mismatch (%)	20	82.0
Proportion of skilled production workers	84	84.0
Unemployment rate with vocational education	114	32.0
Real TVET unemployment	80	66.0
Share of TVET occupations	74	56.7
Manufacturing employment (%)	86	27.9
Quality and infrastructure	76	55.0
Enrolment in vocational education, gender parity	77	50.5
Useable employment rate	70	74.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>40</b>	<b>47.8</b>
Expenditure	71	34
Government expenditure per tertiary student	82	30
Teaching staff compensation (% tertiary expenditure)	44	34.1
Enrolment	1	63.1
Enrolment in bachelor's or equivalent level (%)	1	398
Enrolment in masters, doctoral or equivalent (%)	19	68.3
Resources	107	36.4
Ratios/teacher ratio in tertiary education	125	20
Researchers in higher education (%)	45	50.0
<b>Learning environment</b>	<b>68</b>	<b>31.6</b>
Timely and academic freedom	75	31.0
Teachers in tertiary education, gender parity	77	58.5
Labour mobility rate	66	12.0
Academic freedom	47	87.1
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>85</b>	<b>46.5</b>
Attainment	26	42.0
Educational attainment rate, bachelor's or equivalent	28	67.6
Educational attainment rate, master's or equivalent	38	25.9
Educational attainment rate, doctoral or equivalent	28	34.3
Employment	97	60.0
Labour force participation rate with advanced education	71	72.5
Unemployment rate with advanced education	88	64.0
Innovation	111	25.0
University tertiary enrolment in R&D	128	27.0
OECD students per 100 personnel in higher education	62	29.4
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>10</b>	<b>10.2</b>
Access to credit resources	11	10.0
GDP (% GDP)	34	23.7
GERD per researcher	71	18.7
Researchers per thousand labour force	23	50.1
Tertiary graduates from STEM programmes (%)	86	69.0
<b>Quality of innovation environment</b>	<b>11</b>	<b>10.0</b>
GERD performed by business enterprises (%)	33	15.6
GERD financed by business enterprises (%)	40	52.7
Researchers in business enterprises (%)	42	33.2
Firms that spend on R&D (%)	68	20.0
Quality of innovation environment	111	10.0
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	78	12.1
State of startup development	131	31.9
<b>Outputs</b>	<b>85</b>	<b>46.5</b>
Access to credit resources	11	10.0
Average documents per researcher	63	57.0
Citations per document	33	34.1
Patent applications (per 100 billion GDP)	30	58.0
<b>Quality of innovation environment</b>	<b>11</b>	<b>10.0</b>
Intellectual property receipts (% total trade)	64	11.0
Research design applications (per 100 billion GDP)	32	23.9
PCT applications (per 100 billion GDP)	44	23
Firms producing new goods and services (%)	80	27.8





# GREECE

	Rank	Value
<b>Consumer Innovation Adoption</b>	55	57.7
Treatment applications per 100 million GDP	106	108
Cultural goods exports (% exports)	45	78
Printing and publishing output (% manufactured output)	52	25.7
<b>Finance</b>	55	55.5
<b>Trade</b>	75	80.5
Access to investors' protection	29	22.9
Depth of innovative companies	121	40.1
ISO 9001 quality certificates (% GDP)	6	55.1
ISO 14001 environmental certificates (% GDP)	10	50.1
<b>Intelligence</b>	55	55.1
CERD freedom from abuse (%)	35	27.1
Cost savings per strategic alliance deals (% GDP)	33	12.9
Computer software spending (% GDP)	9	47.4
<b>Government Services</b>	55	55.5
New business density per thousand population	70	7
Firms with new products/services (%)	25	36.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>54</b>	<b>51.2</b>
<b>Infrastructure</b>	65	60.7
<b>Coverage</b>	65	44.5
3G/4G mobile network coverage (% population)	40	60.1
Secure Internet servers per 1 million population	40	17.7
Investment in telecommunication services (% GDP)	60	30.0
<b>Quality</b>	65	44.5
Mobile upload and download speeds	28	17.0
Fixed broadband upload and download speeds	75	1
Fixed broadband subscriptions (by speed) per hundred people	9	69.0
<b>Availability</b>	10	55.3
Fixed broadband latency (% QM per user)	49	63.0
Mobile broadband basket (% QM per capita)	24	61.0
Internet and telephony competition	1	100
<b>Access</b>	25	66.8
<b>Subscribers</b>	31	17.0
Active mobile broadband subscriptions per fixed-line inhabitants	64	36.7
International Internet bandwidth per user	20	63.5
Households with Internet access at home (%)	33	60.5
<b>Skills and employment</b>	55	20.1
Individuals with standard ICT skills (%)	40	43.4
Tertiary graduates from ICT programmes (%)	95	24.4
ICT employment (%)	47	20.1
<b>Usage</b>	75	40
<b>Services</b>	65	44.5
Government online services	64	70.6
Fixed broadband internet traffic per subscription	50	10.6
Mobile broadband internet traffic per subscription	75	30
Internet users (%)	60	34.0
<b>Commerce</b>	65	57.7
ICT FDI patent applications (per 100 million GDP)	63	42.1
E-participation	49	70.6
Internet activities by individuals (%)	21	66.9
Trade in digitally deliverable services (% total trade)	100	35.2
<b>ECONOMY</b>	<b>33</b>	<b>50.5</b>
<b>Economic Competitiveness</b>	75	52.7
<b>Efficiency</b>	60	46.0
Overhead capital formation (% GDP)	140	20.2
Logistics performance	39	55.1
Transport productive capacity	60	25.3
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	65	50.0
Time of starting a business	93	86
Recovery recovery time	91	54.7
Entrepreneurial employee activity rate	47	20.0
Growth of corporate transactions	13	65.7
<b>Corporate openness</b>	55	60.0
Trust and dissemination	54	62.0
Tax (% GDP)	76	25.0
High-technology trade (% total trade)	60	40
Market concentration	90	87.0
Market concentration	4	60.0
Product diversity	70	60.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	94	30
Cost dynamics	60	50
<b>Financing and domestic value added</b>	<b>108</b>	<b>24.0</b>
<b>Financing and costs</b>	140	21.0
Domestic credit to private sector (% GDP)	41	30.0
MSME financing gap (% GDP)	69	79
Tax and contribution rate (% profit)	100	55.0
Bank nonperforming loans (%)	160	8
Unmet loan demand	70	40.0
Medium- and high-tech activities value added	80	22.0
Industry and services value added (% GDP)	77	81.0
Labour underutilization rate	100	40.0
Output per worker	25	34
<b>ENABLING ENVIRONMENT</b>	<b>81</b>	<b>64.8</b>
<b>Governance</b>	47	54.4
Political environment	41	62.1
Peace and stability	60	51.4
View and accountability	29	76.7
Quality of institutions	51	63.0
Rule of law	50	61
Control of corruption	56	58.7
Government effectiveness	45	68.0
<b>Socio-economic</b>	47	64.4
Gender equity	35	64.1
Female-to-male ratio in parliament	61	27.7
Female-to-male labour force participation	60	31.8
Female-to-male ratio in internal wage	75	60.4
Gender inequality	41	70.0
Social protection coverage (% population)	45	63
Adult literacy rate	20	87.0
Youth not in employment, education or training (%)	47	77.0
Standard of living	48	66.0
Poverty headcount ratio (% population)	45	75.0
GDP per capita	49	24.0
<b>Health and environment</b>	<b>61</b>	<b>60.8</b>
Health	36	87.0
Universal health coverage	51	70
Healthy life expectancy (years)	60	69.0
Under-five mortality rate	25	60.0
Environmental performance	100	20.0
Renewable energy consumption (%)	61	18.0
Household footprint per capita	100	71.0
Natural hazard exposure	100	41

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 119/154

**GKI SCORE** 38.1

**WORLD AVERAGE** 48.4

# GUATEMALA

## KEY INDICATORS

**GDP** US\$ billions ..... **141.414**  
**Population** ..... **17,915,567**  
**HDI** ..... **0.663**

## COUNTRY PERFORMANCE SUMMARY

Guatemala is a modest performer in terms of its knowledge infrastructure. It ranks 119th out of 154 countries in the Global Knowledge Index 2021 and 17th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

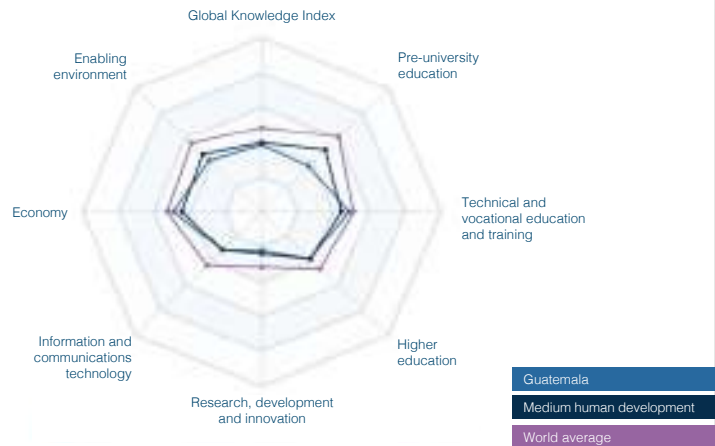
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Ratio of high-skill TVET occupations earnings to average wage
- + Average documents per researcher
- + Gross attendance ratio for tertiary education, gender parity
- + Firms offering formal training (%)

### AREAS OF IMPROVEMENT

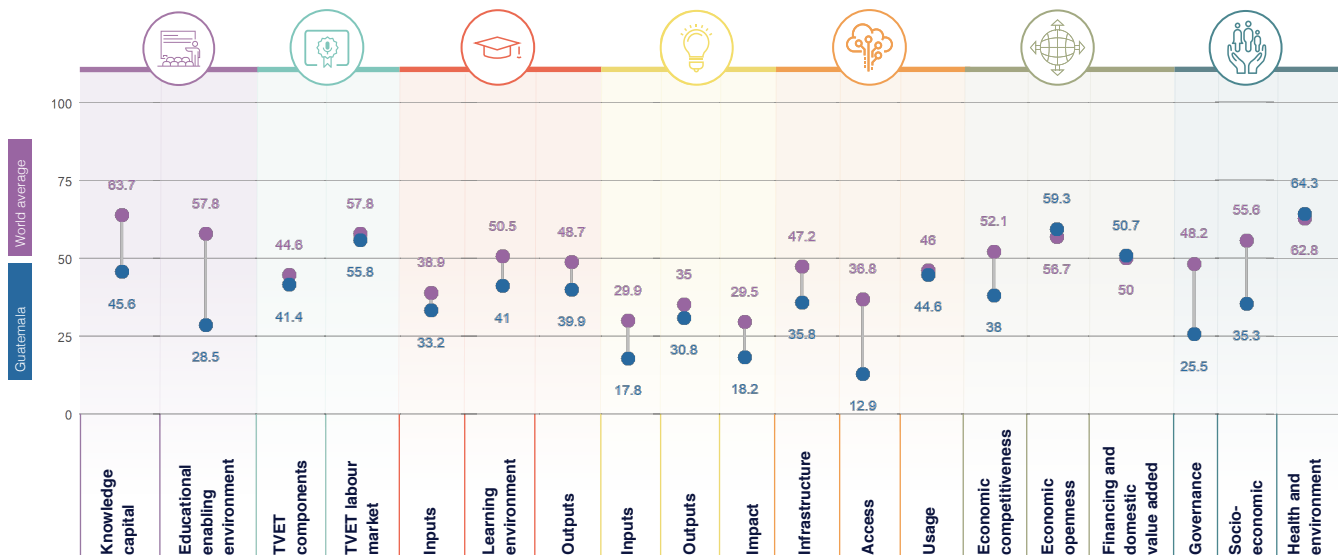
- Government funding per secondary student (% of GDP per capita)
- Government expenditure on vocational education (%)
- Educational attainment rate, master's or equivalent
- Researchers per thousand labour force
- Research institutions prominence

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	135	37
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	86	48.6
HIGHER EDUCATION	114	38
RESEARCH, DEVELOPMENT AND INNOVATION	122	22.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	110	31.1
ECONOMY	86	49.3
ENABLING ENVIRONMENT	130	41.7



## GKI PILLARS





# GUATEMALA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	123	63.4
Enrollment	152	49.5
Net enrolment rate in primary education	111	87.9
Net enrolment rate in lower secondary education	113	81.7
Net enrolment rate in upper secondary education	102	24.9
Completion	113	91.5
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	90	56.3
Success rate rate in the last grade of lower secondary education	111	69.5
Completion	10	50.0
Assessment of 15-year-old students in math, science and reading	194	194
Learning-adjusted years of schooling	108	33.8
<b>Educational enabling environment</b>	<b>143</b>	<b>38.8</b>
Expenditure	111	10.0
Government expenditure on primary education (% GDP)	61	41.3
Government expenditure on secondary education (% GDP)	128	2.2
Government funding per primary student (% GDP per capita)	73	23.4
Government funding per secondary student (% GDP per capita)	121	8
Resources	111	10.0
Pupil-based teacher ratio in primary education	194	194
Pupil-based teacher ratio in secondary education	194	194
Schools with access to computers in primary education (%)	62	12.5
Schools with access to computers in secondary education (%)	55	61.9
Early learning	113	90.2
Class attendance rate in early childhood education	113	90.2
Proportion of children who are developmentally on track	194	194
Proportion of children with stimulating home learning environments	194	194
Pupil-based teacher ratio in preprimary education	194	194
Quality and infrastructure	87	40.0
Completion rate in upper secondary education, gender parity	80	60.0
Completion rate in upper secondary education, wealth parity	100	5.3
Completion rate in upper secondary education, location parity	89	42.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>64</b>	<b>41.4</b>
Companies training apprentices	54	74.9
Firms offering formal training (%)	15	89.6
Labour force with short-cycle tertiary education (%)	194	194
Participation rate in formal and non-formal education and training	69	3.3
TVET resources	109	11.0
Government expenditure on vocational education (%)	74	4
Share of students enrolled in secondary vocational programmes	25	46.5
Share of students enrolled in postsecondary vocational programmes	194	194
TVET quality and infrastructure	9	34.0
Extent of staff training	49	55.3
Quality of vocational training	40	57.7
Ratio of high-skil TVET occupations earnings to average wage	9	78.0
Ratio of medium-skil TVET occupations earnings to average wage	8	66.4
<b>TVET labour market</b>	<b>44</b>	<b>50.3</b>
Efficiency of the labour market	100	11.7
Firms considered well-integrated with labour (%)	89	39
Employment educational mismatch (%)	93	42.7
Proportion of skilled production workers	25	23.6
Unemployment rate with vocational education	194	194
Real TVET unemployment	90	33.6
Share of TVET occupations	114	37.4
Manufacturing employment (%)	89	28.6
Quality and infrastructure	40	71.2
Enrollment in vocational education, gender parity	21	82.0
Useable employment rate	31	61.6

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>84</b>	<b>33.3</b>
Expenditure	104	13.7
Government expenditure per tertiary student	101	5.3
Teaching staff compensation (% tertiary expenditure)	76	13.6
Enrollment	101	8.1
Enrollment in bachelor's or equivalent level (%)	86	11.2
Enrollment in masters, doctoral or equivalent (%)	99	5.2
Resources	21	60.0
Rapiteacher ratio in tertiary education	194	194
Researchers in higher education (%)	17	60.0
<b>Learning environment</b>	<b>111</b>	<b>41</b>
<b>Quality and infrastructure</b>	<b>111</b>	<b>10.0</b>
Teachers in tertiary education, gender parity	194	194
Labour mobility rate	113	0.8
Academic freedom	70	78.0
<b>Quality and infrastructure</b>	<b>40</b>	<b>42.4</b>
Class attendance rate in tertiary education, gender parity	9	84.9
Class attendance rate in tertiary education, wealth parity	55	28.0
Class attendance rate in tertiary education, location parity	60	3.1
<b>Outputs</b>	<b>116</b>	<b>29.3</b>
<b>Attainment</b>	<b>100</b>	<b>3.1</b>
Educational attainment rate, bachelor's or equivalent	89	9.2
Educational attainment rate, master's or equivalent	99	6
Educational attainment rate, doctoral or equivalent	65	0.4
<b>Employment</b>	<b>10</b>	<b>66.4</b>
Labour force participation rate with advanced education	25	81.5
Unemployment rate with advanced education	28	81.0
<b>Impact</b>	<b>100</b>	<b>35.1</b>
University tertiary enrollment in R&D	87	17.7
OECD indicators per 100 personnel in higher education	73	22.4
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>107</b>	<b>11.3</b>
<b>Quality and infrastructure</b>	<b>111</b>	<b>10.0</b>
GDP (% GDP)	121	0.4
GERD per researcher	34	36.6
Researchers per thousand labour force	100	9
Tertiary graduates from STEM programmes (%)	113	36
<b>Quality and infrastructure</b>	<b>10</b>	<b>66.4</b>
GERD performed by business enterprises (%)	87	9
GERD financed by business enterprises (%)	74	12.0
Researchers in business enterprises (%)	76	1.3
Firms that spend on R&D (%)	42	21.2
<b>Quality and infrastructure</b>	<b>10</b>	<b>66.4</b>
High-skilled employment (%)	32	11.7
Intellectual property payments (% total trade)	23	49.2
State of digital development	81	44.0
<b>Outputs</b>	<b>100</b>	<b>10.3</b>
<b>Quality and infrastructure</b>	<b>100</b>	<b>10.3</b>
Average documents per researcher	9	78.3
Citations per document	106	15.0
Patent applications (per 100 billion GDP)	121	19.2
<b>Quality and infrastructure</b>	<b>10</b>	<b>66.4</b>
Intellectual property receipts (% total trade)	80	12.1
Research and development expenditure (per 100 billion GDP)	112	0.1
PCT applications (per 100 billion GDP)	124	28.0
Firms producing new goods and services (%)	71	89





# GUATEMALA

	Rank	Value
<b>Consumer electronics</b>	85	85.0
Treatment applications per 100 million GDP	57	30.1
Cultural goods exports (% exports)	76	8.8
Printing and publishing output (% manufactured output)	116	116
<b>Energy</b>	110	110.0
<b>Energy</b>	110	110.0
Renewable installations' productive	115	9
Depth of innovative companies	84	81.7
ISO 9001 quality certificates (% GDP)	100	0.8
ISO 14001 environmental certificates (% GDP)	113	1
<b>Environment</b>	110	-
CERO released from abroad (%)	90	0.7
Coal reserves per strategic storage deals (% GDP)	118	1.1
Computer software spending (% GDP)	128	1.1
<b>Government services</b>	110	110.0
New business density per thousand population	100	2.5
Firms with one or more employees (%)	25	35.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	111	111.0
<b>Infrastructure</b>	111	111.0
<b>Coverage</b>	121	121.0
3G/4G mobile network coverage (% population)	121	83.3
Secure Internet servers per 1 million population	111	1.8
Investment in telecommunication services (% GDP)	116	116
<b>Speed</b>	81	11.1
Mobile upload and download speeds	81	26
Fixed broadband upload and download speeds	100	3.1
Fixed broadband subscriptions (y-speed) per hundred people	116	116
<b>Availability</b>	111	85.7
Fixed broadband latency (% QM per capita)	108	82.3
Mobile broadband basket (% QM per capita)	118	42.4
Internet and telephone competition	107	76.5
<b>Access</b>	124	124.0
<b>Subscriptions</b>	117	117.0
Active mobile-broadband subscriptions per fixed-line inhabitants	144	8.1
International Internet bandwidth per user	118	27.7
Households with Internet access at home (%)	117	22.6
<b>Skills and employment</b>	109	-
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	112	30.4
ICT employment (%)	109	0.8
<b>Usage</b>	25	44.3
<b>Services</b>	110	41.3
Government online services	107	81.2
Fixed broadband internet traffic per subscription	116	116
Mobile broadband internet traffic per subscription	116	116
Internet users (%)	107	41.4
<b>Commerce</b>	81	11.1
ICT FDI parent applications (per 100 million GDP)	84	23.7
E-participation	106	80
Internet activities by individuals (%)	116	116
Trade in digitally deliverable services (% total trade)	29	40
<b>ECONOMY</b>	84	84.0
<b>Economic complexity indexes</b>	123	31
<b>International Investment</b>	110	110.0
Overhead capital formation (% GDP)	102	26.3
Logistics performance	122	35.4
Transport productive capacity	85	22.3
Building quality control	75	73.3

	Rank	Value
<b>Business agility</b>	110	110.0
Ease of starting a business	84	86.6
Recovery recovery rate	109	33.5
Entrepreneurial employee activity rate	49	15.2
Growth of corporate transactions	111	14.3
<b>Business operations</b>	85	86.3
Trade and investment	81	81.0
Trade (% GDP)	128	14.6
High-technology trade (% total trade)	72	46.1
Market concentration	39	84.6
Market concentration	110	82.4
Product diversity	110	81.0
Climate financial openness	1	109
Foreign direct investment, net inflows (% GDP)	110	34.5
Out dynamics	86	49.0
<b>Financing and domestic value added</b>	73	80.7
<b>Financing and loans</b>	110	110.0
Domestic credit to private sector (% GDP)	85	12.6
IMRS financing gap (% GDP)	80	89.2
Tax and contribution rate (% profit)	85	72.3
Bank nonperforming loans (%)	29	83.1
Unsecured loans ratio	71	47.3
Medium- and high-tech activities value added	71	26.1
Industry and services value added (% GDP)	75	82.2
Labour underutilization rate	80	73.3
Output per worker	104	7.7
<b>ENABLING ENVIRONMENT</b>	130	41.7
<b>Governance</b>	128	25.5
<b>Political environment</b>	88	11.3
Peace and stability	86	31.1
View and accountability	87	32.3
Quality of institutions	104	17.6
Rule of law	110	13.9
Control of corruption	108	13.0
Government effectiveness	118	25.5
<b>Socio-economic</b>	128	35.3
<b>Gender equity</b>	121	21.5
Female-to-male ratio in parliament	100	24
Female-to-male labour force participation	104	40
Female-to-male ratio in internal wage	80	88.0
<b>Government</b>	110	110.0
Social protection coverage (% population)	112	12
Adult literacy rate	87	75.6
Youth not in employment, education or training (%)	125	41.3
<b>Standard of living</b>	101	11.8
Poverty headcount ratio (% population)	128	16.5
GDP per capita	89	7
<b>Health and environment</b>	79	84.3
<b>Health</b>	110	81.0
Universal health coverage	114	85
Healthy life expectancy (years)	100	83.0
Under-five mortality rate	100	80.4
<b>Environmental performance</b>	41	81.0
Renewable energy consumption (%)	27	86.5
Household footprint per capita	88	80.4
Natural hazard exposure	137	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# GUINEA

**GKI RANK** 146/154

**GKI SCORE** 29.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Guinea is a weak performer in terms of its knowledge infrastructure. It ranks 146th out of 154 countries in the Global Knowledge Index 2021 and 20th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Female-to-male labour force participation
- + Proportion of skilled production workers
- + Teaching staff compensation (% tertiary expenditure)
- + Extent of staff training
- + University-industry collaboration in R&D

### AREAS OF IMPROVEMENT

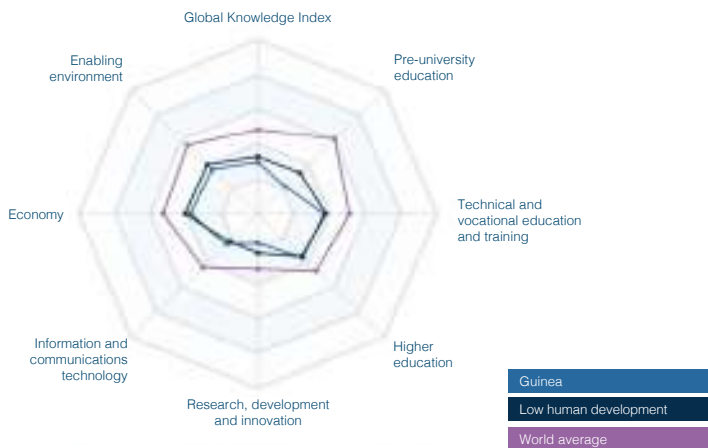
- Schools with access to computers in secondary education (%)
- Pupil-trained teacher ratio in pre-primary education
- Extent of corporate transparency
- Joint ventures per strategic alliance deals (% GDP)
- Chinn-Ito financial openness

### KEY INDICATORS

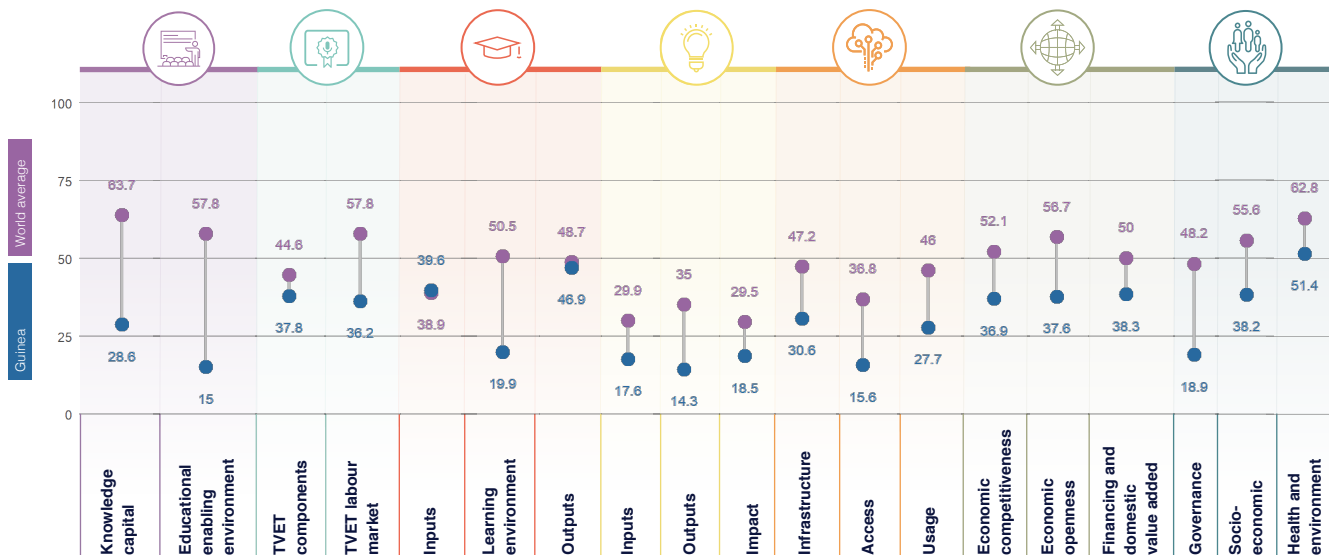
**GDP** US\$ billions ..... **35.075**  
**Population** ..... **13,132,792**  
**HDI** ..... **0.477**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	151	21.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	136	37
HIGHER EDUCATION	128	35.5
RESEARCH, DEVELOPMENT AND INNOVATION	146	16.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	131	24.6
ECONOMY	142	37.6
ENABLING ENVIRONMENT	143	36.1



## GKI PILLARS



	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	144	28.8
Enrollment	138	33.4
Net enrolment rate in primary education	125	30
Net enrolment rate in lower secondary education	127	28.8
Net enrolment rate in upper secondary education	129	21.7
Completion	145	21.1
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	114	29.2
Success rate rate in the last grade of lower secondary education	126	17.8
Completion	133	21.3
Assessment of 15-year-old students in math, science and reading	146	19.4
Learning-adjusted years of schooling	135	22.3
<b>Educational enabling environment</b>	<b>183</b>	<b>18</b>
Expenditure	133	11
Government expenditure on primary education (% GDP)	111	18.2
Government expenditure on secondary education (% GDP)	125	5.4
Government funding per primary student (% GDP per capita)	121	12
Government funding per secondary student (% GDP per capita)	112	6.4
Resources	132	12.1
Pupil-based teacher ratio in primary education	81	35.3
Pupil-based teacher ratio in secondary education	78	24.8
Schools with access to computers in primary education (%)	85	8
Schools with access to computers in secondary education (%)	85	8
Early learning	141	12.2
Class attendance rate in early childhood education	118	13.8
Proportion of children who see developmentally on track	83	16.1
Proportion of children with stimulating home learning environments	89	16.1
Pupil-based teacher ratio in preprimary education	81	8
Quality and infrastructure	131	21.3
Completion rate in upper secondary education, gender parity	122	50.0
Completion rate in upper secondary education, wealth parity	119	1.8
Completion rate in upper secondary education, location parity	117	11.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>118</b>	<b>21.8</b>
Companies training apprentices	91	43.0
Firms offering formal training (%)	111	18.2
Labour force with short-cycle tertiary education (%)	31	80.3
Participation rate in formal and non-formal education and training	106	19.8
TVET resources	130	11.3
Government expenditure on vocational education (%)	84	25.9
Share of students enrolled in secondary vocational programmes	115	3.8
Share of students enrolled in postsecondary vocational programmes	106	19.8
TVET quality and infrastructure	81	30.0
Extent of staff training	11	30.8
Quality of vocational training	30	81.3
Ratio of high-end TVET occupations earnings to average wage	47	28.7
Ratio of median-end TVET occupations earnings to average wage	80	41.3
<b>TVET labour market</b>	<b>141</b>	<b>38.3</b>
Efficiency of the labour market	86	22.0
Firms considered with inappropriately educated workforce (%)	85	23.8
Employment educational mismatch (%)	100	24.7
Proportion of skilled production workers	8	88.6
Unemployment rate with vocational education	106	51.2
Real TVET unemployment	144	11.1
Share of TVET occupations	136	18.0
Manufacturing employment (%)	90	5.7
Quality and infrastructure	132	38.2
Enrollment in vocational education, gender parity	81	89.2
Useable employment rate	125	3.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>73</b>	<b>33.8</b>
Expenditure	27	44.0
Government expenditure per tertiary student	88	6.2
Teaching staff compensation (% tertiary expenditure)	8	83.8
Enrollment	114	4.3
Enrollment in bachelor's or equivalent level (%)	114	4.3
Enrollment in masters, doctoral or equivalent (%)	100	4.7
Resources	91	19.1
Rapit teacher ratio in tertiary education	80	88.8
Research in higher education (%)	106	19.8
<b>Learning environment</b>	<b>183</b>	<b>18.8</b>
<b>Directly and indirectly funded</b>	<b>144</b>	<b>23.0</b>
Teachers in tertiary education, gender parity	125	3.4
Labour mobility rate	89	3.2
Academic freedom	101	28
Quality and infrastructure	89	18.2
Class attendance rate in tertiary education, gender parity	86	44.5
Class attendance rate in tertiary education, wealth parity	78	9.2
Class attendance rate in tertiary education, location parity	76	6
<b>Outputs</b>	<b>84</b>	<b>40.8</b>
<b>Attainment</b>	<b>88</b>	<b>3.2</b>
Educational attainment rate, bachelor's or equivalent	85	14.2
Educational attainment rate, master's or equivalent	80	9.1
Educational attainment rate, doctoral or equivalent	70	4.3
<b>Employment</b>	<b>100</b>	<b>83.0</b>
Labour force participation rate with advanced education	41	78.0
Unemployment rate with advanced education	127	47
<b>Innov</b>	<b>11</b>	<b>82.3</b>
University tertiary enrollment in R&D	11	88.8
CRISPE documents per 100 personnel in higher education	106	19.8
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>138</b>	<b>17.2</b>
<b>Government R&amp;D expenditure</b>	<b>100</b>	<b>100</b>
GDP (% GDP)	106	19.8
GERD per researcher	106	19.8
Researchers per thousand labour force	106	19.8
Tertiary graduates from STEM programmes (%)	106	19.8
<b>Quality of innovation environment</b>	<b>118</b>	<b>22.0</b>
GERD performed by business enterprises (%)	106	19.8
GERD financed by business enterprises (%)	106	19.8
Researchers in business enterprises (%)	106	19.8
Firms that spend on R&D (%)	88	13.3
<b>Quality of innovation environment</b>	<b>118</b>	<b>22.0</b>
High-skilled employment (%)	71	12.5
Intellectual property payments (% total trade)	128	0.8
State of startup development	83	82.5
<b>Outputs</b>	<b>138</b>	<b>14.2</b>
<b>Government R&amp;D expenditure</b>	<b>107</b>	<b>10.2</b>
Average documents per researcher	106	19.8
Citations per document	101	4.2
Patent applications (per 100 billion GDP)	112	28.3
<b>Quality of innovation environment</b>	<b>118</b>	<b>22.0</b>
Intellectual property receipts (% total trade)	82	0.4
Research design applications (per 100 billion GDP)	89	3.3
PCT applications (per 100 billion GDP)	100	35.4
Firms producing new goods and services (%)	88	28.2

# GUINEA

	Rank	Value		Rank	Value
<b>Consumer electronics</b>			<b>Business agility</b>		
Treatment applications per 100 million GDP	106	5.8	Ease of starting a business	104	84.5
Cultural goods exports (% exports)	118	0.3	Recovery recovery rate	103	21.1
Printing and publishing output (% manufactured output)	116	116	Entrepreneurial employee activity rate	116	116
<b>Energy</b>	<b>115</b>	<b>16.5</b>	Growth of corporate transactions	118	8
Energy	115	16.5	<b>Executive openness</b>	<b>142</b>	<b>37.3</b>
Access to institutions' provisions	115	8	Trust and dissatisfaction	119	43.0
Depth of innovative companies	40	54.0	Taxs (% GDP)	44	37.3
ISO 9001 quality certificates (% GDP)	145	0.8	High-technology trade (% total trade)	140	50
ISO 14001 environmental certificates (% GDP)	137	0.8	Media concentration	141	41.3
<b>Environment</b>	<b>107</b>	<b>5.5</b>	Market concentration	104	85.4
CERO received from abroad (%)	116	116	Product diversity	141	23.1
Cost savings per strategic alliance deals (% GDP)	112	8	Charitable financial openness	138	8
Computer software spending (% GDP)	106	3.1	Foreign direct investment, net inflows (% GDP)	80	42.7
<b>Government efficiency</b>	<b>95</b>	<b>100.0</b>	Cost dynamics	100	46.4
New business density per thousand population	106	1.8	<b>Financing and domestic value added</b>	<b>120</b>	<b>26.3</b>
Firms with new products/services (%)	95	27.7	Financing and costs	122	41.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>101</b>	<b>24.9</b>	Domestic credit to private sector (% GDP)	140	2.3
<b>Infrastructure</b>	<b>107</b>	<b>30.8</b>	IMRS financing gap (% GDP)	59	88.0
Coverage	108	22.4	Tax and contribution rate (% profit)	140	37.8
30MHz mobile network coverage (% population)	118	23.0	Bank nonperforming loans (%)	100	80.0
Secure Internet servers per 1 million population	145	0.1	Unsecured loans ratio	110	34.0
Investment in telecommunication services (% GDP)	41	41.4	Medium- and high-tech activities value added	118	118
<b>Quality</b>	<b>111</b>	<b>7.1</b>	Industry and services value added (% GDP)	132	42.7
Mobile speed and download speeds	81	10.7	Labour underutilization rate	100	26.2
Fixed-broadband upload and download speeds	89	3.8	Output per worker	134	2.8
Fixed-broadband subscriptions (by speed) per hundred people	116	116	<b>ENABLING ENVIRONMENT</b>	<b>143</b>	<b>36.1</b>
<b>Availability</b>	<b>104</b>	<b>25.3</b>	<b>Governance</b>	<b>137</b>	<b>58.3</b>
Fixed broadband bandwidth (% Gbps per capita)	121	88.8	Political environment	118	23.1
Mobile broadband basket (% Gbps per capita)	102	30.0	Peace and stability	113	23.0
Internet and telephony competition	1	100	Value and accountability	101	22.7
<b>Access</b>	<b>128</b>	<b>18.8</b>	Quality of institutions	140	14.0
<b>Subscriptions</b>	<b>111</b>	<b>13.0</b>	Rule of law	148	9.3
Active mobile-broadband subscriptions per fixed-line inhabitants	137	0.1	Control of corruption	130	17.0
International Internet bandwidth per user	128	23.9	Government effectiveness	138	17.8
Households with Internet access at home (%)	103	10.0	<b>Socio-economic</b>	<b>126</b>	<b>36.2</b>
<b>Skills and employment</b>	<b>116</b>	<b>116</b>	Gender equity	107	57.5
Individuals with standard ICT skills (%)	116	116	Female-to-male ratio in parliament	115	30
Tertiary graduates from ICT programmes (%)	116	116	Female-to-male labour force participation	1	100
ICT employment (%)	104	116	Female-to-male ratio in internal wage	100	52.4
<b>Usage</b>	<b>123</b>	<b>27.7</b>	Government openness	127	27.1
<b>Services</b>	<b>116</b>	<b>22.3</b>	Social protection coverage (% population)	116	116
Government online services	147	21.0	Adult literacy rate	100	22.0
Fixed broadband internet traffic per subscription	116	116	Youth not in employment, education or training (%)	100	51.0
Mobile broadband internet traffic per subscription	116	116	<b>Standard of living</b>	<b>111</b>	<b>20.1</b>
Internet users (%)	103	10.0	Poverty headcount ratio (% population)	111	35.0
<b>Statistics</b>	<b>110</b>	<b>10.1</b>	GDP per capita	132	1.8
ICT FDI patent applications (per 100 million GDP)	116	116	<b>Health and environment</b>	<b>147</b>	<b>21.4</b>
E-participation	106	31	Health	100	37.0
Internet activities by individuals (%)	116	116	Universal health coverage	145	37
Trade in digitally deliverable services (% total trade)	74	20.2	Healthy life expectancy (years)	116	30.4
<b>ECONOMY</b>	<b>142</b>	<b>37.8</b>	Unemployment rate	149	96
<b>Economic complexity/structure</b>	<b>133</b>	<b>26.3</b>	Economic total performance	21	16.0
Manufacture innovation	133	13.0	Renewable energy consumption (%)	23	72.5
Overhead capital formation (% GDP)	106	30.1	Household footprint per capita	85	81.2
Logistics performance	137	30	Natural hazard exposure	59	81
Transport productive capacity	130	14.3			
Building quality control	47	80			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# GUYANA

**GKI RANK** 82/154

**GKI SCORE** 47.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Guyana is a moderate performer in terms of its knowledge infrastructure. It ranks 82nd out of 154 countries in the Global Knowledge Index 2021 and 1st out of the 27 countries with medium human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **14.693**  
**Population** ..... **786,559**  
**HDI** ..... **0.682**

### AREAS OF STRENGTH

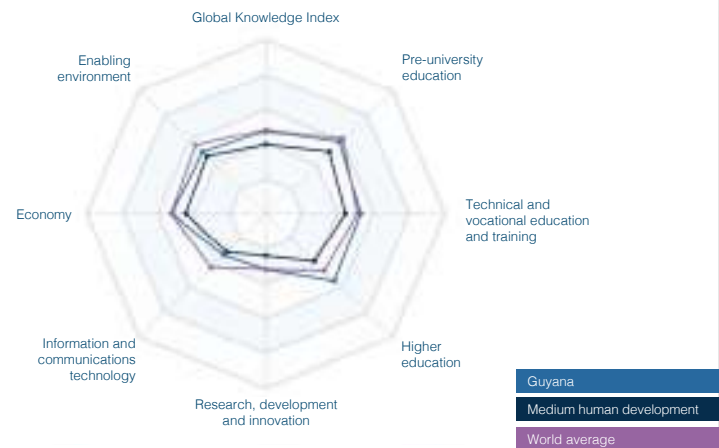
- + Firms that spend on R&D (%)
- + MSME financing gap (% GDP)
- + Foreign direct investment, net inflows (% GDP)
- + Firms offering formal training (%)
- + Trade in digitally deliverable services (% total trade)

### AREAS OF IMPROVEMENT

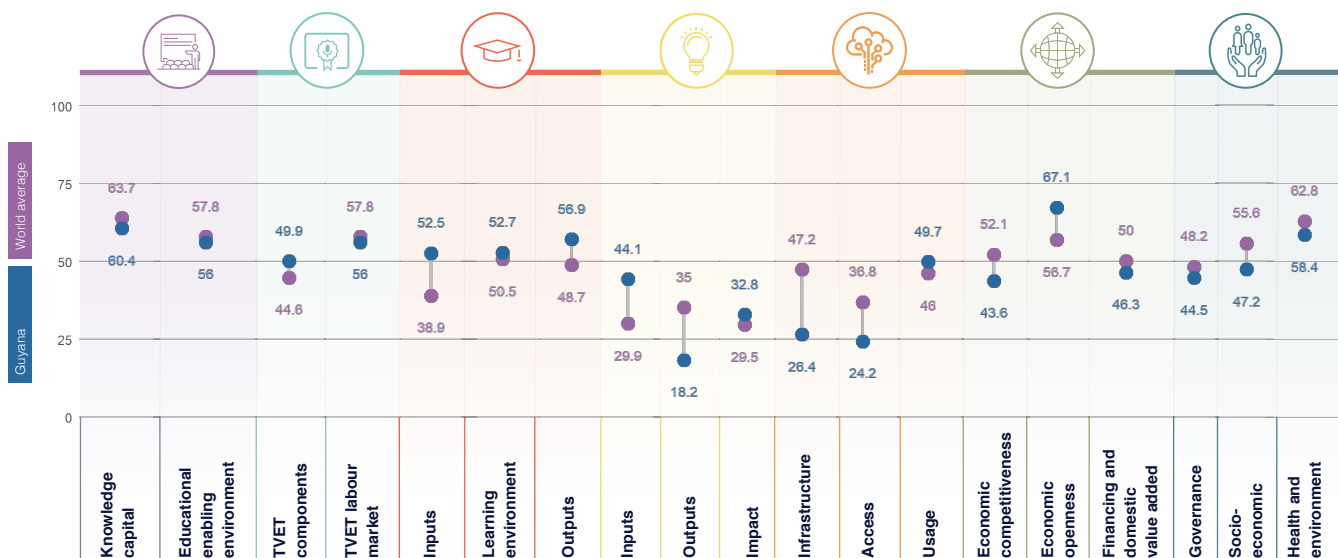
- Building quality control
- Youth not in employment, education or training (%)
- Government funding per secondary student (% of GDP per capita)
- High-technology trade (% total trade)
- Firms constrained with inadequately educated workforce (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	94	58.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	72	53
HIGHER EDUCATION	36	54
RESEARCH, DEVELOPMENT AND INNOVATION	64	31.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	103	33.4
ECONOMY	71	52.4
ENABLING ENVIRONMENT	96	50



## GKI PILLARS







# GUYANA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	63.4
Enrollment	33	83.5
Net enrolment rate in primary education	60	94.5
Net enrolment rate in lower secondary education	79	89.7
Net enrolment rate in upper secondary education	94	83.7
Completion	105	91
Years of compulsory education in primary and secondary	132	66.2
Completion rate in upper secondary education	71	83.9
Success rate rate in the last grade of lower secondary education	104	104
Completion	33	40
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	90	43
<b>Educational enabling environment</b>	<b>81</b>	<b>88</b>
Expenditure	100	10.0
Government expenditure on primary education (% GDP)	123	15.4
Government expenditure on secondary education (% GDP)	114	11.2
Government funding per primary student (% GDP per capita)	122	12.7
Government funding per secondary student (% GDP per capita)	118	2.8
Resources	88	81.7
Pupil-based teacher ratio in primary education	94	71.8
Pupil-based teacher ratio in secondary education	73	88.8
Schools with access to computers in primary education (%)	104	104
Schools with access to computers in secondary education (%)	104	104
Early learning	11	83.2
Class attendance rate in early childhood education	11	76.1
Proportion of children who are developmentally on track	13	79.0
Proportion of children with stimulating home learning environments	19	89.9
Pupil-based teacher ratio in preprimary education	47	83.4
Quality and infrastructure	88	87.8
Completion rate in upper secondary education, gender parity	94	36.0
Completion rate in upper secondary education, wealth parity	64	42.9
Completion rate in upper secondary education, location parity	48	81.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>48</b>	<b>80.8</b>
Companies training apprentices	10	54.5
Firms offering formal training (%)	6	76
Labour force with short-cycle tertiary education (%)	23	81.7
Participation rate in formal and non-formal education and training	72	3
TVET enrolment	67	40.3
Government expenditure on vocational education (%)	104	104
Share of students enrolled in secondary vocational programmes	99	6.4
Share of students enrolling in postsecondary vocational programmes	79	88.2
TVET quality and infrastructure	30	40.0
Extent of staff training	82	82.9
Quality of vocational training	104	104
Ratio of high-skill TVET occupations earnings to average wage	48	31.1
Ratio of median-skill TVET occupations earnings to average wage	69	56.0
<b>TVET labour market</b>	<b>81</b>	<b>98</b>
Efficiency of the labour market	100	41
Firms considered well-integrated with workforce (%)	129	3.8
Employment educational mismatch (%)	53	80.3
Proportion of skilled production workers	104	104
Unemployment rate with vocational education	37	59.0
Real TVET unemployment	81	31
Share of TVET occupations	89	49.5
Manufacturing employment (%)	71	26.4
Quality and infrastructure	11	83.0
Enrollment in vocational education, gender parity	27	82.1
Useable employment rate	77	80.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>27</b>	<b>82.8</b>
Expenditure	88	14.0
Government expenditure per tertiary student	111	3.8
Teaching staff compensation (% tertiary expenditure)	65	24.8
Enrollment	104	104
Enrollment in bachelor's or equivalent level (%)	104	104
Enrollment in masters, doctoral or equivalent (%)	104	104
Resources	9	90.8
Pupil-teacher ratio in tertiary education	15	80.8
Research in higher education (%)	104	104
<b>Learning environment</b>	<b>63</b>	<b>82.7</b>
Directly paid academic freedom	80	88.8
Teachers in tertiary education, gender parity	22	88.0
Labour mobility rate	100	7.4
Academic freedom	68	78.1
Quality and infrastructure	13	41
Class attendance rate in tertiary education, gender parity	23	82.0
Class attendance rate in tertiary education, wealth parity	27	43.4
Class attendance rate in tertiary education, location parity	30	8.8
<b>Outputs</b>	<b>47</b>	<b>56.9</b>
Efficiency	104	104
Educational attainment rate, bachelor's or equivalent	104	104
Educational attainment rate, master's or equivalent	104	104
Educational attainment rate, doctoral or equivalent	104	104
Employment	82	87.0
Labour force participation rate with advanced education	114	48.0
Unemployment rate with advanced education	48	86.0
Impact	48	43.0
University tertiary enrollment in R&D	81	43.0
UNITE students per 100 personnel in higher education	104	104
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>18</b>	<b>87.7</b>
Access to credit resources	10	83.3
GDP (% GDP)	104	104
GDP per researcher	104	104
Researchers per thousand labour force	104	104
Tertiary graduates from STEM programmes (%)	100	24.2
Quality and infrastructure	11	83.3
GDP performed by business enterprises (%)	104	104
GDP financed by business enterprises (%)	104	104
Researchers in business enterprises (%)	104	104
Firms that spend on R&D (%)	3	87
Quality and infrastructure	10	83.3
High-skill employment (%)	37	24.3
Intellectual property payments (% total trade)	113	1.8
State of cluster development	86	43.0
<b>Outputs</b>	<b>102</b>	<b>102</b>
Access to credit resources	104	104
Average documents per researcher	104	104
Citations per document	87	18.0
Patent applications (per 100 billion GDP)	104	104
Quality and infrastructure	11	83.3
Intellectual property receipts (% total trade)	100	2.1
Research design applications (per 100 billion GDP)	104	104
PCT applications (per 100 billion GDP)	70	50.3
Firms producing new goods and services (%)	87	46



# GUYANA

	Rank	Value
<b>Consumer confidence</b>	100	1.1
Treatment applications per 100 million GDP	109	106
Cultural goods exports (% exports)	123	1.1
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>	85	100.0
<b>Energy</b>	100	1.1
Renewable installations percentage	104	104
Depth of innovative companies	104	104
ISO 9001 quality certificates (% GDP)	80	0.8
ISO 14001 environmental certificates (% GDP)	100	1.1
<b>Environment</b>	97	100.0
CERO received from abroad (%)	106	106
Cost savings per storage volume deals (% GDP)	39	26.7
Computer software spending (% GDP)	106	106
<b>Government efficiency</b>	75	100.0
New business density per thousand population	106	106
Firms with new products/services (%)	89	86.4
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	180	25.4
<b>Infrastructure</b>	141	26.4
<b>Coverage</b>	125	31.1
3G/LTE mobile network coverage (% population)	119	87.9
Secure Internet servers per 1 million population	122	1.3
Investment in telecommunication services (% GDP)	83	24.4
<b>Quality</b>	125	1.1
Mobile upload and download speeds	104	104
Fixed broadband upload and download speeds	104	104
Fixed broadband subscriptions (y speed) per hundred people	88	0.3
<b>Availability</b>	100	83.7
Fixed broadband latency (% QM per capita)	100	83.1
Mobile broadband basket (% QM per capita)	122	39.0
Internet and telephone competition	148	29
<b>Access</b>	111	26.2
<b>Subscriptions</b>	111	25.7
Active mobile-broadband subscriptions per fixed-line inhabitants	100	10.0
International Internet bandwidth per user	32	80.4
Households with Internet access at home (%)	110	26.1
<b>Skills and employment</b>	100	16.7
Individuals with standard ICT skills (%)	104	104
Tertiary graduates from ICT programmes (%)	71	31
ICT employment (%)	87	0.4
<b>Usage</b>	71	100.0
<b>Services</b>	87	40.2
Government online services	119	40.5
Fixed broadband Internet traffic per subscription	104	104
Mobile broadband Internet traffic per subscription	104	104
Internet users (%)	114	33.0
<b>Commerce</b>	97	100.0
ICT/FIT patent applications (per 100,000 GDP)	27	81.0
E-participation	113	45.2
Internet activities by individuals (%)	104	104
Trade in digitally deliverable services (% total trade)	12	70.0
<b>ECONOMY</b>	71	100.0
<b>Economic Competitiveness</b>	118	41.0
<b>Infrastructure Investment</b>	141	26.4
Overhead capital formation (% GDP)	104	104
Logistics performance	128	34
Transport productive capacity	30	30.0
Building quality control	143	24.7

	Rank	Value
<b>Business agility</b>	75	100.0
Cost of starting a business	86	86.0
Recovery recovery rate	128	30
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	79	57.1
<b>Customer experience</b>	43	100.0
Trust and dissatisfaction	123	40.1
<b>Trade (% GDP)</b>	104	104
High-technology trade (% total trade)	143	12.0
Market concentration	137	47.1
Market concentration	112	84.0
Product diversity	9	91.0
Climate financial openness	80	71.7
Foreign direct investment, net inflows (% GDP)	1	100
Cost dynamics	104	104
<b>Financing and domestic value added</b>	30	100.0
<b>Financing and costs</b>	27	87.0
Domestic credit to private sector (% GDP)	80	14.1
IMRS financing gap (% GDP)	4	80.4
Tax and contribution rate (% profit)	43	77
Bank nonperforming loans (%)	104	104
Unmet loan demand	127	11.1
Medium- and high-tech activities value added	104	104
Industry and services value added (% GDP)	104	54.1
Labour underutilization rate	128	26
Output per worker	81	11.2
<b>ENABLING ENVIRONMENT</b>	84	50
<b>Governance</b>	78	44.5
<b>Political environment</b>	80	44.3
Peace and stability	80	42.5
View and accountability	88	54.1
Quality of institutions	86	40.7
Rule of law	87	34.1
Control of corruption	74	49.0
Government effectiveness	87	37.0
<b>Socio-economic</b>	108	47.2
<b>Gender equity</b>	100	100.0
Female-to-male ratio in parliament	37	80.0
Female-to-male labour force participation	117	80.8
Female-to-male ratio in internal wage	104	104
Gender inequality	74	87.2
Social protection coverage (% population)	1	100
Adult literacy rate	80	81.0
Youth not in employment, education or training (%)	140	100
<b>Standard of living</b>	100	100.0
Poverty headcount ratio (% population)	104	104
GDP per capita	80	10.4
<b>Health and environment</b>	112	55.4
<b>Health</b>	100	84
Universal health coverage	85	72
Healthy life expectancy (years)	128	42.0
Under-five mortality rate	107	70.3
Environmental performance	75	83.0
Renewable energy consumption (%)	34	17.4
Household footprint per capita	86	78.8
Natural hazard exposure	59	81

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# HONDURAS

KEY INDICATORS	
GDP US\$ billions	50.894
Population	9,904,608
HDI	0.634

**GKI RANK** 113/154

**GKI SCORE** 40.1

**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**

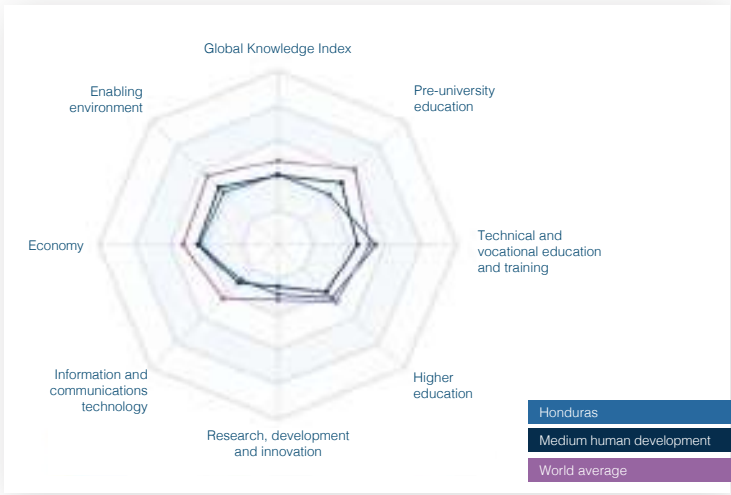
Honduras is a modest performer in terms of its knowledge infrastructure. It ranks 113th out of 154 countries in the Global Knowledge Index 2021 and 13th out of the 27 countries with medium human development.

- AREAS OF STRENGTH**
- + Citations per document
  - + Government expenditure on primary education (% of GDP)
  - + Share of students enrolled in secondary vocational programmes
  - + Ratio of medium-skill TVET occupations earnings to average wage
  - + Ratio of high-skill TVET occupations earnings to average wage

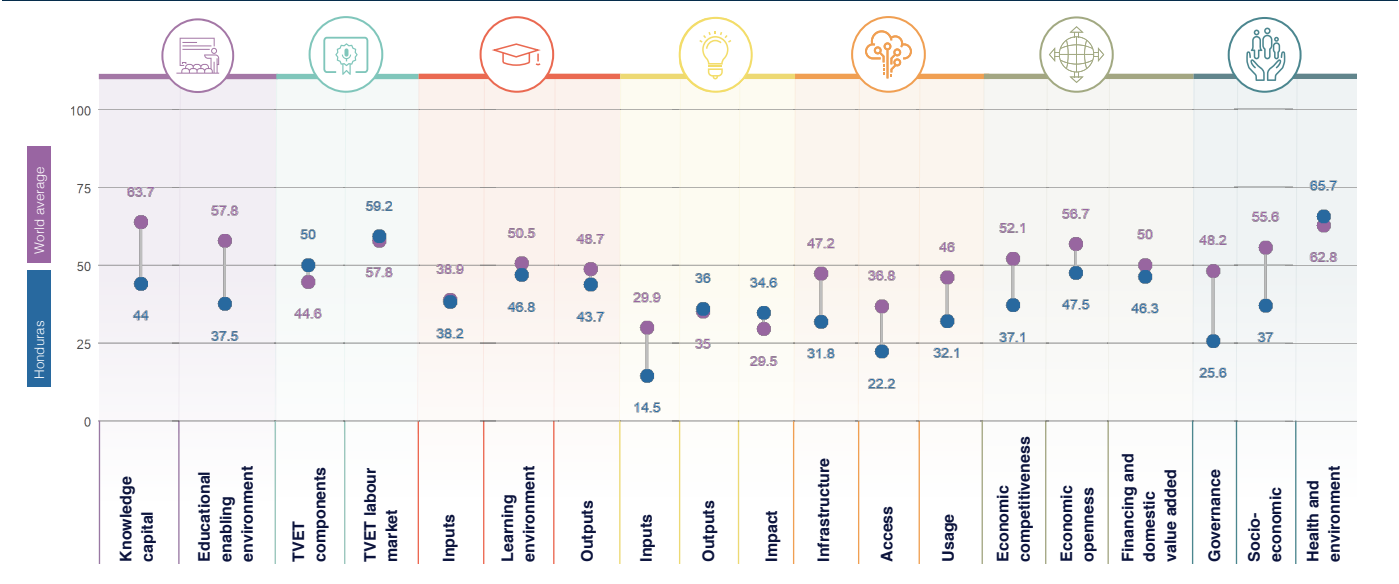
- AREAS OF IMPROVEMENT**
- Chinn-Ito financial openness
  - Industrial design applications (per 100 billion GDP)
  - GERD (% GDP)
  - Research institutions prominence
  - Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	128	40.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	58	54.6
HIGHER EDUCATION	85	42.9
RESEARCH, DEVELOPMENT AND INNOVATION	88	28.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	116	28.7
ECONOMY	123	43.6
ENABLING ENVIRONMENT	123	42.8



## GKI PILLARS







# HONDURAS

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	126	40.8
Enrollment	128	41.7
Net enrolment rate in primary education	129	51.4
Net enrolment rate in lower secondary education	122	40.5
Net enrolment rate in upper secondary education	118	33.1
Completion	112	53.3
Years of compulsory education in primary and secondary	28	88.6
Completion rate in upper secondary education	89	47.3
Success rate rate in the last grade of lower secondary education	127	21.9
Completion	100	37
Assessment of 15-year-old students in math, science and reading	116	114
Learning-adjusted years of schooling	111	37
<b>Educational enabling environment</b>		
Expenditure	22	45.0
Government expenditure on primary education (% GDP)	8	84.3
Government expenditure on secondary education (% GDP)	82	26.0
Government funding per primary student (% GDP per capita)	29	21.5
Government funding per secondary student (% GDP per capita)	52	32
Resources	112	12.1
Pupil-based teacher ratio in primary education	116	114
Pupil-based teacher ratio in secondary education	116	114
Schools with access to computers in primary education (%)	79	15.3
Schools with access to computers in secondary education (%)	116	114
Early learning	100	45.1
Class attendance rate in early childhood education	88	31.1
Proportion of children who are developmentally on track	49	44.3
Proportion of children with stimulating home learning environments	95	28.2
Pupil-based teacher ratio in preprimary education	23	79.2
Quality and infrastructure	100	41.0
Completion rate in upper secondary education, gender parity	100	75.7
Completion rate in upper secondary education, wealth parity	85	30.1
Completion rate in upper secondary education, location parity	94	30
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	111	31.5
Firms offering formal training (%)	27	58.2
Labour force with short-cycle tertiary education (%)	116	114
Participation rate in formal and non-formal education and training	84	4.2
<b>TVET resources</b>		
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	11	52.2
Share of students enrolled in postsecondary vocational programmes	114	114
<b>TVET quality and infrastructure</b>		
Extent of staff training	84	57.1
Quality of vocational training	81	45.0
Ratio of high-skil TVET occupations earnings to average wage	13	33.7
Ratio of medium-skill TVET occupations earnings to average wage	13	62.1
<b>TVET labour market</b>		
Efficiency of the labour market	100	11.4
Firms considered well-integrated with labour (%)	104	23.6
Employment educational mismatch (%)	53	40.0
Proportion of skilled production workers	29	34.1
Unemployment rate with vocational education	77	32.7
Real TVET unemployment	10	31
Share of TVET occupations	90	45.7
Manufacturing employment (%)	25	80.4
Quality and infrastructure	10	71.1
Enrollment in vocational education, gender parity	85	84.0
Useable employment rate	30	57.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	74	23.6
Government expenditure per tertiary student	21	7.8
Teaching staff compensation (% tertiary expenditure)	41	28.6
Enrollment	60	12.0
Enrollment in bachelor's or equivalent level (%)	86	18.0
Enrollment in masters, doctoral or equivalent (%)	94	0.2
Resources	27	78.2
Rpnteacher ratio in tertiary education	76	71.6
Research in higher education (%)	13	84.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	20	83.0
Labour mobility rate	90	2.9
Academic freedom	29	62.7
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	44	38.0
Class attendance rate in tertiary education, wealth parity	66	14.0
Class attendance rate in tertiary education, location parity	48	31
<b>Outputs</b>		
Retention	10	22.0
Educational attainment rate, bachelor's or equivalent	77	20.5
Educational attainment rate, master's or equivalent	104	114
Educational attainment rate, doctoral or equivalent	114	114
Employment	23	84
Labour force participation rate with advanced education	17	84.5
Unemployment rate with advanced education	68	81.0
<b>Impact</b>		
University tertiary enrollment in FSD	86	37.0
OECD students per 1000 persons in higher education	99	11.2
<b>Government's contribution and financing plan</b>		
<b>Inputs</b>		
Share of GDP expenditure	100	14.2
GDP (% GDP)	114	0.4
GERD per researcher	99	9.8
Researchers per thousand labour force	99	0.3
Tertiary graduates from STEM programmes (%)	99	28.1
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	114	114
GERD financed by business enterprises (%)	76	12.0
Researchers in business enterprises (%)	114	114
Firms that spend on R&D (%)	82	13.0
<b>Quality and infrastructure</b>		
High-skilled employment (%)	76	0.6
Intellectual property payments (% total trade)	55	15.1
State of cluster development	73	46
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	72	63.2
Citations per document	7	89.0
Patent applications (per 100 billion GDP)	106	31
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	114	114
Research and development expenditure (per 100 billion GDP)	112	0.4
PCT applications (per 100 billion GDP)	119	32.0
Firms producing new goods and services (%)	44	62.0





# HONDURAS

	Rank	Value
<b>Business environment</b>	107	10.0
Treatment applications per 100 million GDP	89	23.4
Cultural goods exports (% exports)	118	1.8
Printing and publishing output (% manufactured output)	196	1.9
<b>Energy</b>	85	10.0
<b>Trade</b>	85	10.0
Access to institutions' provisions	115	9
Depth of innovative companies	89	48.5
ISO 9001 quality certificates (% GDP)	77	10.0
ISO 14001 environmental certificates (% GDP)	77	5.7
<b>Transport</b>	85	10.0
CERD freedom from abuse (%)	75	5.7
Cost volume per storage volume deals (% GDP)	75	7.8
Computer software spending (% GDP)	40	23.1
<b>Government services</b>	100	10.0
New business density per thousand population	196	1.9
Firms with one or more employees (%)	25	34.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>111</b>	<b>22.2</b>
<b>Infrastructure</b>	122	21.8
<b>Coverage</b>	85	10
3G/4G mobile network coverage (% population)	100	75
Secure Internet servers per 1 million population	112	1.7
Investment in telecommunication services (% GDP)	27	49.3
<b>Speed</b>	108	8.8
Mobile upload and download speeds	85	26.2
Fixed broadband upload and download speeds	85	4.1
Fixed broadband subscriptions (y speed) per hundred people	88	5.1
<b>Availability</b>	108	41.0
Fixed broadband latency (% QM per capita)	123	24.3
Mobile broadband basket (% QM per capita)	157	25.3
Internet and telephone competition	135	30
<b>Access</b>	<b>114</b>	<b>22.2</b>
<b>Subscriptions</b>	111	21.8
Active mobile-broadband subscriptions per fixed-line inhabitants	111	21.8
International Internet bandwidth per user	84	37.0
Households with Internet access at home (%)	112	26.3
<b>Skills and employment</b>	112	16.6
Individuals with standard ICT skills (%)	104	1.9
Tertiary graduates from ICT programmes (%)	85	24.5
ICT employment (%)	80	9.8
<b>Usage</b>	<b>112</b>	<b>21.8</b>
<b>Services</b>	111	21.8
Government online services	111	45.5
Fixed broadband internet traffic per subscription	67	13.5
Mobile broadband internet traffic per subscription	27	25.5
Internet users (%)	122	28.4
<b>Commerce</b>	100	25.0
ICT/FIT patent applications (per 100,000 GDP)	196	1.9
E-participation	108	45.0
Internet activities by individuals (%)	104	1.9
Trade in digitally deliverable services (% total trade)	114	24.0
<b>ECONOMY</b>	<b>123</b>	<b>43.6</b>
<b>Economic complexity indexes</b>	134	37.3
<b>REGULATION</b>	111	43.0
Overhead capital formation (% GDP)	100	30
Logistics performance	85	40.1
Transport productive capacity	52	32.5
Building quality control	115	80

	Rank	Value
<b>Business agility</b>	100	31
Cost of starting a business	145	31.3
Recovery recovery rate	122	21.5
Entrepreneurial employee activity rate	196	1.9
Growth of corporate transactions	118	8
<b>Business openness</b>	<b>111</b>	<b>47.3</b>
<b>Trade and investment</b>	84	35
Trade (% GDP)	80	35.2
High-technology trade (% total trade)	89	42.0
Market concentration	72	76.1
Market concentration	102	71.7
Product diversity	100	31.1
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	29	81
Cost dynamics	80	49.7
<b>Financing and domestic value added</b>	<b>85</b>	<b>40.3</b>
<b>Financing and costs</b>	40	43.0
Domestic credit to private sector (% GDP)	85	25.1
MSME financing gap (% GDP)	45	70.2
Tax and contribution rate (% profit)	80	85.4
Bank nonperforming loans (%)	49	87.7
Unmet loan demand	102	35
Medium- and high-tech activities value added	118	6.1
Industry and services value added (% GDP)	72	82.0
Labour underutilization rate	128	45.8
Output per worker	121	4.8
<b>ENABLING ENVIRONMENT</b>	<b>122</b>	<b>40.8</b>
<b>GOVERNANCE</b>	<b>118</b>	<b>25.5</b>
Political environment	100	23.7
Peace and stability	100	25.4
View and accountability	100	30.8
Quality of institutions	125	22.5
Rule of law	102	17.3
Control of corruption	125	20.7
Government effectiveness	112	28.8
<b>Socio-economic</b>	<b>124</b>	<b>37</b>
Gender equity	117	41.8
Female-to-male ratio in parliament	94	26.7
Female-to-male labour force participation	123	57.1
Female-to-male ratio in internal wage	118	1.9
Gender inequality	114	32.0
Social protection coverage (% population)	86	24.5
Adult literacy rate	74	83.0
Youth not in employment, education or training (%)	122	43
<b>Standard of living</b>	102	18.2
Poverty headcount ratio (% population)	144	21.4
GDP per capita	110	4
<b>Health and environment</b>	<b>83</b>	<b>55.7</b>
<b>Health</b>	81	71.0
Universal health coverage	85	85
Healthy life expectancy (years)	88	82.8
Under-five mortality rate	85	87.1
Environmental performance	80	88.0
Renewable energy consumption (%)	40	81.0
Household footprint per capita	81	80.4
Natural hazard exposure	150	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 29/154

**GKI SCORE** 61

**WORLD AVERAGE** 48.4

# HONG KONG, CHINA (SAR)

## KEY INDICATORS

GDP US\$ billions ..... **420.133**  
 Population ..... **7,496,988**  
 HDI ..... **0.949**

## COUNTRY PERFORMANCE SUMMARY

Hong Kong, China (SAR) is a leading performer in terms of its knowledge infrastructure. It ranks 29th out of 154 countries in the Global Knowledge Index 2021 and 29th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

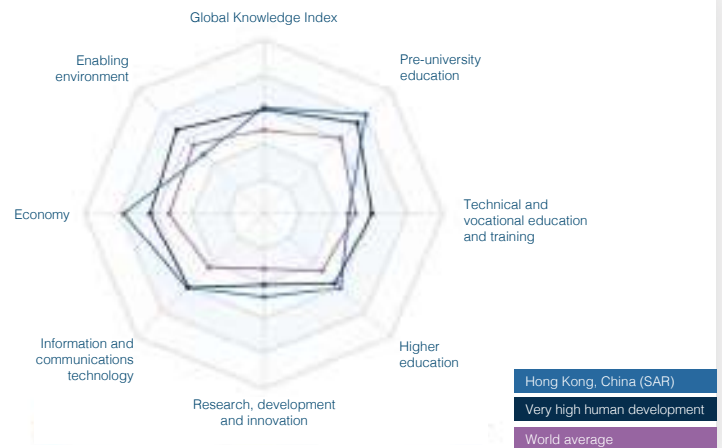
- + International Internet bandwidth per user
- + High-technology trade (% total trade)
- + Domestic credit to private sector (% GDP)
- + Learning-adjusted years of schooling
- + Government expenditure per tertiary student

### AREAS OF IMPROVEMENT

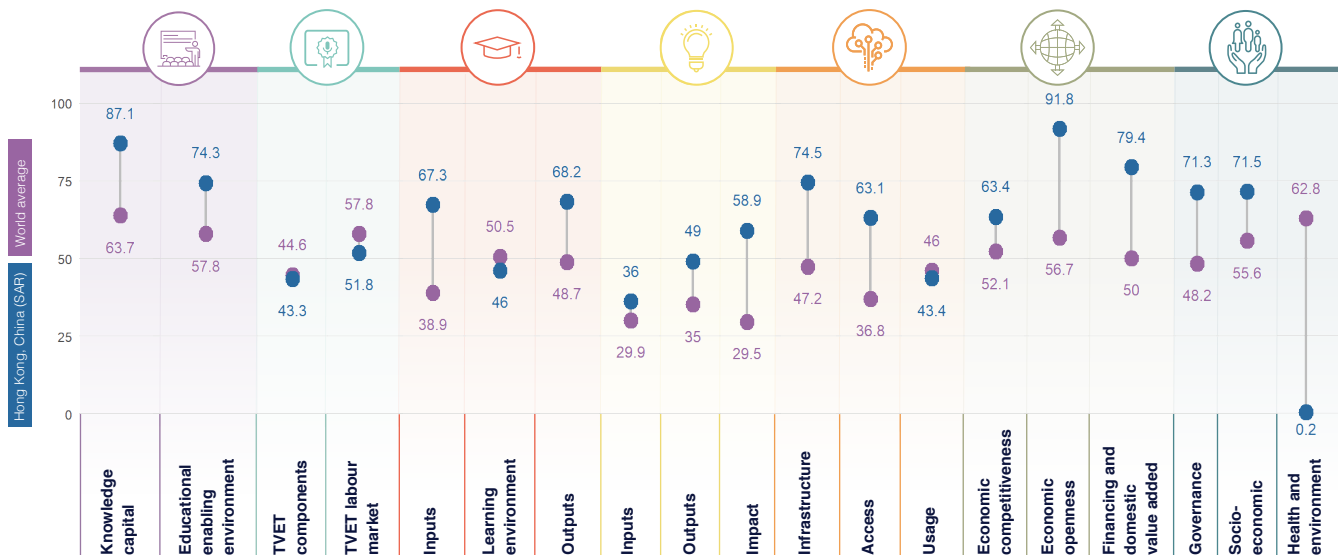
- Enrolment in vocational education, gender parity
- Renewable energy consumption (%)
- Manufacturing employment (%)
- Government online services
- E-participation

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	11	80.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	90	47.5
HIGHER EDUCATION	24	60.5
RESEARCH, DEVELOPMENT AND INNOVATION	15	47.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	29	60.3
ECONOMY	3	78.2
ENABLING ENVIRONMENT	106	47.7



## GKI PILLARS





# HONG KONG

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	3	87.5
Enrolment	27	97.1
Net enrolment rate in primary education	75	92.5
Net enrolment rate in lower secondary education	27	99.2
Net enrolment rate in upper secondary education	4	98.7
Completion	50	75.5
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	11	87.8
Completion	2	95.0
Assessment of "Crystal Ball" students in math, science and reading	3	90.3
Learning-adjusted years of schooling	2	81.3
<b>Educational enabling environment</b>		
Expenditure	57	37.1
Government expenditure on primary education (% GDP)	42	29.0
Government expenditure on secondary education (% GDP)	62	25.5
Government funding per primary student (% GDP per capita)	57	40.2
Government funding per secondary student (% GDP per capita)	32	39.0
Resources	17	97.1
Pupil-based teacher ratio in primary education	6	90.0
Pupil-based teacher ratio in secondary education	6	90.2
Schools with access to computers in primary education (%)	34	92.5
Schools with access to computers in secondary education (%)	49	90
Early learning	4	85.7
Class attendance rate in early childhood education	1	99.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	7	90.7
Quality and inclusiveness	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communications training and learning	116	116
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	57	31
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	125	2.3
Share of students enrolled in postsecondary vocational programmes	81	89.6
TVET quality and inclusiveness	57	52.0
Extent of staff training	72	70
Quality of vocational training	13	87.9
Ratio of high-skill TVET occupations earnings to average wage	37	56.4
Ratio of median-skill TVET occupations earnings to average wage	45	47.0
<b>TVET labour market</b>		
Efficiency of the labour market	116	116
Firms considered with inappropriately educated workforce (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	116	116
High TVET unemployment	116	53.0
Share of TVET occupations	24	70.1
Manufacturing employment (%)	100	5.9
Quality and inclusiveness	57	61.1
Enrolment in vocational education, gender parity	111	36.1
Useable employment rate	12	34

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	1	100
Government expenditure per tertiary student	1	100
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	30	30.7
Enrolment in bachelor's or equivalent level (%)	84	33.6
Enrolment in masters, doctoral or equivalent (%)	30	45.7
Resources	75	63.2
Pupil-teacher ratio in tertiary education	116	116
Researchers in higher education (%)	55	62.2
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	93	97.1
Academic freedom	122	34.0
<b>Quality and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Skilled worker	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Skilled worker	52	81.0
Labour force participation rate with advanced education	55	74.5
Unemployment rate with advanced education	36	88.0
Impact	30	54.0
University tertiary enrolment in R&D	17	65.0
CRISPE scholars rate per 100 personnel in higher education	42	43.0
<b>Government's contribution to economic growth</b>		
Output	11	90
Value added in manufacturing	17	100.0
GDP (% GDP)	41	17.3
GERD per researcher	80	28.5
Researchers per thousand labour force	24	45.7
Tertiary graduates from STEM programmes (%)	116	116
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	42	10.7
GERD financed by business enterprises (%)	27	60.8
Researchers in business enterprises (%)	34	43.2
Firms that spend on R&D (%)	116	116
Quality of innovation environment	116	100.0
High-skill employment (%)	30	62.1
Intellectual property payments (% total trade)	67	7.6
State of cluster development	6	10.1
<b>Support</b>		
Government's contribution	0	100.0
Average documents per researcher	27	85.7
Citations per document	6	70.1
Patent applications (per 100 billion GDP)	64	52
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	50	13.2
Research and development expenditure (per 100 billion GDP)	41	13.7
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	116	116





# HONG KONG

	Rank	Value
<b>Consumer &amp; business credit</b>		
Treatment applications per 100 million GDP	33	50.1
Cultural goods exports (% exports)	18	81.2
Printing and publishing output (% manufactured output)	196	196
<b>Finance</b>	5	95.3
<b>Banking</b>	9	92.2
Ratio of institutions' provisions	27	34.3
Depth of innovative companies	30	30
ISO 9001 quality certificates (% GDP)	57	32
ISO 14001 environmental certificates (% GDP)	80	10.2
<b>Insurance</b>	10	91.5
CERD received from abroad (%)	77	1
Cost of letters per storage of letters dealt (% GDP)	6	86.1
Computer software spending (% GDP)	24	32.0
<b>Government &amp; public services</b>	1	100
New business density per thousand population	1	100
Firms with new products/services (%)	196	196
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>28</b>	<b>62.3</b>
<b>Infrastructure</b>	9	74.3
<b>Coverage</b>	23	52.2
30MHz mobile network coverage (% population)	48	82.2
Secure Internet servers per 1 million population	12	50.4
Investment in telecommunication services (% GDP)	115	18.2
<b>Quality</b>	8	82.2
Mobile speed and download speeds	23	43.1
Fixed broadband upload and download speeds	2	84.1
Fixed broadband subscriptions (by speed) per hundred people	15	82.5
<b>Availability</b>	1	97.3
Fixed broadband bandwidth (% Gbps per capita)	4	30
Mobile broadband basket (% Gbps per capita)	2	37
Internet and telephony competition	1	100
<b>Access</b>	13	62.5
<b>Subscribers</b>	2	95.1
Active mobile-broadband subscriptions per hundred inhabitants	9	82.1
International Internet bandwidth per user	1	100
Households with Internet access at home (%)	15	84.1
<b>Skills and employment</b>	44	45.2
Individuals with standard ICT skills (%)	45	40.9
Tertiary graduates from ICT programmes (%)	196	196
ICT employment (%)	196	196
<b>Usage</b>	89	42.4
<b>Services</b>	87	38.4
Government online services	100	8
Fixed broadband Internet traffic per subscriber	13	40
Mobile broadband Internet traffic per subscriber	38	25.5
Internet users (%)	94	80
<b>Commerce</b>	70	41.5
ICT FDI parent applications (per 100 million GDP)	196	196
E-participation	100	8
Internet activities by individuals (%)	6	87.9
Trade in digitally deliverable services (% total trade)	30	54.7
<b>ECONOMY</b>	<b>3</b>	<b>76.2</b>
<b>Economic &amp; property services</b>	23	62.4
<b>Infrastructure investment</b>	21	62.2
Overhead capital formation (% GDP)	122	15.4
Logistics performance	58	40
Transport productive capacity	27	42.5
Building quality control	1	100

	Rank	Value
<b>Business agility</b>	81	32.2
Cost of starting a business	5	88.2
Recovery recovery rate	19	84.7
Entrepreneurial employee activity rate	45	17
Growth of corporate transactions	50	21.4
<b>Corporate openness</b>	2	91.5
<b>Trade and investment</b>	1	92.2
Trade (% GDP)	1	100
High-technology trade (% total trade)	1	100
Market concentration	100	87.7
Market concentration	39	82.2
<b>Product openness</b>	4	89.4
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	15	85.2
Cost dynamics	1	100
<b>Financing and domestic value added</b>	2	75.4
<b>Financing and costs</b>	1	94.2
Domestic credit to private sector (% GDP)	1	100
MSME financing gap (% GDP)	196	196
Tax and contribution rate (% profit)	10	85.0
Bank nonperforming loans (%)	6	87.2
<b>Unmet needs index</b>	13	81.4
Medium- and high-tech activities value added	38	44.5
Industry and services value added (% GDP)	11	75.1
Labour underutilization rate	19	86.1
Output per worker	11	45.7
<b>ENABLING ENVIRONMENT</b>	<b>196</b>	<b>47.2</b>
<b>Governance</b>	38	71.3
<b>Political environment</b>	50	64.2
Peace and stability	85	50
View and accountability	75	48.3
Quality of institutions	12	85.4
Rule of law	13	81.6
Control of corruption	16	83.2
Government effectiveness	9	85.2
<b>Socio-economic</b>	25	71.5
<b>Gender equity</b>	9	87.5
Female-to-male ratio in parliament	196	196
Female-to-male labour force participation	87	27.6
Female-to-male ratio in internal wage	55	87.4
<b>Gender equality</b>	81	70.2
Social protection coverage (% population)	52	85.5
Adult literacy rate	196	196
Youth not in employment, education or training (%)	8	84.1
<b>Standard of living</b>	17	80.2
Poverty headcount ratio (% population)	196	196
GDP per capita	13	80.5
<b>Health and environment</b>	<b>154</b>	<b>5.2</b>
<b>Health</b>	196	100
Universal health coverage	196	196
Healthy life expectancy (years)	196	196
Under-five mortality rate	196	196
<b>Environmental performance</b>	104	11.2
Renewable energy consumption (%)	148	0.2
Household footprint per capita	196	196
Natural hazard exposure	196	196

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 30/154

**GKI SCORE** 60.2

**WORLD AVERAGE** 48.4

# HUNGARY

## COUNTRY PERFORMANCE SUMMARY

Hungary is a leading performer in terms of its knowledge infrastructure. It ranks 30th out of 154 countries in the Global Knowledge Index 2021 and 30th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **302.318**  
**Population** ..... **9,660,350**  
**HDI** ..... **0.854**

### AREAS OF STRENGTH

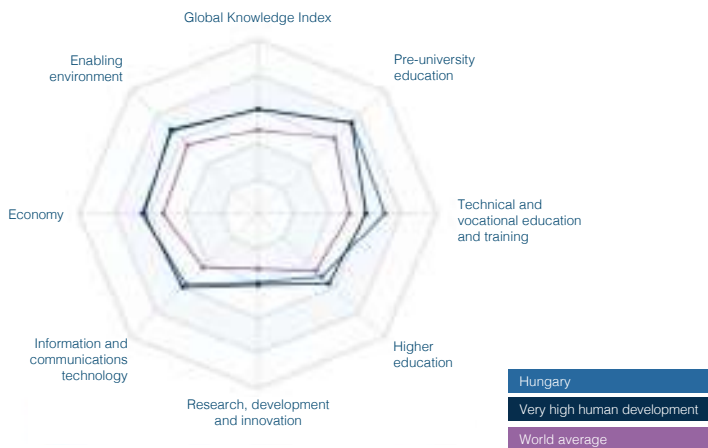
- + Unemployment rate with advanced education
- + Share of TVET occupations
- + Manufacturing employment (%)
- + Employment educational mismatch (%)
- + Bank non-performing loans (%)

### AREAS OF IMPROVEMENT

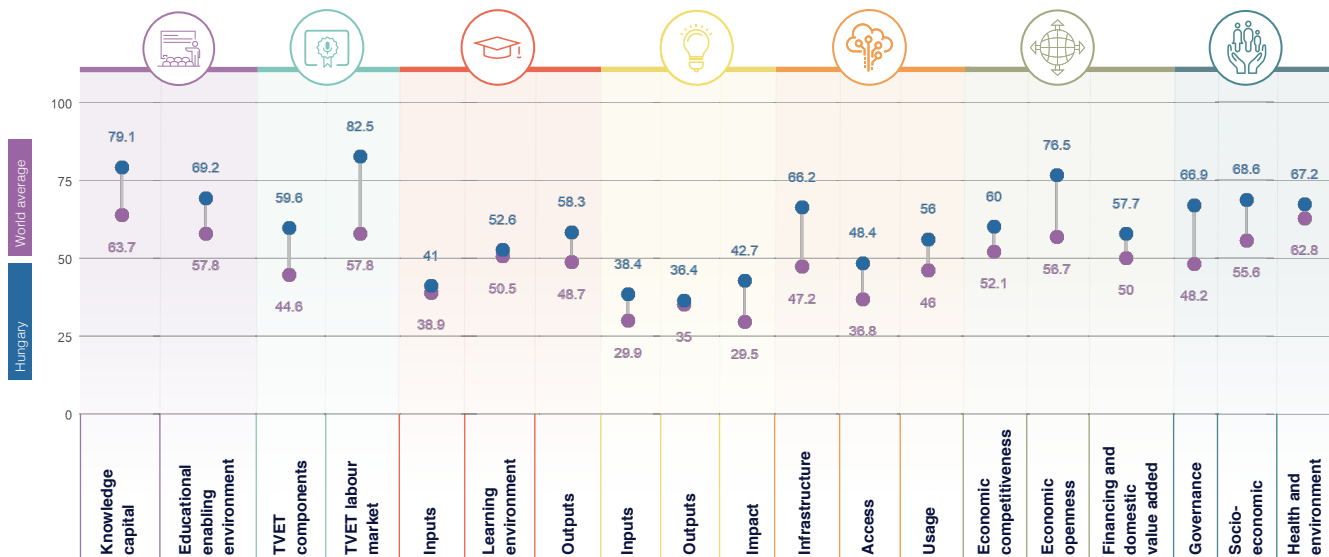
- Ratio of high-skill TVET occupations earnings to average wage
- Female-to-male ratio in parliament
- MSME financing gap (% GDP)
- Researchers in higher education (%)
- Government expenditure on primary education (% of GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	43	74.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	5	71
HIGHER EDUCATION	44	50.6
RESEARCH, DEVELOPMENT AND INNOVATION	33	39.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	38	56.9
ECONOMY	30	64.7
ENABLING ENVIRONMENT	33	67.6



## GKI PILLARS





# HUNGARY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	43	76.5
Enrolment	60	63.0
Net enrolment rate in primary education	85	63.4
Net enrolment rate in lower secondary education	82	60.0
Net enrolment rate in upper secondary education	54	64.0
Completion	47	61.3
Years of compulsory education in primary and secondary	42	74.0
Completion rate in upper secondary education	30	60.0
Success rate rate in the last grade of lower secondary education	21	77.4
Completion	30	67.7
Assessment of PISA/PIAAC students in math, science and reading	21	68.0
Learning-adjusted years of schooling	30	76
<b>Educational enabling environment</b>		
Enrolment	60	60.0
Government expenditure on primary education (% GDP)	129	16.1
Government expenditure on secondary education (% GDP)	47	33.1
Government funding per primary student (% GDP per capita)	33	40.5
Government funding per secondary student (% GDP per capita)	54	32.7
Resources	1	100
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	77	52.0
Class attendance rate in early childhood education	43	69.0
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	31	61.0
Completion rate in upper secondary education, gender parity	34	65.0
Completion rate in upper secondary education, wealth parity	35	70.0
Completion rate in upper secondary education, location parity	26	66
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	20	67.1
Firms offering formal training (%)	66	35.4
Labour force with short-cycle tertiary education (%)	7	60.4
Participation rate in formal and non-formal education and training	62	35.4
TVET enrolment	10	33.0
Government expenditure on vocational education (%)	9	66.0
Share of students enrolled in secondary vocational programmes	6	66.7
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	116	66.1
Extent of staff training	100	44.0
Quality of vocational training	100	42.0
Ratio of high-skill TVET occupations earnings to average wage	64	17.1
Ratio of medium-skill TVET occupations earnings to average wage	65	40
<b>TVET labour market</b>		
Efficiency of the labour market	22	71.1
Firms considered well-integrated with workforce (%)	69	61
Employment educational mismatch (%)	5	60.0
Proportion of skilled production workers	30	64.0
Unemployment rate with vocational education	43	60.0
Real TVET unemployment	0	60.0
Share of TVET occupations	5	60.1
Manufacturing employment (%)	6	70.0
Quality and infrastructure	11	61.0
Enrolment in vocational education, gender parity	67	63.7
Useable employment rate	60	63.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrolment	60	61.0
Government expenditure per tertiary student	30	21.0
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	41	30
Enrolment in bachelor's or equivalent level (%)	62	26
Enrolment in master's, doctoral or equivalent (%)	32	49.0
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	27	66.0
Research staff in higher education (%)	57	58.0
<b>Learning environment</b>		
Timely and academic freedom	71	63.0
Teachers in tertiary education, gender parity	57	66.7
Labour mobility rate	11	44.4
Academic freedom	112	42.7
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	66	116
<b>Outputs</b>		
Retention	32	46.0
Educational attainment rate, bachelor's or equivalent	33	62.0
Educational attainment rate, master's or equivalent	29	46.0
Educational attainment rate, doctoral or equivalent	32	33
Employment	38	61.1
Labour force participation rate with advanced education	53	67.0
Unemployment rate with advanced education	4	64.7
<b>Impact</b>		
University tertiary enrolment in R&D	66	44.0
OECD indicators per 100 personnel in higher education	34	46
<b>Government's contribution to economic growth</b>		
Output	22	34.4
Government's contribution to economic growth	11	60.0
GDP (% GDP)	22	36.0
GERD per researcher	67	23.0
Researchers per thousand labour force	27	42.1
Tertiary graduates from STEM programmes (%)	66	43.1
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	19	31.0
GERD financed by business enterprises (%)	20	65.0
Researchers in business enterprises (%)	7	77.0
Firms that spend on R&D (%)	25	12.0
<b>Quality of innovation</b>		
High-skill employment (%)	66	116
Intellectual property payments (% total trade)	41	25.0
State of cluster development	66	47.0
<b>Outputs</b>		
Government's contribution to economic growth	11	60.0
Average documents per researcher	77	60.0
Citations per document	50	36.0
Patent applications (per 100 billion GDP)	40	64.0
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	20	30
Research design applications (per 100 billion GDP)	13	14.0
PCT applications (per 100 billion GDP)	35	65.0
Firms producing new goods and services (%)	66	26.1

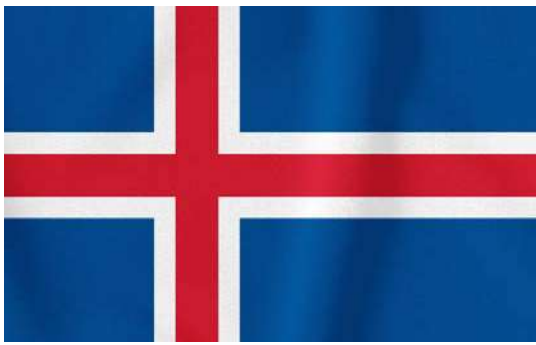


# HUNGARY

	Rank	Value
<b>Business environment</b>	99	41.3
Treatment applications (per 100 million GDP)	75	21.3
Cultural goods exports (% exports)	81	12.6
Printing and publishing output (% manufactured output)	75	17.0
<b>Energy</b>	115	55.7
<b>Finance</b>	5	84.0
Access to venture's provisions	45	23.0
Depth of innovative companies	100	43.5
ISO 9001 quality certificates (% GDP)	10	80.5
ISO 14001 environmental certificates (% GDP)	10	55.0
<b>Infrastructure</b>	11	78
CERD freedom from abuse (%)	29	25.3
Cost savings per strategic storage deals (% GDP)	85	6.3
Computer software spending (% GDP)	52	22.4
<b>Government services</b>	99	40.0
New business density per thousand population	40	16.5
Firms with new products/services (%)	15	76
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>38</b>	<b>58.9</b>
<b>Infrastructure</b>	29	66.8
<b>Coverage</b>	21	64.2
30MHz mobile network coverage (% population)	41	69.1
Secure Internet servers per 1 million population	24	34.5
Investment in telecommunication services (% GDP)	78	20.9
<b>Speed</b>	27	52.2
Mobile upload and download speeds	23	42.6
Fixed broadband upload and download speeds	14	48.2
Fixed broadband subscriptions (by speed) per hundred people	23	31.5
<b>Accessibility</b>	95	35.3
Fixed broadband basket (% GNI per capita)	49	63.2
Mobile broadband basket (% GNI per capita)	11	67.7
Internet and telephony competition	1	100
<b>Access</b>	<b>66</b>	<b>66.6</b>
<b>Subscribers</b>	27	53.3
Active mobile-broadband subscriptions per fixed-line inhabitants	65	32
International Internet bandwidth per user	89	45.4
Households with Internet access at home (%)	35	87.8
<b>Skills and employment</b>	41	51.4
Individuals with standard ICT skills (%)	40	44.0
Tertiary graduates from ICT programmes (%)	10	35.4
ICT employment (%)	28	30
<b>Usage</b>	<b>49</b>	<b>38</b>
<b>Services</b>	61	45.2
Government online services	54	34.7
Fixed broadband Internet traffic per subscriber	45	22.1
Mobile broadband Internet traffic per subscriber	52	16
Internet users (%)	40	83.0
<b>Commerce</b>	95	52.7
ICT FDI parent applications (per 100 million GDP)	41	50.4
E-participation	74	67.9
Internet activities by individuals (%)	30	35.3
Trade in digitally deliverable services (% total trade)	35	55.2
<b>ECONOMY</b>	<b>33</b>	<b>64.7</b>
<b>Economic competitiveness</b>	47	30
OECD innovation leadership	11	11.0
Overhead capital formation (% GDP)	21	81
Logistics performance	29	60.5
Transport productive capacity	35	35.0
Building quality control	22	86.7

	Rank	Value
<b>Business agility</b>	99	50.0
Ease of starting a business	75	65.2
Recovery recovery rate	51	46
Entrepreneurial employee activity rate	39	25
Growth of corporate transactions	50	21.4
<b>Corporate openness</b>	<b>11</b>	<b>76.3</b>
Trust and dissatisfaction	5	70.4
Tax (% GDP)	11	65.4
High-technology trade (% total trade)	92	60
Market concentration	29	64.3
Market concentration	69	81
Product diversity	10	73.0
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	85	40.0
Cost dynamics	41	60
<b>Financing and domestic value added</b>	<b>43</b>	<b>57.7</b>
<b>Financing and costs</b>	59	22.1
Domestic credit to private sector (% GDP)	54	12.0
IMRS financing gap (% GDP)	34	40.5
Tax and contribution rate (% profit)	85	69.6
Bank nonperforming loans (%)	7	67
Unmet loan demand	10	61.7
Medium- and high-tech activities value added	18	62.0
Industry and services value added (% GDP)	80	55.4
Labour underutilization rate	9	83.0
Output per worker	40	25.0
<b>ENABLING ENVIRONMENT</b>	<b>11</b>	<b>47.4</b>
<b>Governance</b>	<b>43</b>	<b>65.3</b>
Political environment	27	67
Peace and stability	24	75
View and accountability	24	68.0
Quality of institutions	45	65.0
Rule of law	46	67.0
Control of corruption	55	60.0
Government effectiveness	81	72.1
<b>Socio-economic</b>	<b>34</b>	<b>60.6</b>
Gender equity	95	61.0
Female-to-male ratio in parliament	100	85
Female-to-male labour force participation	46	30.6
Female-to-male ratio in internal wage	1	100
Gender inequality	95	61.0
Social protection coverage (% population)	55	65.0
Adult literacy rate	21	88.0
Youth not in employment, education or training (%)	39	60.0
Standard of living	99	63.0
Poverty headcount ratio (% population)	25	65.5
GDP per capita	38	27.6
<b>Health and environment</b>	<b>41</b>	<b>67.2</b>
Health	91	61.1
Universal health coverage	55	74
Healthy life expectancy (years)	47	76.0
Under-five mortality rate	22	60.5
Environmental performance	11	51.0
Renewable energy consumption (%)	102	16
Household footprint per capita	46	30.0
Natural hazard exposure	47	60

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ICELAND

**GKI RANK** 10/154

**GKI SCORE** 67.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Iceland is a leading performer in terms of its knowledge infrastructure. It ranks 10th out of 154 countries in the Global Knowledge Index 2021 and 10th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Completion rate in upper secondary education, wealth parity
- + Under-five mortality rate
- + Individuals with standard ICT skills (%)
- + Peace and stability
- + Internet users (%)

### AREAS OF IMPROVEMENT

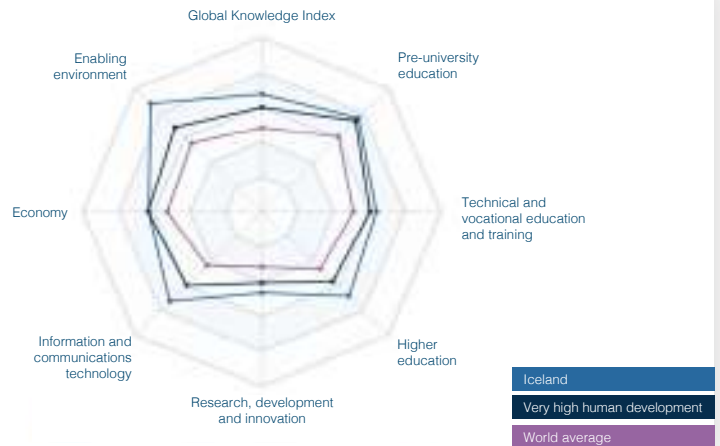
- Completion rate in upper secondary education, gender parity
- Product concentration
- Building quality control
- Enrolment in vocational education, gender parity
- Foreign direct investment, net inflows (% GDP)

### KEY INDICATORS

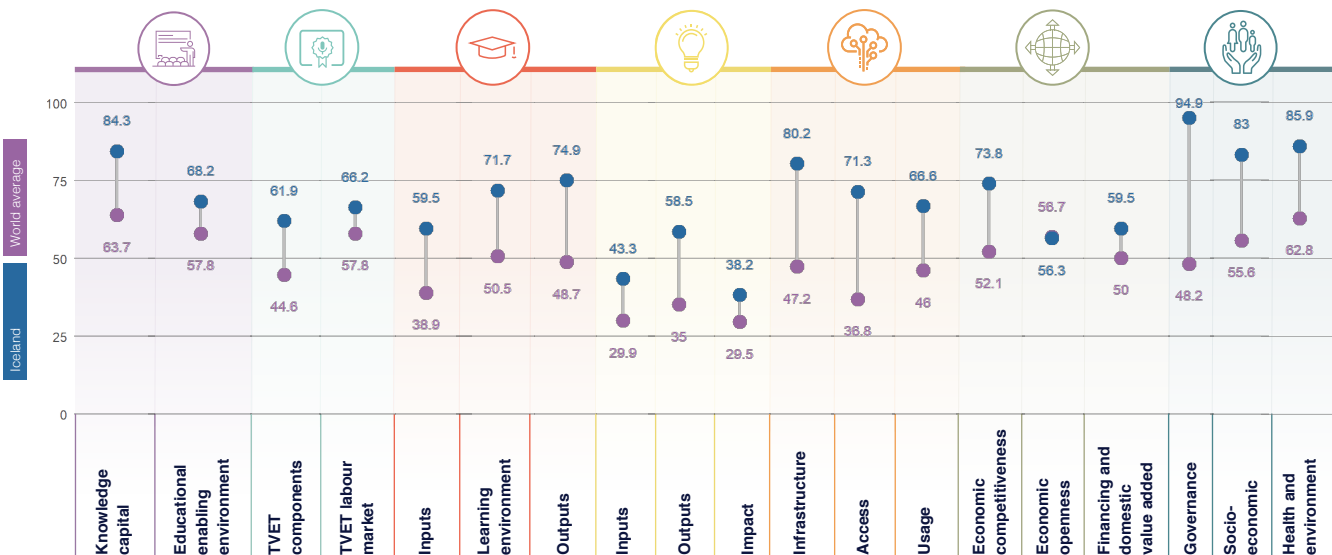
**GDP US\$ billions** 19.007  
**Population** 341,250  
**HDI** 0.949

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	33	76.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	25	64
HIGHER EDUCATION	4	68.7
RESEARCH, DEVELOPMENT AND INNOVATION	19	46.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	2	72.7
ECONOMY	36	63.2
ENABLING ENVIRONMENT	2	87.9



## GKI PILLARS







# ICELAND

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	23	76.3
Enrolment	17	97.5
Net enrolment rate in primary education	17	99.4
Net enrolment rate in lower secondary education	12	99.6
Net enrolment rate in upper secondary education	23	93.4
Completion	35	85.3
Years of compulsory education in primary and secondary	42	79.0
Completion rate in upper secondary education	30	84.3
Success rate rate in the last grade of lower secondary education	25	88.6
Completion	33	85.2
Assessment of 15-year-old students in math, science and reading	26	80.1
Learning-adjusted years of schooling	29	80.2
<b>Educational enabling environment</b>	<b>83</b>	<b>68.3</b>
Expenditure	13	91.0
Government expenditure on primary education (% GDP)	24	49.1
Government expenditure on secondary education (% GDP)	6	56.1
Government funding per primary student (% GDP per capita)	11	58
Government funding per secondary student (% GDP per capita)	27	41.2
Resources	106	106
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	106	106
Schools with access to computers in secondary education (%)	106	106
Early learning	33	65.4
Class attendance rate in early childhood education	27	86.8
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	34	65.5
Completion rate in upper secondary education, gender parity	100	71.0
Completion rate in upper secondary education, wealth parity	1	100
Completion rate in upper secondary education, location parity	39	86
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>64</b>	<b>81.8</b>
Communications training and learning	7	99.9
Firms offering formal training (%)	106	106
Labour force with short-cycle tertiary education (%)	9	85.0
Participation rate in formal and non-formal education and training	106	106
TVET enrolment	33	89.0
Government expenditure on vocational education (%)	44	34.9
Share of students enrolled in secondary vocational programmes	45	20
Share of students enrolling in postsecondary vocational programmes	69	84.5
TVET quality and infrastructure	33	86
Extent of staff training	19	83.8
Quality of vocational training	11	89.5
Ratio of high-skill TVET occupations earnings to average wage	89	79
Ratio of medium-skill TVET occupations earnings to average wage	77	80.0
<b>TVET labour market</b>	<b>61</b>	<b>86.2</b>
Efficiency of the labour market	3	99.0
Firms considered well-integrated into workforce (%)	106	106
Employment educational mismatch (%)	9	89.1
Proportion of skilled production workers	106	106
Unemployment rate with vocational education	6	82.4
High TVET employment	35	89.0
Share of TVET occupations	30	49.5
Manufacturing employment (%)	89	37.1
Quality and infrastructure	34	65.0
Enrolment in vocational education, gender parity	106	42.0
Useable employment rate	26	91.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>13</b>	<b>84.8</b>
Expenditure	17	49.0
Government expenditure per tertiary student	33	50.0
Teaching staff compensation (% tertiary expenditure)	28	47.6
Enrolment	9	90.0
Enrolment in bachelor's or equivalent level (%)	19	47.6
Enrolment in masters, doctoral or equivalent (%)	11	38.3
Resources	39	88.1
Ratios/teacher ratio in tertiary education	14	81.7
Research in higher education (%)	55	43.2
<b>Learning environment</b>	<b>18</b>	<b>71.7</b>
<b>Quality and academic freedom</b>	<b>22</b>	<b>71.7</b>
Teachers in tertiary education, gender parity	14	82.0
Labour mobility rate	34	29.0
Academic freedom	21	82.5
<b>Quality and infrastructure</b>	<b>106</b>	<b>106</b>
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>	<b>6</b>	<b>74.9</b>
Efficiency	9	86
Educational attainment rate, bachelor's or equivalent	9	86
Educational attainment rate, master's or equivalent	8	82.0
Educational attainment rate, doctoral or equivalent	6	87.0
Employment	7	81
Labour force participation rate with advanced education	6	91.1
Unemployment rate with advanced education	33	89.0
Impact	23	87.0
University tertiary enrollment in R&D	34	89.1
OECD indicators per 100 personnel in higher education	21	56.4
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>22</b>	<b>81.2</b>
Access to credit resources	37	81.1
GDP (% GDP)	16	41.2
GERD per researcher	32	36.6
Researchers per thousand labour force	12	64.4
Tertiary graduates from STEM programmes (%)	18	37.0
<b>Quality of innovation environment</b>	<b>35</b>	<b>89.0</b>
GERD performed by business enterprises (%)	19	38.1
GERD financed by business enterprises (%)	45	49.7
Researchers in business enterprises (%)	30	81.0
Firms that spend on R&D (%)	106	106
<b>Quality of business environment</b>	<b>19</b>	<b>82.0</b>
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	45	23.7
State of startup development	44	82.2
<b>Outputs</b>	<b>9</b>	<b>88.8</b>
Access to credit resources	7	89.0
Average documents per researcher	28	87.0
Citations per document	13	82.0
Patent applications (per 100 billion GDP)	106	106
<b>Quality of business environment</b>	<b>35</b>	<b>89.0</b>
Intellectual property receipts (% total trade)	4	85.0
Research and development expenditure (per 100 billion GDP)	106	106
PCT applications (per 100 billion GDP)	10	85.1
Firms producing new goods and services (%)	106	106



# ICELAND

	Rank	Value
<b>Consumer Innovation</b>	95	10.7
Treatment applications per 100 million GDP	109	1.6
Cultural goods exports (% exports)	109	3.8
Printing and publishing output (% manufactured output)	30	33.1
<b>Science</b>	27	35.3
<b>Health</b>	15	38
Risks of institutions' persistence	81	8.8
Depth of innovative companies	23	83.0
ISO 9001 quality certificates (% GDP)	99	21.9
ISO 14001 environmental certificates (% GDP)	93	10.0
<b>Energy</b>	10	11.3
CERO forecast from abroad (%)	23	35.4
Coal reserves per strategic resource deals (% GDP)	19	50.1
Computer software spending (% GDP)	47	22.9
<b>Government</b>	10	10.1
New business density per thousand population	13	45.1
Firms with new products/services (%)	106	1.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	2	12.7
<b>Infrastructure</b>	1	85.3
<b>Coverage</b>	14	38
30MHz mobile network coverage (% population)	12	100
Secure Internet servers per 1 million population	11	52.1
Investment in telecommunication services (% GDP)	89	35
<b>Speed</b>	3	103.0
Mobile spread and download speeds	106	1.6
Fixed broadband upload and download speeds	106	1.6
Fixed broadband subscriptions (y speed) per hundred people	1	80.9
<b>Availability</b>	14	38.0
Fixed broadband basket (% GNI per capita)	27	85.7
Mobile broadband basket (% GNI per capita)	15	90.1
Internet and telephone competition	1	100
<b>Access</b>	6	71.3
<b>Subscribers</b>	7	71.0
Active mobile broadband subscriptions per hundred inhabitants	15	54.2
International Internet bandwidth per user	15	82.8
Households with Internet access at home (%)	1	95.1
<b>Skills and employment</b>	3	71
Individuals with standard ICT skills (%)	2	84.1
Tertiary graduates from ICT programmes (%)	35	40.0
ICT employment (%)	7	76.3
<b>Usage</b>	22	66.8
<b>Services</b>	15	66.0
Government online services	41	75.4
Fixed broadband internet traffic per subscription	9	32
Mobile broadband internet traffic per subscription	15	45.3
Internet users (%)	4	80.0
<b>Commerce</b>	11	61.7
ICT FDI patent applications (per 100 million GDP)	21	87.6
E-participation	80	77.4
Internet activities by individuals (%)	106	1.6
Trade in digitally deliverable services (% total trade)	54	47.0
<b>ECONOMY</b>	34	63.2
<b>Economic Competitiveness</b>	7	73.0
<b>Infrastructure Investment</b>	14	11.0
Overhead capital formation (% GDP)	89	45.3
Logistics performance	37	55.6
Transport productive capacity	5	77.0
Building quality control	126	12.0

	Rank	Value
<b>Business Agility</b>	2	83.7
Ease of starting a business	56	80.6
Recovery recovery rate	12	82.8
Entrepreneurial employee activity rate	106	1.6
Growth of corporate transactions	13	85.7
<b>Employee openness</b>	74	28.3
<b>Trust and development</b>	100	2.0
Tax (% GDP)	81	21.3
High-technology trade (% total trade)	77	44.0
Market concentration	107	83.4
Market concentration	76	80.0
Product diversity	10	10.7
Climate financial openness	57	76
Foreign direct investment, net inflows (% GDP)	101	8
Cost dynamics	1	100
<b>Financing and domestic value added</b>	31	60.3
<b>Financing and costs</b>	21	67.0
Domestic credit to private sector (% GDP)	30	37.0
MSME financing gap (% GDP)	106	1.6
Tax and contribution rate (% profit)	82	75.7
Bank nonperforming loans (%)	49	83.0
Unmet loan demand	41	81.0
Medium- and high-tech activities value added	86	17.0
Industry and services value added (% GDP)	80	84.7
Labour underutilization rate	20	81.0
Output per worker	21	42.0
<b>ENABLING ENVIRONMENT</b>	2	47.8
<b>Government</b>	6	54.0
Political environment	4	83.7
Peace and stability	2	90.7
View and accountability	11	84.7
Quality of institutions	11	84.1
Rule of law	9	84.0
Control of corruption	11	84.7
Government effectiveness	11	81.3
<b>Socio-economic</b>	5	83
Gender equity	4	83.1
Female-to-male ratio in parliament	6	80.0
Female-to-male labour force participation	20	88.0
Female-to-male ratio in internal wage	1	100
Gender inequality	15	83.0
Social protection coverage (% population)	37	80.0
Adult literacy rate	106	1.6
Youth not in employment, education or training (%)	5	85.1
Standard of living	1	87.0
Poverty headcount ratio (% population)	13	85.0
GDP per capita	18	49.7
<b>Health and environment</b>	1	85.9
<b>Health</b>	6	83.0
Universal health coverage	5	84
Healthy life expectancy (years)	12	87.0
Under-five mortality rate	1	100
Environmental performance	11	75.0
Renewable energy consumption (%)	95	81.1
Household footprint per capita	106	1.6
Natural hazard exposure	45	70

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 97/154

**GKI SCORE** 44.3

**WORLD AVERAGE** 48.4

# INDIA

## COUNTRY PERFORMANCE SUMMARY

India is a modest performer in terms of its knowledge infrastructure. It ranks 97th out of 154 countries in the Global Knowledge Index 2021 and 4th out of the 27 countries with medium human development.

### KEY INDICATORS

**GDP US\$ billions** 8,447,442  
**Population** 1,380,004,385  
**HDI** 0.645

### AREAS OF STRENGTH

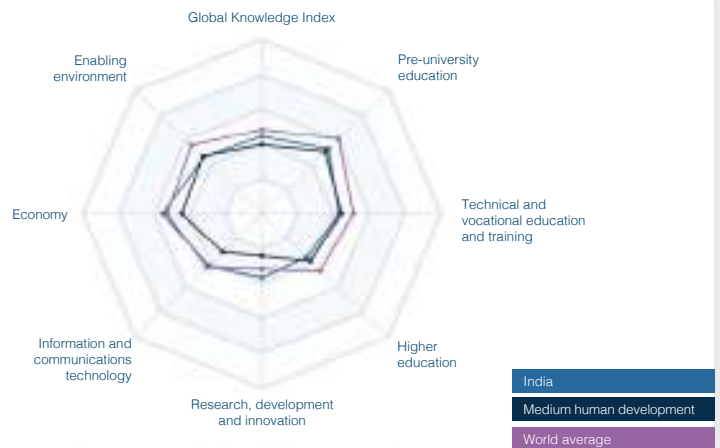
- + Building quality control
- + Cultural goods exports (% exports)
- + Research institutions prominence
- + Trade in digitally deliverable services (% total trade)
- + Firms that spend on R&D (%)

### AREAS OF IMPROVEMENT

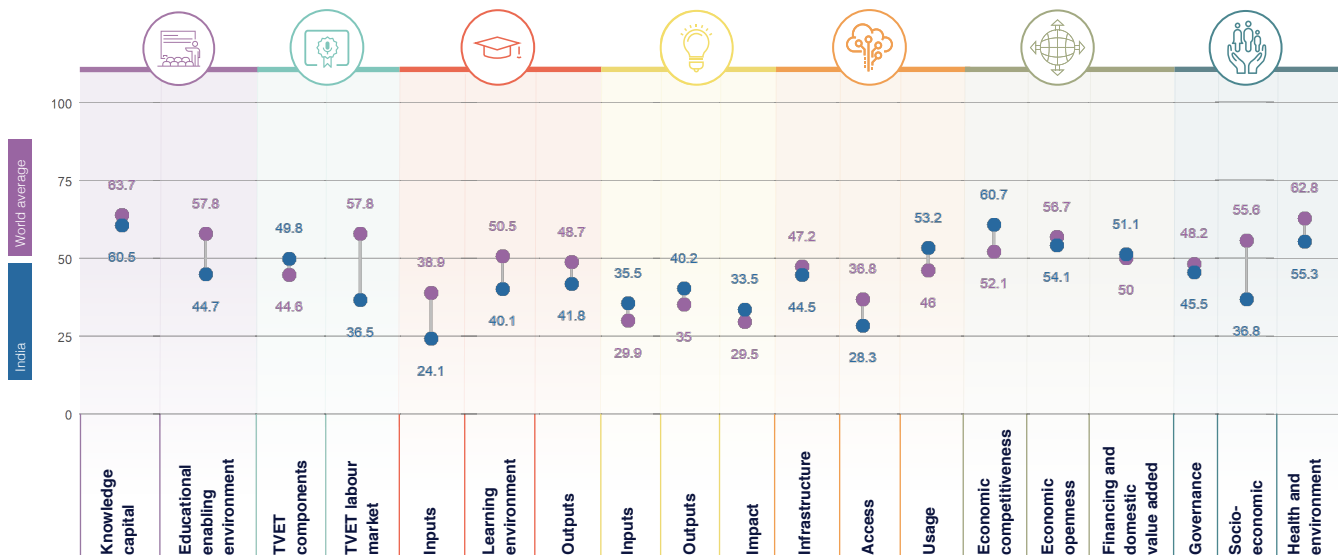
- Female-to-male labour force participation
- Mobile upload and download speeds
- Natural hazard exposure
- Entrepreneurial employee activity rate
- Enrolment in vocational education, gender parity

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	109	52.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	117	43.2
HIGHER EDUCATION	129	35.3
RESEARCH, DEVELOPMENT AND INNOVATION	42	36.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	78	42
ECONOMY	61	55.3
ENABLING ENVIRONMENT	116	45.9



## GKI PILLARS







# INDIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	87	60.8
Enrollment	107	71.2
Net enrolment rate in primary education	84	83.7
Net enrolment rate in lower secondary education	80	75.0
Net enrolment rate in upper secondary education	106	60.0
Completion	88	61.3
Years of compulsory education in primary and secondary	118	81.5
Completion rate in upper secondary education	72	62.0
Success rate rate in the last grade of lower secondary education	81	68.4
Completion	79	49.0
Assessment of Grade 5/6 students in math, science and reading	104	104
Learning-adjusted years of schooling	85	46.0
<b>Educational enabling environment</b>		
Expenditure	106	20.4
Government expenditure on primary education (% GDP)	100	22.7
Government expenditure on secondary education (% GDP)	83	23.0
Government funding per primary student (% GDP per capita)	100	31
Government funding per secondary student (% GDP per capita)	89	14.0
Resources	86	83.0
Pupil-based teacher ratio in primary education	80	71
Pupil-based teacher ratio in secondary education	88	80
Schools with access to computers in primary education (%)	77	10.0
Schools with access to computers in secondary education (%)	77	60.0
Early learning	88	40.0
Class attendance rate in early childhood education	86	48.0
Proportion of children who are developmentally on track	104	104
Presence of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	81	60.0
Completion rate in upper secondary education, gender parity	79	65.0
Completion rate in upper secondary education, wealth parity	80	17.7
Completion rate in upper secondary education, location parity	89	80
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	88	84
Firms offering formal training (%)	88	84
Labour force with short-cycle tertiary education (%)	104	104
Participation rate in formal and non-formal education and training	104	104
<b>TVET resources</b>		
Government expenditure on vocational education (%)	88	40
Share of students enrolled in secondary vocational programmes	100	5.1
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>		
Extent of staff training	88	65.1
Quality of vocational training	80	53.0
Ratio of high-skil TVET occupations earnings to average wage	104	104
Ratio of medium-skil TVET occupations earnings to average wage	104	104
<b>TVET labour market</b>		
Efficiency of the labour market	100	100.0
Firms considered with inappropriately educated workforce (%)	21	84
Employment educational mismatch (%)	84	40.0
Presence of skilled production workers	100	36.1
Unemployment rate with vocational education	104	104
Real TVET unemployment	100	10.7
Share of TVET occupations	116	25.1
Manufacturing employment (%)	80	24.4
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	119	10.0
Useable employment rate	104	21.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	100	6.8
Government expenditure per tertiary student	86	6.8
Teaching staff compensation (% tertiary expenditure)	104	104
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	81	18.7
Enrollment in masters, doctoral or equivalent (%)	82	15.0
<b>Resources</b>		
Ratios teacher ratio in tertiary education	101	57.1
Research staff in higher education (%)	70	36.1
<b>Learning environment</b>		
<b>Timely and academic freedom</b>		
Teachers in tertiary education, gender parity	80	13.0
Labour mobility rate	117	0.0
Academic freedom	111	45.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>		
Skilled	80	22.1
Educational attainment rate, bachelor's or equivalent	79	22.1
Educational attainment rate, master's or equivalent	104	104
Educational attainment rate, doctoral or equivalent	104	104
Skilled	110	22.0
Labour force participation rate with advanced education	111	52.7
Unemployment rate with advanced education	101	62.0
<b>Input</b>		
University tertiary enrollment in FTE	88	47.7
CRISC documents per FTE personnel in higher education	26	62.0
<b>Enrollment, quality and infrastructure</b>		
Quality	81	22.0
Share of FTE enrollment	88	100.0
GDP (% GDP)	49	45
GERD per researcher	88	36.0
Researchers per thousand labour force	75	4.4
Tertiary graduates from STEM programmes (%)	73	62.0
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	88	6.8
GERD financed by business enterprises (%)	48	45.0
Researchers in business enterprises (%)	36	41.0
Firms that spend on R&D (%)	11	81.7
<b>Quality and infrastructure</b>		
High-skilled employment (%)	104	104
Intellectual property payments (% total trade)	27	35.0
State of cluster development	36	64.0
<b>Quality and infrastructure</b>		
Quality and infrastructure	88	100.0
Average documents per researcher	82	67.0
Citations per document	107	12.0
Patent applications (per 100 billion GDP)	26	62.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	40	13.0
Research design applications (per 100 billion GDP)	66	8.3
PCT applications (per 100 billion GDP)	53	56.0
Firms producing new goods and services (%)	84	63.0





# INDIA

	Rank	Value		Rank	Value
<b>Consumer Electronics</b>			<b>Business agility</b>		
Treatment applications per 100 million GDP	53	31.7	Cost of starting a business	117	81.6
Cultural goods exports (% exports)	7	59.9	Recovery recovery rate	25	77.7
Printing and publishing output (% manufactured output)	88	11.1	Entrepreneurial employee activity rate	94	0.8
<b>Energy</b>	<b>85</b>	<b>25.3</b>	Growth of corporate transactions	13	85.7
Energy	35	40.2	<b>Executive openness</b>	<b>83</b>	<b>24.3</b>
Access to investors' proximity	8	87.6	Trust and dissemination	33	34
Depth of innovative companies	31	59.3	Taxs (% GDP)	130	12.3
ISO 9001 quality certificates (% GDP)	71	15.9	High-technology trade (% total trade)	28	29.4
ISO 14001 environmental certificates (% GDP)	73	5.4	Market concentration	37	80.2
<b>Environment</b>	<b>35</b>	<b>69.9</b>	Market concentration	28	84
CERO released from abroad (%)	106	114	Product ownership	33	44.7
Cost savings per strategic alliance deals (% GDP)	86	18.2	Charitable financial openness	86	16.4
Computer software spending (% GDP)	53	22.9	Foreign direct investment, net inflows (% GDP)	100	30
<b>Government efficiency</b>	<b>35</b>	<b>57.3</b>	Cost dynamics	41	80
New business density per thousand population	102	0.8	<b>Financing and domestic value added</b>	<b>73</b>	<b>21.1</b>
Firms with new products/services (%)	85	23.9	Financing and costs	33	30
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>78</b>	<b>42</b>	Domestic credit to private sector (% GDP)	70	20.4
<b>Infrastructure</b>	<b>82</b>	<b>42.3</b>	MSME financing gap (% GDP)	28	79.2
Coverage	37	61.4	Tax and contribution rate (% profit)	128	87.8
3G/4G mobile network coverage (% population)	81	87.8	Bank nonperforming loans (%)	80	66.0
Secure Internet servers per 1 million population	77	4	Unmet needs index	31	61.2
Investment in telecommunication services (% GDP)	38	43.5	Medium- and high-tech activities value added	31	48.8
<b>Quality</b>	<b>108</b>	<b>5.1</b>	Industry and services value added (% GDP)	102	47.3
Mobile speed and download speeds	108	5.8	Labour underutilization rate	24	81.4
Fixed-broadband upload and download speeds	45	17.7	Output per worker	105	7.8
Fixed-broadband subscriptions (y-speed) per hundred people	100	1	<b>ENABLING ENVIRONMENT</b>	<b>114</b>	<b>45.8</b>
<b>Availability</b>	<b>71</b>	<b>37</b>	<b>Governance</b>	<b>74</b>	<b>45.5</b>
Fixed broadband bandwidth (% Gbps per capita)	81	73.8	Political environment	80	21.1
Mobile broadband basket (% Gbps per capita)	84	57.7	Peace and stability	100	17
Internet and telephony competition	1	100	Value and accountability	88	53.1
<b>Access</b>	<b>102</b>	<b>26.2</b>	Quality of institutions	52	85.0
<b>Subsidies</b>	<b>108</b>	<b>21.1</b>	Rule of law	84	54.0
Active mobile-broadband subscriptions per hundred inhabitants	108	22.4	Control of corruption	75	49.0
International Internet bandwidth per user	73	40	Government effectiveness	53	88.8
Households with Internet access at home (%)	106	32.0	<b>Socio-economic</b>	<b>128</b>	<b>26.8</b>
<b>Skills and employment</b>	<b>87</b>	<b>20.5</b>	Gender equity	147	32.4
Individuals with standard ICT skills (%)	104	19	Female-to-male ratio in parliament	125	16.0
Tertiary graduates from ICT programmes (%)	87	35.3	Female-to-male labour force participation	184	20.6
ICT employment (%)	71	13.7	Female-to-male ratio in internal wage	107	59.0
<b>Usage</b>	<b>89</b>	<b>22.2</b>	Government access	102	45.8
<b>Services</b>	<b>86</b>	<b>41.5</b>	Social protection coverage (% population)	100	22.2
Government online services	24	85.0	Adult literacy rate	89	87
Fixed broadband Internet traffic per subscription	82	5.8	Youth not in employment, education or training (%)	132	33.1
Mobile broadband Internet traffic per subscription	18	32.6	Standard of living	85	37.0
Internet users (%)	110	37.0	Poverty headcount ratio (% population)	84	85.0
<b>Connectivity</b>	<b>27</b>	<b>61.1</b>	GDP per capita	108	4.8
ICT FDI positive applications (per 100 million GDP)	54	45.4	<b>Health and environment</b>	<b>138</b>	<b>55.3</b>
E-participation	25	85.7	Health	111	81.0
Internet activities by individuals (%)	104	19	Universal health coverage	114	85
Trade in digitally deliverable services (% total trade)	82	87.3	Healthy life expectancy (years)	111	82.0
<b>ECONOMY</b>	<b>81</b>	<b>25.3</b>	Under-five mortality rate	111	72
<b>Economic complexity</b>	<b>43</b>	<b>80.2</b>	Government performance	80	51.4
Manufacture innovation	33	61	Renewable energy consumption (%)	58	32.0
Overhead capital formation (% GDP)	23	85.4	Household budget per capita	83	85.2
Logistics performance	41	54.8	Natural hazard exposure	145	23
Transport productive capacity	85	25.0			
Building quality control	7	86.7			

\*All values are normalized to a scale from 0 (worst) to 100 (best).

<b>GKI SCORE</b>	<b>46.3</b>
<b>WORLD AVERAGE</b>	<b>48.4</b>

**GKI RANK** **87/154**

# INDONESIA

## KEY INDICATORS

<b>GDP US\$ billions</b>	<b>3,130.467</b>
<b>Population</b>	<b>273,523,621</b>
<b>HDI</b>	<b>0.718</b>

## COUNTRY PERFORMANCE SUMMARY

Indonesia is a moderate performer in terms of its knowledge infrastructure. It ranks 87th out of 154 countries in the Global Knowledge Index 2021 and 24th out of the 39 countries with high human development.

### AREAS OF STRENGTH

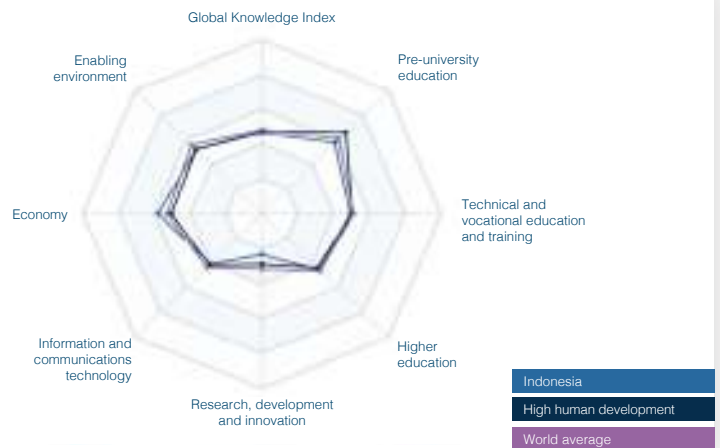
- + Teaching staff compensation (% tertiary expenditure)
- + Extent of corporate transparency
- + Completion rate in upper secondary education, gender parity
- + Gross fixed capital formation (% GDP)
- + Poverty headcount ratio (% population)

### AREAS OF IMPROVEMENT

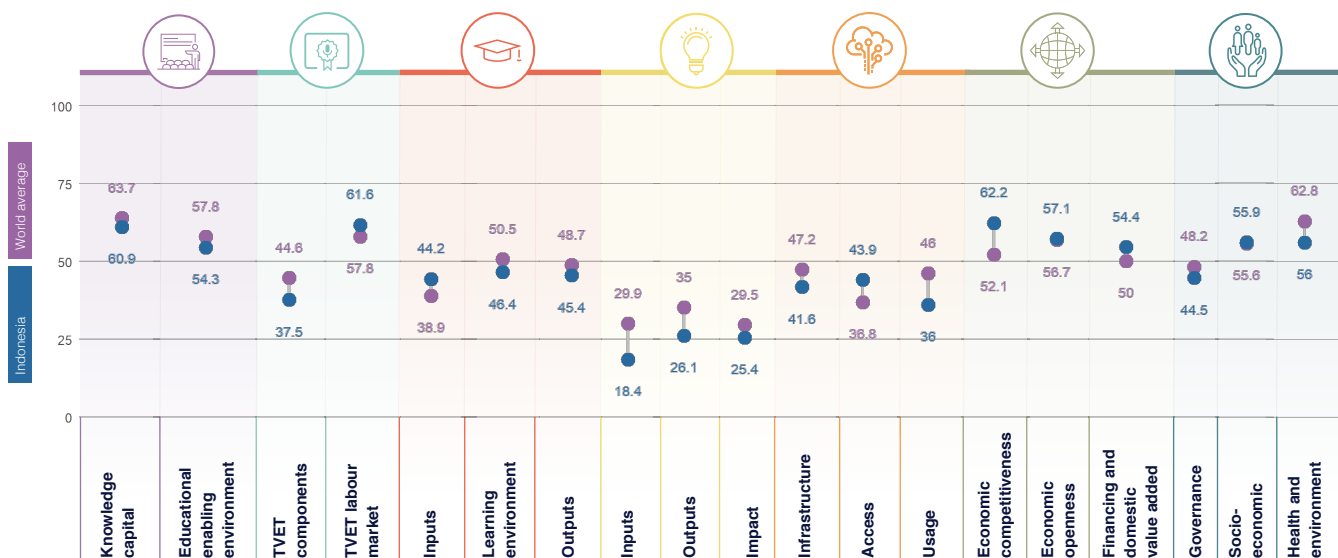
- Firms producing new goods and services (%)
- Natural hazard exposure
- Firms offering formal training (%)
- Citations per document
- ICT PCT patent applications (per 100 billion GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	95	57.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	82	49.5
HIGHER EDUCATION	77	45.3
RESEARCH, DEVELOPMENT AND INNOVATION	116	23.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	86	40.5
ECONOMY	52	57.9
ENABLING ENVIRONMENT	85	52.1



## GKI PILLARS



# INDONESIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	40.8
Enrollment	34	75
Net enrolment rate in primary education	90	82.0
Net enrolment rate in lower secondary education	100	77.2
Net enrolment rate in upper secondary education	81	74
Completion	51	61.3
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	73	62
Success rate rate in the last grade of lower secondary education	87	73.7
Completion	100	34.3
Assessment of TIMSS/PIRLS students in math, science and reading	70	78.5
Learning-adjusted years of schooling	82	85
<b>Educational enabling environment</b>		
Expenditure	100	21.4
Government expenditure on primary education (% GDP)	88	22.7
Government expenditure on secondary education (% GDP)	100	13.8
Government funding per primary student (% GDP per capita)	76	21.7
Government funding per secondary student (% GDP per capita)	100	11.2
Resources	81	60.3
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	60	40.1
Schools with access to computers in secondary education (%)	65	62.8
Early learning	74	21.2
Class attendance rate in early childhood education	75	37.8
Proportion of children who are developmentally on track	11	64.5
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	88	51.2
Completion rate in upper secondary education, gender parity	11	80.0
Completion rate in upper secondary education, wealth parity	89	34.6
Completion rate in upper secondary education, location parity	88	68.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	114	21.1
Firms offering formal training (%)	103	7.8
Labour force with short-cycle tertiary education (%)	20	82.1
Participation rate in formal and non-formal education and training	88	0.8
TVET enrolment	111	22.0
Government expenditure on vocational education (%)	60	14.3
Share of students enrolled in secondary vocational programmes	41	31.3
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	11	50.0
Extent of staff training	21	60.5
Quality of vocational training	35	60.4
Ratio of high-skill TVET occupations earnings to average wage	10	69.6
Ratio of medium-skill TVET occupations earnings to average wage	17	56.3
<b>TVET labour market</b>		
Efficiency of the labour market	51	22.0
Firms considered with inappropriately educated workforce (%)	29	61.3
Employment educational mismatch (%)	80	60.4
Proportion of skilled production workers	23	32.0
Unemployment rate with vocational education	40	61.7
Real TVET unemployment	65	21.0
Share of TVET occupations	112	39.3
Manufacturing employment (%)	43	47.8
Quality and infrastructure	50	21.0
Enrollment in vocational education, gender parity	40	87
Useable employment rate	100	40.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	10	53.0
Government expenditure per tertiary student	92	7.7
Teaching staff compensation (% tertiary expenditure)	1	308
Enrollment	66	74.0
Enrollment in bachelor's or equivalent level (%)	72	27
Enrollment in masters, doctoral or equivalent (%)	61	0.2
Resources	71	64.7
Pupil-teacher ratio in tertiary education	118	50.0
Researchers in higher education (%)	15	78.1
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	45	76.0
Labour mobility rate	119	0.3
Academic freedom	80	62.7
Quality and infrastructure	50	40
Class attendance rate in tertiary education, gender parity	62	71.7
Class attendance rate in tertiary education, wealth parity	20	54.8
Class attendance rate in tertiary education, location parity	36	11.8
<b>Outputs</b>		
Attainment	65	70
Educational attainment rate, bachelor's or equivalent	74	25.0
Educational attainment rate, master's or equivalent	67	2.3
Educational attainment rate, doctoral or equivalent	58	2.1
Employment	24	68.8
Labour force participation rate with advanced education	22	82.0
Unemployment rate with advanced education	41	67.0
Innovation	71	43.0
University tertiary enrollment in R&D	55	63.6
Citable documents per 100 personnel in higher education	64	28.2
<b>Government's contribution to economic growth</b>		
Growth	107	18.4
Quality and infrastructure	100	21.0
GDP (% GDP)	99	4.4
GERD per researcher	58	23.5
Researchers per thousand labour force	80	2.6
Tertiary graduates from STEM programmes (%)	78	36.0
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	81	0.6
GERD financed by business enterprises (%)	80	9.9
Researchers in business enterprises (%)	63	6.8
Firms that spend on R&D (%)	115	1.8
Quality and infrastructure	71	34.0
High-skilled employment (%)	60	18.0
Intellectual property payments (% total trade)	44	24
State of cluster development	25	58.4
<b>Science</b>		
Quality and infrastructure	65	20.0
Average documents per researcher	41	63.0
Citations per document	104	0
Patent applications (per 100 billion GDP)	79	42.4
Quality and infrastructure	100	21.0
Intellectual property receipts (% total trade)	73	6.6
Research and development expenditure (per 100 billion GDP)	76	4.4
PCT applications (per 100 billion GDP)	131	17.0
Firms producing new goods and services (%)	117	6.1



# INDONESIA

	Rank	Value
<b>Consumer Electronics</b>		
Smartphone applications per 100 million GDP	83	17.5
Cultural goods exports (% exports)	23	28.5
Printing and publishing output (% manufactured output)	88	12.8
<b>Energy</b>		
Renewable	35	25.4
Renewable or sustainable percentage	43	26.5
Depth of innovative companies	22	83.8
ISO 9001 quality certificates (% GDP)	87	8.8
ISO 14001 environmental certificates (% GDP)	79	5.8
<b>Finance</b>		
CERD received from abroad (%)	108	0.1
Joint ventures per strategic industry deals (% GDP)	117	1
Computer software spending (% GDP)	25	31.8
<b>Government</b>		
New business density per thousand population	114	1.5
Firms with new products/services (%)	27	34.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>81</b>	<b>65.5</b>
<b>Infrastructure</b>		
Coverage	85	41.8
3G/4G mobile network coverage (% population)	86	47.3
Secure Internet servers per 1 million population	54	8
Investment in telecommunication services (% GDP)	88	23.6
Quality	100	0
Mobile internet and download speeds	87	12.1
Fixed broadband upload and download speeds	79	1
Fixed broadband subscriptions (y-over) per hundred people	82	7.8
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	118	87.8
Mobile broadband basket (% QM per capita)	75	81.2
Internet and telephony competition	1	100
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	82	38.0
International Internet bandwidth per user	81	47.8
Households with Internet access at home (%)	82	38.3
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	48	25
Tertiary graduates from ICT programmes (%)	13	59.8
ICT employment (%)	100	4.1
<b>Usage</b>		
<b>Services</b>		
Government online services	71	85.2
Fixed broadband internet traffic per subscription	74	70.8
Mobile broadband internet traffic per subscription	45	18.1
Internet users (%)	88	51.2
<b>Commerce</b>		
ICT FDI positive applications (per 100 million GDP)	113	8
E-participation	88	76
Internet activities by individuals (%)	78	4.3
Trade in digitally deliverable services (% total trade)	32	50.8
<b>ECONOMY</b>	<b>84</b>	<b>87.8</b>
<b>Economic Competitiveness</b>		
OECD Economic Surveys	31	52.5
Overhead capital formation (% GDP)	13	72
Logistics performance	43	53.6
Transport productive capacity	121	16.1
Building quality control	20	82

	Rank	Value
<b>Business Agility</b>		
Time of starting a business	113	81.2
Recovery recovery time	54	71.1
Entrepreneurial employee activity rate	88	11.8
Growth of corporate transactions	1	100
<b>Employee experience</b>		
Trust and development	73	87.1
<b>Trade and Investment</b>		
Trade (% GDP)	108	10.8
High-technology trade (% total trade)	82	81.8
Market concentration	28	87.8
Market concentration	38	83.8
Product diversity	11	81.2
China's financial openness	86	41.7
Foreign direct investment, net inflows (% GDP)	88	38.1
Data dynamics	54	88
<b>Financing and domestic value added</b>	<b>55</b>	<b>58.4</b>
<b>Financing and credit</b>		
Domestic credit to private sector (% GDP)	88	13.8
MSME financing gap (% GDP)	88	83.8
Tax and contribution rate (% profit)	41	77.8
Bank nonperforming loans (%)	48	88.1
Unmet loan demand	10	41.8
Medium- and high-tech activities value added	48	41.7
Industry and services value added (% GDP)	84	88.8
Labour underutilization rate	46	77.8
Output per worker	88	8.4
<b>ENABLING ENVIRONMENT</b>	<b>88</b>	<b>82.1</b>
<b>Governance</b>		
Political environment	88	41.2
Peace and stability	104	88.8
View and accountability	87	82.8
Quality of institutions	77	48.7
Rule of law	86	41.8
Control of corruption	82	38.8
Government effectiveness	88	85.8
<b>Socio-economic</b>	<b>78</b>	<b>55.8</b>
Gender equity	102	58.8
Female-to-male ratio in parliament	88	28.7
Female-to-male labour force participation	113	82.8
Female-to-male ratio in internal wage	88	88.8
Gender inequality	81	83.8
Social protection coverage (% population)	88	25.7
Adult literacy rate	47	88.8
Youth not in employment, education or training (%)	88	57.8
Standard of living	88	88.8
Poverty headcount ratio (% population)	14	87.4
GDP per capita	88	18
<b>Health and environment</b>	<b>121</b>	<b>88</b>
<b>Health</b>		
Universal health coverage	112	37
Healthy life expectancy (years)	88	82.8
Under-five mortality rate	88	81
<b>Environment and performance</b>		
Renewable energy consumption (%)	87	21.8
Household footprint per capita	43	81.8
Natural hazard exposure	148	25

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 104/154

**GKI SCORE** 42.4

**WORLD AVERAGE** 48.4

# IRAN

## (ISLAMIC REPUBLIC OF)

### KEY INDICATORS

**GDP US\$ billions** 1,044.309  
**Population** 83,992,953  
**HDI** 0.783

### COUNTRY PERFORMANCE SUMMARY

Iran (Islamic Republic of) is a modest performer in terms of its knowledge infrastructure. It ranks 104th out of 154 countries in the Global Knowledge Index 2021 and 36th out of the 39 countries with high human development.

### AREAS OF STRENGTH

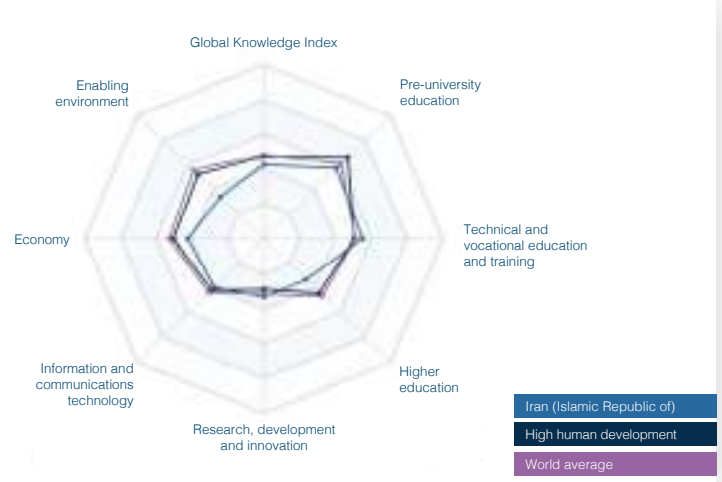
- + Trademark applications (per 100 billion GDP)
- + Tertiary graduates from STEM programmes (%)
- + Industrial design applications (per 100 billion GDP)
- + Patent applications (per 100 billion GDP)
- + Research institutions prominence

### AREAS OF IMPROVEMENT

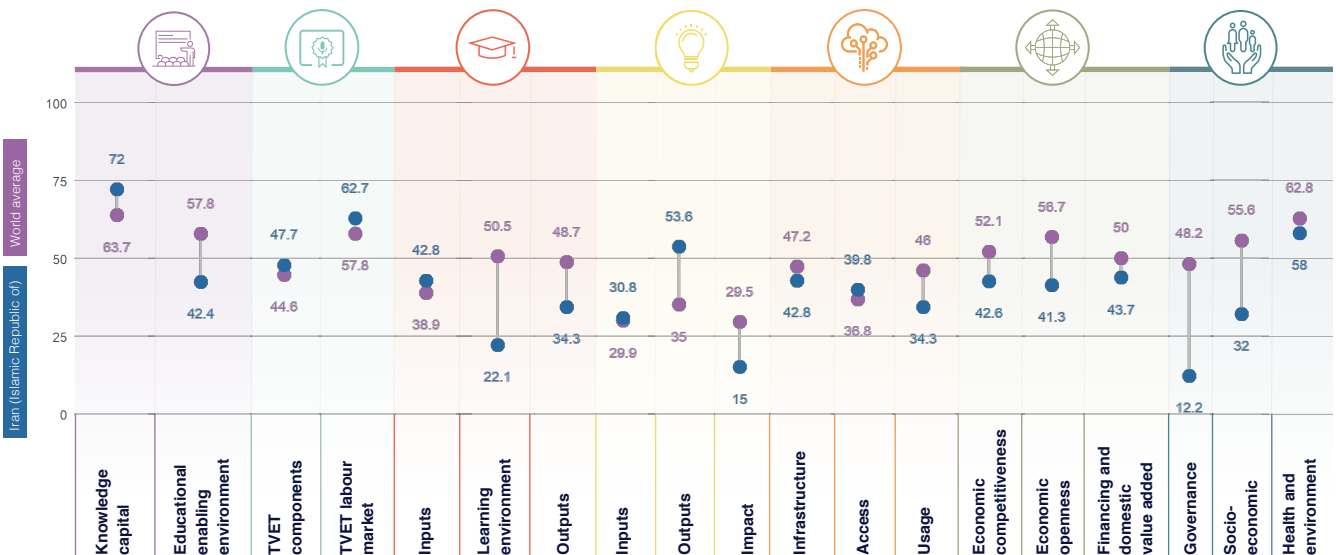
- Female-to-male ratio in parliament
- Trade in digitally deliverable services (% total trade)
- Ease of starting a business
- Female-to-male labour force participation
- Chinn-Ito financial openness

### SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	98	57.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	54	55.2
HIGHER EDUCATION	137	33.1
RESEARCH, DEVELOPMENT AND INNOVATION	56	33.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	89	39
ECONOMY	125	42.5
ENABLING ENVIRONMENT	147	34.1



### GKI PILLARS





# IRAN (ISLAMIC REPUBLIC OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>	<b>88</b>	<b>87.2</b>
Revolving capital	88	73
Enrollment	71	87.5
Net enrolment rate in primary education	78	80.3
Net enrolment rate in lower secondary education	65	85.4
Net enrolment rate in upper secondary education	88	68.7
Completion	87	72
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	87	72.7
Success rate rate in the last grade of lower secondary education	85	73.9
Completion	88	50.4
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	77	56.4
<b>Educational enabling environment</b>	<b>123</b>	<b>57.4</b>
Expenditure	69	27.7
Government expenditure on primary education (% GDP)	87	27.4
Government expenditure on secondary education (% GDP)	89	22.7
Government funding per primary student (% GDP per capita)	89	26.4
Government funding per secondary student (% GDP per capita)	72	30
Resources	69	88.8
Pupil-based teacher ratio in primary education	59	77.5
Pupil-based teacher ratio in secondary education	38	78.7
Schools with access to computers in primary education (%)	75	87.1
Schools with access to computers in secondary education (%)	81	81
Early learning	113	42.7
Class attendance rate in early childhood education	70	82.7
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	104	104
Completion rate in upper secondary education, gender parity	104	104
Completion rate in upper secondary education, wealth parity	104	104
Completion rate in upper secondary education, location parity	104	104
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>	<b>84</b>	<b>58.2</b>
<b>TVET occupations</b>	<b>66</b>	<b>47.7</b>
Commence training and learning	87	51.4
Firms offering formal training (%)	104	104
Labour force with short-cycle tertiary education (%)	80	55.4
Participation rate in formal and non-formal education and training	104	104
TVET resources	40	53.8
Government expenditure on vocational education (%)	85	45.9
Share of students enrolled in secondary vocational programmes	59	21.4
Share of students enrolled in postsecondary vocational programmes	1	104
TVET quality and infrastructure	100	37.0
Extent of staff training	137	34.9
Quality of vocational training	114	41.5
Ratio of high-skill TVET occupations earnings to average wage	104	104
Ratio of median-skill TVET occupations earnings to average wage	104	104
<b>TVET labour market</b>	<b>80</b>	<b>49.7</b>
Efficiency of the labour market	89	70.1
Firms considered well-integrated with labour (%)	104	104
Employment educational mismatch (%)	54	87.9
Proportion of skilled production workers	104	104
Unemployment rate with vocational education	70	72.3
Real TVET unemployment	76	61.3
Share of TVET occupations	30	87.0
Manufacturing employment (%)	23	81.1
Quality and infrastructure	111	52.0
Enrollment in vocational education, gender parity	100	53.0
Useable employment rate	89	53.8

	Rank	Value
<b>HIGHER EDUCATION</b>	<b>67</b>	<b>83.1</b>
<b>Inputs</b>	<b>82</b>	<b>43.8</b>
Expenditure	66	27.9
Government expenditure per tertiary student	77	11
Teaching staff compensation (% tertiary expenditure)	38	44.8
Enrollment	47	31.7
Enrollment in bachelor's or equivalent level (%)	67	27
Enrollment in masters, doctoral or equivalent (%)	44	26.4
Resources	88	88.3
Pupil-teacher ratio in tertiary education	44	83.3
Research in higher education (%)	38	57.0
<b>Learning environment</b>	<b>106</b>	<b>22.1</b>
<b>Quality and academic freedom</b>	<b>101</b>	<b>22.1</b>
Teachers in tertiary education, gender parity	88	56.5
Labour mobility rate	58	2.7
Academic freedom	128	12
<b>Quality and infrastructure</b>	<b>104</b>	<b>104</b>
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>	<b>126</b>	<b>34.3</b>
<b>Attainment</b>	<b>67</b>	<b>50.0</b>
Educational attainment rate, bachelor's or equivalent	48	48.4
Educational attainment rate, master's or equivalent	43	18.8
Educational attainment rate, doctoral or equivalent	42	17.8
<b>Employment</b>	<b>102</b>	<b>68.0</b>
Labour force participation rate with advanced education	118	48.5
Unemployment rate with advanced education	118	57.1
<b>Impact</b>	<b>116</b>	<b>27.0</b>
University tertiary enrollment in R&D	107	58.7
OECD indicators per 100 personnel in higher education	70	25.9
<b>Government expenditure and financing</b>	<b>88</b>	<b>55.1</b>
<b>Inputs</b>	<b>82</b>	<b>43.8</b>
Commence training and learning	87	51.4
GDP (% GDP)	44	16.0
GERD per researcher	60	21.3
Researchers per thousand labour force	39	27.0
Tertiary graduates from STEM programmes (%)	9	33
<b>Quality and infrastructure</b>	<b>104</b>	<b>104</b>
GERD performed by business enterprises (%)	89	9.7
GERD financed by business enterprises (%)	104	104
Researchers in business enterprises (%)	52	23.2
Firms that spend on R&D (%)	104	104
<b>Quality and infrastructure</b>	<b>100</b>	<b>37.0</b>
High-skill employment (%)	34	37.0
Intellectual property payments (% total trade)	104	104
State of cluster development	82	45.1
<b>Outputs</b>	<b>126</b>	<b>34.3</b>
<b>Quality and infrastructure</b>	<b>104</b>	<b>104</b>
Average documents per researcher	60	55.0
Citations per document	78	23.7
Patent applications (per 100 billion GDP)	43	39
<b>Quality and infrastructure</b>	<b>104</b>	<b>104</b>
Intellectual property receipts (% total trade)	104	104
Research and development expenditure (per 100 billion GDP)	4	88.9
PCT applications (per 100 billion GDP)	49	60.1
Firms producing new goods and services (%)	104	104



# IRAN (ISLAMIC REPUBLIC OF)

	Rank	Value
<b>Consumer Electronics</b>	95	25.3
Treatment applications per 100 million GDP	1	100
Cultural goods exports (% exports)	100	3.3
Printing and publishing output (% manufactured output)	100	4
<b>Energy</b>	100	10
<b>Energy</b>	95	20.2
Risks of institutions' persistence	78	62.3
Depth of innovative companies	87	47.1
ISO 9001 quality certificates (% GDP)	100	3.5
ISO 14001 environmental certificates (% GDP)	99	3.8
<b>Finance</b>	111	10.5
CERD received from abroad (%)	106	11.8
Joint ventures per strategic industry deals (% GDP)	101	0.4
Computer software spending (% GDP)	37	27.2
<b>Government</b>	100	0
New business density per thousand population	106	2
Firms with new products/services (%)	106	1.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>84</b>	<b>30</b>
<b>Infrastructure</b>	85	42.3
<b>Coverage</b>	111	11.1
3G/4G mobile network coverage (% population)	100	60.7
Secure Internet servers per 1 million population	85	3.2
Investment in telecommunication services (% GDP)	85	23.0
<b>Speed</b>	85	16.2
Mobile upload and download speeds	84	23.9
Fixed broadband upload and download speeds	82	5.8
Fixed broadband subscriptions (y speed) per hundred people	83	12
<b>Availability</b>	77	70.5
Fixed broadband latency (% QM per capita)	11	80.2
Mobile broadband basket (% QM per capita)	52	80.4
Internet and telephony competition	105	70
<b>Access</b>	71	28.3
<b>Subscribers</b>	11	17.1
Active mobile-broadband subscriptions per hundred inhabitants	21	40.0
International Internet bandwidth per user	87	37.3
Households with Internet access at home (%)	15	82.5
<b>Skills and employment</b>	99	22.5
Individuals with standard ICT skills (%)	72	9.4
Tertiary graduates from ICT programmes (%)	23	46.0
ICT employment (%)	80	11.8
<b>Usage</b>	100	34.2
<b>Services</b>	89	41.5
Government online services	89	55.0
Fixed broadband Internet traffic per subscriber	29	5.1
Mobile broadband Internet traffic per subscriber	85	20.6
Internet users (%)	40	83.0
<b>Commerce</b>	100	21.7
ICT/FIT patent applications (per 100,000 GDP)	84	35.0
E-participation	111	46.4
Internet activities by individuals (%)	85	18.7
Trade in digitally deliverable services (% total trade)	143	3
<b>ECONOMY</b>	<b>100</b>	<b>42.3</b>
<b>Economic Competitiveness</b>	113	42.3
<b>Infrastructure Investment</b>	11	44.0
Overhead capital formation (% GDP)	70	43.4
Logistics performance	64	46.3
Transport productive capacity	103	14.1
Building quality control	21	80

	Rank	Value
<b>Business Agility</b>	100	22.0
Ease of starting a business	149	87.6
Recovery recovery time	76	39.2
Entrepreneurial employee activity rate	71	9.4
Growth of corporate transactions	86	26.0
<b>Corporate Governance</b>	124	41.3
<b>Trust and Development</b>	91	12.1
Trade (% GDP)	101	12.2
High-technology trade (% total trade)	104	1.8
Market concentration	100	87.3
Market concentration	100	85.0
<b>Product Innovation</b>	117	17.3
Climate financial openness	104	8
Foreign direct investment, net inflows (% GDP)	137	32.2
Data dynamics	89	59
<b>Financing and Domestic Value Added</b>	111	40.7
<b>Financing and Loans</b>	100	42.7
Domestic credit to private sector (% GDP)	85	24.7
MSME financing gap (% GDP)	104	1.8
Tax and contribution rate (% profit)	100	82.7
Bank nonperforming loans (%)	104	1.8
Unmet loan demand	99	41.0
Medium- and high-tech activities value added	25	52.4
Industry and services value added (% GDP)	41	85.0
Labour underutilization rate	100	26.4
Output per worker	70	16.0
<b>ENABLING ENVIRONMENT</b>	<b>147</b>	<b>34.1</b>
<b>Governance</b>	146	12.2
Political environment	122	7.8
Peace and stability	142	7.5
View and accountability	144	8.2
Quality of institutions	127	10.0
Rule of law	138	20.0
Control of corruption	137	14.4
Government effectiveness	137	10.8
<b>Socio-economic</b>	145	32
Gender equity	141	35
Female-to-male ratio in parliament	145	5.8
Female-to-male labour force participation	180	17.0
Female-to-male ratio in internal wage	54	84.0
Gender inequality	112	16.0
Social protection coverage (% population)	89	25.7
Adult literacy rate	80	81.8
Youth not in employment, education or training (%)	127	40.0
<b>Standard of living</b>	117	10.7
Poverty headcount ratio (% population)	106	1.8
GDP per capita	79	10.7
<b>Health and Environment</b>	118	85
<b>Health</b>	10	13.0
Universal health coverage	85	72
Healthy life expectancy (years)	80	73.6
Under-five mortality rate	75	80.0
<b>Environmental performance</b>	112	27.0
Renewable energy consumption (%)	143	1
Household footprint per capita	88	78.0
Natural hazard exposure	137	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 137/154

**GKI SCORE** 33

**WORLD AVERAGE** 48.4

# IRAQ

## KEY INDICATORS

**GDP US\$ billions** 381,055  
**Population** 40,222,503  
**HDI** 0.674

## COUNTRY PERFORMANCE SUMMARY

Iraq is a weak performer in terms of its knowledge infrastructure. It ranks 137th out of 154 countries in the Global Knowledge Index 2021 and 26th out of the 27 countries with medium human development.

## AREAS OF STRENGTH

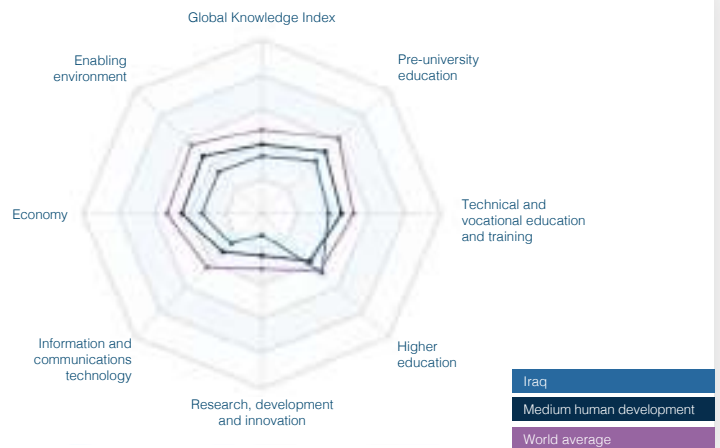
- + Average documents per researcher
- + Citable documents per R&D personnel in higher education
- + Industry and services value added (% GDP)
- + Gross attendance ratio for tertiary education, gender parity
- + Gross attendance ratio for tertiary education, wealth parity

## AREAS OF IMPROVEMENT

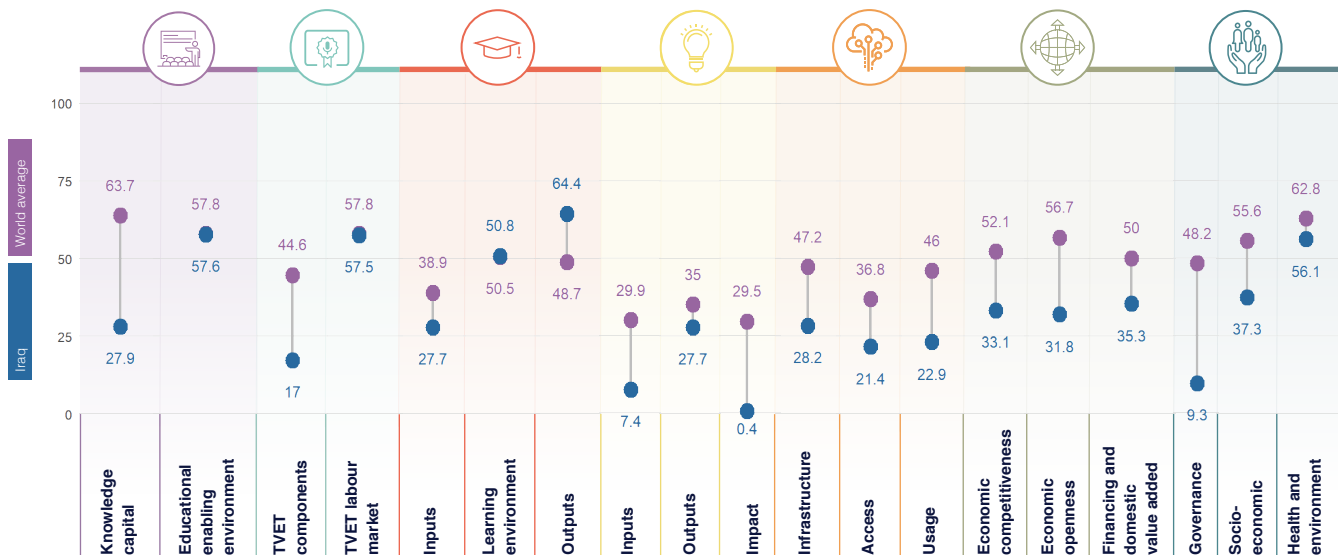
- GERD performed by business enterprises (%)
- Cultural goods exports (% exports)
- GERD financed from abroad (%)
- Gross fixed capital formation (% GDP)
- Youth not in employment, education or training (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	124	42.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	135	37.2
HIGHER EDUCATION	66	47.6
RESEARCH, DEVELOPMENT AND INNOVATION	154	11.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	132	24.2
ECONOMY	149	33.4
ENABLING ENVIRONMENT	146	34.2



## GKI PILLARS







# IRAQ

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	148	27.8
Enrollment	196	196
Net enrolment rate in primary education	196	196
Net enrolment rate in lower secondary education	196	196
Net enrolment rate in upper secondary education	196	196
Completion	129	32.0
Years of compulsory education in primary and secondary	132	48.2
Completion rate in upper secondary education	100	31.1
Success rate rate in the last grade of lower secondary education	196	196
Completion	143	17.2
Assessment of 15-year-old students in math, science and reading	196	196
Learning-adjusted years of schooling	143	17.2
<b>Educational enabling environment</b>	<b>88</b>	<b>87.8</b>
Expenditure	196	196
Government expenditure on primary education (% GDP)	196	196
Government expenditure on secondary education (% GDP)	196	196
Government funding per primary student (% GDP per capita)	196	196
Government funding per secondary student (% GDP per capita)	196	196
Resources	196	196
Pupil-based teacher ratio in primary education	196	196
Pupil-based teacher ratio in secondary education	196	196
Schools with access to computers in primary education (%)	196	196
Schools with access to computers in secondary education (%)	196	196
Early learning	81	52.0
Class attendance rate in early childhood education	196	196
Proportion of children who are developmentally on track	30	68.0
Proportion of children with stimulating home learning environments	49	36.9
Pupil-based teacher ratio in preprimary education	196	196
Quality and infrastructure	74	31
Completion rate in upper secondary education, gender parity	70	65.2
Completion rate in upper secondary education, wealth parity	81	34
Completion rate in upper secondary education, location parity	49	79.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>180</b>	<b>11</b>
Companies training apprentices	113	10.4
Firms offering formal training (%)	67	26.9
Labour force with short-cycle tertiary education (%)	70	57.0
Participation rate in formal and non-formal education and training	83	1.5
TVET resources	196	196
Government expenditure on vocational education (%)	196	196
Share of students enrolled in secondary vocational programmes	196	5.5
Share of students enrolled in postsecondary vocational programmes	196	196
TVET quality and infrastructure	196	196
Extent of staff training	196	196
Quality of vocational training	196	196
Ratio of high-skill TVET occupations earnings to average wage	196	196
Ratio of median-skill TVET occupations earnings to average wage	196	196
<b>TVET labour market</b>	<b>84</b>	<b>87.8</b>
Efficiency of the labour market	191	12.0
Firms considered well-integrated into workforce (%)	196	32.7
Employment educational mismatch (%)	196	31.0
Proportion of skilled production workers	48	68.0
Unemployment rate with vocational education	40	80
Real TVET unemployment	95	66.0
Share of TVET occupations	60	51.0
Manufacturing employment (%)	88	29.7
Quality and infrastructure	74	76.1
Enrollment in vocational education, gender parity	196	196
Useable employment rate	82	76.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>128</b>	<b>27.7</b>
Expenditure	196	196
Government expenditure per tertiary student	196	196
Teaching staff compensation (% tertiary expenditure)	196	196
Enrollment	196	196
Enrollment in bachelor's or equivalent level (%)	196	196
Enrollment in masters, doctoral or equivalent (%)	196	196
Resources	108	37.7
Pupil-teacher ratio in tertiary education	196	196
Research in higher education (%)	87	27.7
<b>Learning environment</b>	<b>74</b>	<b>50.8</b>
Directly paid academic freedom	196	196
Teachers in tertiary education, gender parity	196	196
Labour mobility rate	196	196
Academic freedom	196	196
Quality and infrastructure	29	66.0
Class attendance rate in tertiary education, gender parity	17	82.0
Class attendance rate in tertiary education, wealth parity	17	52.8
Class attendance rate in tertiary education, location parity	67	2.1
<b>Outputs</b>	<b>22</b>	<b>64.4</b>
Efficiency	196	196
Educational attainment rate, bachelor's or equivalent	196	196
Educational attainment rate, master's or equivalent	196	196
Educational attainment rate, doctoral or equivalent	196	196
Employment	127	42.0
Labour force participation rate with advanced education	121	28.7
Unemployment rate with advanced education	118	65.8
Impact	1	68.2
University tertiary enrollment in FTE	196	196
UNITE scholars per 100 personnel in higher education	8	68.2
<b>Entrepreneurship, innovation and business performance</b>		
<b>Inputs</b>	<b>122</b>	<b>7.4</b>
Access to FDI investments	196	196
GDP (% GDP)	117	0.7
GERD per researcher	83	11.4
Researchers per thousand labour force	81	2.5
Tertiary graduates from STEM programmes (%)	196	196
Quality and infrastructure	196	196
GERD performed by business enterprises (%)	87	9
GERD financed by business enterprises (%)	80	2.3
Researchers in business enterprises (%)	80	0.6
Firms that spend on R&D (%)	196	196
Quality and infrastructure	122	66.1
High-skilled employment (%)	35	37.2
Intellectual property payments (% total trade)	127	0.2
State of cluster development	196	196
<b>Outputs</b>	<b>194</b>	<b>27.2</b>
Access to FDI investments	35	11.1
Average documents per researcher	5	60.0
Citations per document	188	6.8
Patent applications (per 100 billion GDP)	44	57.0
Quality and infrastructure	196	196
Intellectual property receipts (% total trade)	113	0.5
Research design applications (per 100 billion GDP)	98	1.1
PCT applications (per 100 billion GDP)	132	16.0
Firms producing new goods and services (%)	196	196



# IRAQ

	Rank	Value
<b>Consumer Electronics</b>		
Treatment applications per 100 billion GDP	119	2.2
Cultural goods exports (% exports)	145	8
Printing and publishing output (% manufactured output)	100	1.4
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	194	194
Depth of innovative companies	194	194
ISO 50001 quality certificates (% GDP)	144	0.7
ISO 14001 environmental certificates (% GDP)	109	1.1
<b>Environment</b>		
CERO received from abroad (%)	100	8
Cost savings per strategic storage deals (% GDP)	194	194
Computer software spending (% GDP)	194	194
<b>Government</b>		
New business density per thousand population	107	0.4
Firms with new products/services (%)	194	194
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>		
<b>Infrastructure</b>		
<b>Coverage</b>		
3G/4G mobile network coverage (% population)	128	41.2
Secure Internet servers per 1 million population	107	0.8
Investment in telecommunication services (% GDP)	108	0.4
<b>Speed</b>		
Mobile spread and download speeds	194	194
Fixed broadband upload and download speeds	194	194
Fixed broadband subscriptions (y speed) per hundred people	81	7.8
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	86	87.5
Mobile broadband basket (% QM per capita)	37	50.0
Internet and telephony competition	107	80
<b>Access</b>		
<b>Subscribers</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	100	18.0
International Internet bandwidth per user	78	28.8
Households with Internet access at home (%)	115	26.3
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	80	14.9
Tertiary graduates from ICT programmes (%)	194	194
ICT employment (%)	194	194
<b>Usage</b>		
<b>Services</b>		
Government online services	100	23.0
Fixed broadband Internet traffic per subscriber	80	2
Mobile broadband Internet traffic per subscriber	100	0.8
Internet users (%)	100	40.0
<b>Commerce</b>		
eTPU/T purchases applications (per 100 billion GDP)	119	14.0
E-participation	100	31
Internet activities by individuals (%)	194	194
Trade in digitally deliverable services (% total trade)	100	25.0
<b>ECONOMY</b>		
<b>Economic Competitiveness</b>		
OECD average innovation	104	100
Overhead capital formation (% GDP)	143	8
Logistics performance	128	29.4
Transport productive capacity	107	10.0
Building quality control	145	38.7

	Rank	Value
<b>Business agility</b>		
Cost of starting a business	100	27.5
Recovery recovery time	194	194
Entrepreneurial employee activity rate	194	194
Growth of corporate transactions	111	14.5
<b>Corporate openness</b>		
Trust and dissemination	100	40
Trade (% GDP)	71	20
High-technology trade (% total trade)	194	194
Market concentration	100	27.0
Market concentration	80	87.4
Product diversity	100	110
Charitable financial openness	194	194
Foreign direct investment, net inflows (% GDP)	149	17.0
Cost dynamics	194	194
<b>Financing and domestic value added</b>		
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	144	2.4
MSME financing gap (% GDP)	104	21.0
Tax and contribution rate (% profit)	46	26.8
Bank nonperforming loans (%)	110	32.7
Unsecured loans ratio	80	37.7
Medium- and high-tech activities value added	108	15.0
Industry and services value added (% GDP)	14	20.7
Labour underutilization rate	118	44.0
Output per worker	37	19.0
<b>ENABLING ENVIRONMENT</b>		
<b>Governance</b>		
Political environment	140	11.1
Peace and stability	100	1.4
View and accountability	100	20.8
Quality of institutions	148	7.0
Rule of law	100	0.8
Control of corruption	140	9.1
Government effectiveness	147	9.8
<b>Socio-economic</b>		
Gender equity	146	11.0
Female-to-male ratio in parliament	80	30
Female-to-male labour force participation	100	7.4
Female-to-male ratio in internal wage	110	52.1
Gender inequality	104	10.1
Social protection coverage (% population)	79	35.7
Adult literacy rate	81	81.0
Youth not in employment, education or training (%)	100	9
Standard of living	70	80.0
Poverty headcount ratio (% population)	50	70.0
GDP per capita	86	8
<b>Health and environment</b>		
Health	100	81.0
Universal health coverage	100	81
Healthy life expectancy (years)	100	81.7
Under-five mortality rate	100	70.0
Environmental performance	100	80.0
Renewable energy consumption (%)	140	0.5
Household footprint per capita	81	80.0
Natural hazard exposure	100	44

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 19/154

**GKI SCORE** 64.5

**WORLD AVERAGE** 48.4

# IRELAND

## COUNTRY PERFORMANCE SUMMARY

Ireland is a leading performer in terms of its knowledge infrastructure. It ranks 19th out of 154 countries in the Global Knowledge Index 2021 and 19th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 452.959  
**Population** 4,937,796  
**HDI** 0.955

### AREAS OF STRENGTH

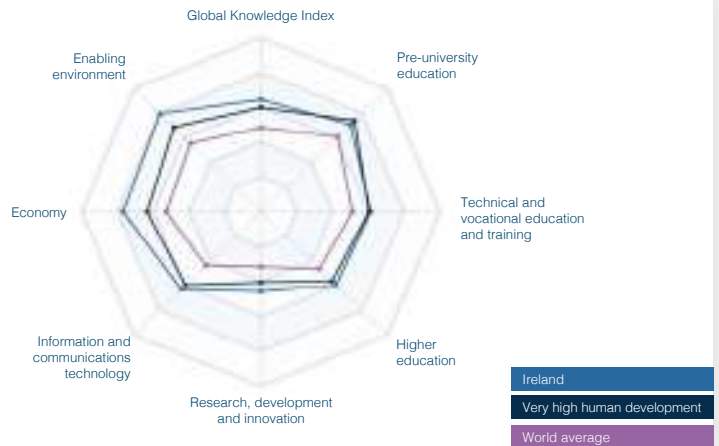
- + Trade in digitally deliverable services (% total trade)
- + Output per worker
- + GDP per capita
- + Computer software spending (% GDP)
- + Transport productive capacity

### AREAS OF IMPROVEMENT

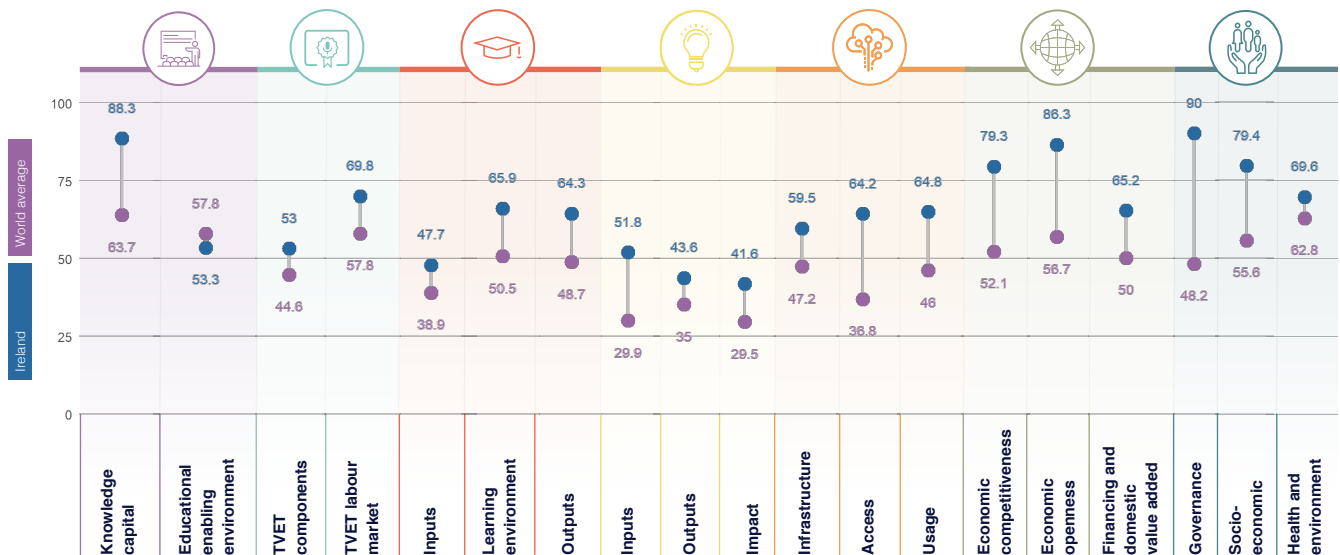
- Ratio of high-skill TVET occupations earnings to average wage
- Ratio of medium-skill TVET occupations earnings to average wage
- Government funding per secondary student (% of GDP per capita)
- Investment in telecommunication services (% GDP)
- Printing and publishing output (% manufactured output)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	59	70.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	37	61.4
HIGHER EDUCATION	28	59.3
RESEARCH, DEVELOPMENT AND INNOVATION	21	45.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	20	62.8
ECONOMY	4	76.9
ENABLING ENVIRONMENT	12	79.7



## GKI PILLARS





# IRELAND

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	2	108.3
Enrolment	9	93.0
Net enrolment rate in primary education	14	99.0
Net enrolment rate in lower secondary education	24	99.1
Net enrolment rate in upper secondary education	14	98.1
Completion	9	95.9
Years of compulsory education in primary and secondary	12	76.0
Completion rate in upper secondary education	4	99.0
Success rate rate in the last grade of lower secondary education	23	84.7
Completion	10	75.1
Assessment of 15-year-old students in math, science and reading	9	89.6
Learning-adjusted years of schooling	7	89.0
<b>Educational enabling environment</b>	<b>89</b>	<b>83.3</b>
Expenditure	100	11.1
Government expenditure on primary education (% GDP)	85	27.9
Government expenditure on secondary education (% GDP)	37	19.4
Government funding per primary student (% GDP per capita)	97	23.6
Government funding per secondary student (% GDP per capita)	105	13.0
Resources	106	106
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	106	106
Schools with access to computers in secondary education (%)	106	106
Early learning	111	65.1
Class attendance rate in early childhood education	69	48.1
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	9	81.0
Completion rate in upper secondary education, gender parity	21	87.1
Completion rate in upper secondary education, wealth parity	6	83.1
Completion rate in upper secondary education, location parity	20	87.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>37</b>	<b>83</b>
Companies training apprentices	41	81
Firms offering formal training (%)	9	76.9
Labour force with short-cycle tertiary education (%)	48	75.2
Participation rate in formal and non-formal education and training	38	32.0
TVET enrolment	10	111.0
Government expenditure on vocational education (%)	89	24.9
Share of students enrolled in secondary vocational programmes	47	28.2
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	75	61.0
Extent of staff training	81	66.8
Quality of vocational training	21	84.1
Ratio of high-skill TVET occupations earnings to average wage	96	79.6
Ratio of medium-skill TVET occupations earnings to average wage	80	34.0
<b>TVET labour market</b>	<b>84</b>	<b>66.8</b>
Efficiency of the labour market	94	11.1
Firms considered with inequality educated workforce (%)	8	81
Employment educational mismatch (%)	38	75.0
Proportion of skilled production workers	24	33.0
Unemployment rate with vocational education	40	80
Real TVET unemployment	71	11.0
Share of TVET occupations	75	90
Manufacturing employment (%)	81	28.0
Quality and infrastructure	61	61.0
Enrolment in vocational education, gender parity	79	72.0
Useable employment rate	32	60.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>42</b>	<b>47.7</b>
Expenditure	10	47.1
Government expenditure per tertiary student	16	56.4
Teaching staff compensation (% tertiary expenditure)	88	35.6
Enrolment	10	46.0
Enrolment in bachelor's or equivalent level (%)	12	44.7
Enrolment in masters, doctoral or equivalent (%)	34	48.0
Resources	113	48.2
Rap teacher ratio in tertiary education	106	106
Researchers in higher education (%)	43	48.2
<b>Learning environment</b>	<b>22</b>	<b>63.8</b>
<b>Quality and academic freedom</b>	<b>37</b>	<b>83.0</b>
Teachers in tertiary education, gender parity	106	106
Labour mobility rate	14	37.0
Academic freedom	18	84
<b>Quality and infrastructure</b>	<b>106</b>	<b>106</b>
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>	<b>14</b>	<b>64.3</b>
<b>Attainment</b>	<b>17</b>	<b>57.0</b>
Educational attainment rate, bachelor's or equivalent	18	81.0
Educational attainment rate, master's or equivalent	31	43.1
Educational attainment rate, doctoral or equivalent	19	47.0
<b>Employment</b>	<b>69</b>	<b>61.0</b>
Labour force participation rate with advanced education	53	80.0
Unemployment rate with advanced education	34	88.0
<b>Impact</b>	<b>41</b>	<b>60.0</b>
University tertiary enrolment in R&D	15	87.0
OECD students per 1000 personnel in higher education	32	34.0
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>17</b>	<b>11.8</b>
<b>Human capital</b>	<b>10</b>	<b>100.0</b>
GDP (% GDP)	10	25
GERD per researcher	41	38.0
Researchers per thousand labour force	12	80
Tertiary graduates from STEM programmes (%)	45	48.8
<b>Quality of innovation environment</b>	<b>10</b>	<b>100.0</b>
GERD performed by business enterprises (%)	24	23.0
GERD financed by business enterprises (%)	29	60.0
Researchers in business enterprises (%)	24	88.7
Firms that spend on R&D (%)	28	31.0
<b>Quality of business environment</b>	<b>9</b>	<b>100.0</b>
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	1	99
State of startup development	27	68.0
<b>Outputs</b>	<b>18</b>	<b>10.8</b>
<b>Human capital</b>	<b>10</b>	<b>100.0</b>
Average documents per researcher	61	69.0
Citations per document	41	22.0
Patent applications per 100 billion GDP	30	61.2
<b>Quality of business environment</b>	<b>11</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	9	60.0
Research design applications per 100 billion GDP	48	11.4
PCT applications per 100 billion GDP	22	85.4
Firms producing new goods and services (%)	5	83.2



# IRELAND

	Rank	Value		Rank	Value
<b>Business environment</b>	100	100	<b>Business agility</b>	5	100.7
Treatment applications per 100 million GDP	100	100	Ease of starting a business	19	90.4
Cultural goods exports (% exports)	35	18.5	Recovery recovery rate	11	93.5
Printing and publishing output (% manufactured output)	100	7.8	Entrepreneurial employee activity rate	7	95.2
<b>Finance</b>	39	91.9	Growth of corporate transactions	13	95.7
<b>Health</b>	35	91.9	<b>Employee experience</b>	9	98.3
Ratio of institutions' provisions	89	23.0	Trust and dissatisfaction	7	94
Depth of innovative companies	13	90.3	Talent (% GDP)	1	100
ISO 9001 quality certificates (% GDP)	81	20.7	High-technology trade (% total trade)	9	100.0
ISO 14001 environmental certificates (% GDP)	57	15.4	Market concentration	99	99.2
<b>Industry</b>	11	90.7	Market concentration	87	90
CERD freedom from abuse (%)	95	40	Product innovation	9	100.1
Cost savings per strategic alliance deals (% GDP)	21	34.9	Climate financial openness	1	100
Computer software spending (% GDP)	3	57.1	Foreign direct investment, net inflows (% GDP)	95	90
<b>Government services</b>	11	91.0	Data dynamics	1	100
New business density per thousand population	22	35.4	<b>Financing and domestic value added</b>	17	95.2
Firms with new products/services (%)	89	90	Financing and costs	71	100
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	28	92.3	Domestic credit to private sector (% GDP)	100	11.5
<b>Infrastructure</b>	42	90.3	ISMS financing gap (% GDP)	100	100
<b>Connectivity</b>	39	90.3	Tax and contribution rate (% profit)	30	87.8
30MHz mobile network coverage (% population)	99	81.5	Bank nonperforming loans (%)	98	85.7
Secure Internet servers per 1 million population	7	84.5	Unmet needs index	4	100
Investment in telecommunication services (% GDP)	100	12.9	Medium- and high-tech activities value added	9	94
<b>Quality</b>	61	11.1	Industry and services value added (% GDP)	17	73.0
Mobile speed and download speeds	99	23.7	Labour underutilization rate	74	89.1
Fixed-broadband upload and download speeds	31	20	Output per worker	2	77.0
Fixed-broadband subscriptions (by speed) per hundred people	30	83.7	<b>ENABLING ENVIRONMENT</b>	13	79.7
<b>Accessibility</b>	10	90	<b>Governance</b>	10	90
Fixed broadband bandwidth (% Gbps per capita)	89	63.8	Political environment	91	93.1
Mobile broadband basket (% Gbps per capita)	45	71.7	Peace and stability	15	95
Internet and telephony competition	1	100	View and accountability	10	95.2
<b>Access</b>	16	94.2	Quality of institutions	17	93.0
<b>Subscriptions</b>	11	90.3	Rule of law	16	90.4
Active mobile-broadband subscriptions per fixed-line inhabitants	35	45.0	Control of corruption	17	91.3
International Internet bandwidth per user	99	43.1	Government effectiveness	15	90.8
Households with Internet access at home (%)	24	92.0	<b>Socio-economic</b>	13	79.4
<b>Skills and employment</b>	5	100.1	Gender equity	10	93.7
Individuals with standard ICT skills (%)	39	58.7	Female-to-male ratio in parliament	95	30
Tertiary graduates from ICT programmes (%)	17	96.1	Female-to-male labour force participation	80	90.1
ICT employment (%)	4	90.0	Female-to-male ratio in internal wage	1	100
<b>Usage</b>	25	94.0	Government access	21	93.0
<b>Services</b>	60	47.6	Social protection coverage (% population)	28	93.0
Government online services	89	77.1	Adult literacy rate	100	100
Fixed broadband internet traffic per subscription	60	13.0	Youth not in employment, education or training (%)	35	95.1
Mobile broadband internet traffic per subscription	78	0.3	Standard of living	5	93.1
Internet users (%)	20	97.6	Poverty headcount ratio (% population)	26	91.2
<b>Commerce</b>	1	91.1	GDP per capita	3	92.1
ICT FDI patent applications (per 100 million GDP)	31	59.5	<b>Health and environment</b>	27	90.8
E-participation	25	95.7	Health	31	93.2
Internet activities by individuals (%)	100	100	Universal health coverage	40	70
Trade in digitally deliverable services (% total trade)	1	100	Healthy life expectancy (years)	19	99.0
<b>ECONOMY</b>	6	79.3	Under-five mortality rate	17	95.0
<b>Economic competitiveness</b>	1	79.3	Government performance	90	91
Government innovation	9	11.0	Renewable energy consumption (%)	112	11.1
Overhead capital formation (% GDP)	20	87.4	Household budget per capita	100	93.8
Logistics performance	35	82.8	Natural hazard exposure	49	70
Transport productive capacity	4	75.7			
Building quality control	22	90.7			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 18/154

**GKI SCORE** 64.6

**WORLD AVERAGE** 48.4

# ISRAEL

## COUNTRY PERFORMANCE SUMMARY

Israel is a leading performer in terms of its knowledge infrastructure. It ranks 18th out of 154 countries in the Global Knowledge Index 2021 and 18th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **353.975**  
**Population** ..... **8,655,541**  
**HDI** ..... **0.919**

### AREAS OF STRENGTH

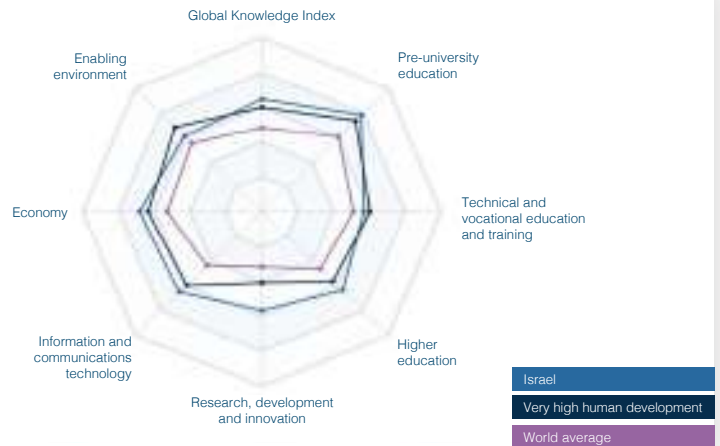
- + University-industry collaboration in R&D
- + GERD (% GDP)
- + Growth of innovative companies
- + GERD financed from abroad (%)
- + ICT employment (%)

### AREAS OF IMPROVEMENT

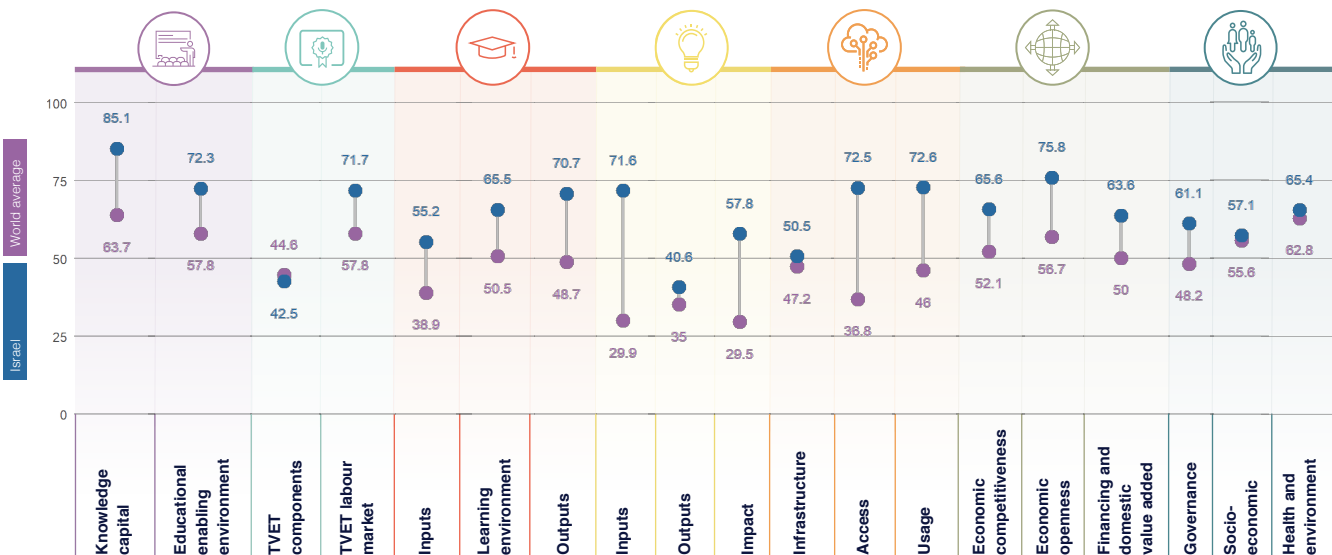
- Firms producing new goods and services (%)
- Ratio of medium-skill TVET occupations earnings to average wage
- Ratio of high-skill TVET occupations earnings to average wage
- Renewable energy consumption (%)
- Share of students enrolled in post-secondary vocational programmes

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	21	78.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	46	57.1
HIGHER EDUCATION	17	63.8
RESEARCH, DEVELOPMENT AND INNOVATION	3	56.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	15	65.2
ECONOMY	16	68.3
ENABLING ENVIRONMENT	49	61.2



## GKI PILLARS





# ISRAEL

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	85.1
Enrollment	11	83.0
Net enrolment rate in primary education	20	88.0
Net enrolment rate in lower secondary education	1	100
Net enrolment rate in upper secondary education	66	87.0
Completion	5	87.0
Years of compulsory education in primary and secondary	9	82.0
Completion rate in upper secondary education	25	82
Success rate rate in the last grade of lower secondary education	88	86.7
Completion	39	85.0
Assessment of 15-year-old students in math, science and reading	37	83.0
Learning-adjusted years of schooling	35	79
<b>Educational enabling environment</b>	<b>38</b>	<b>75.3</b>
Enrollment	29	40.0
Government expenditure on primary education (% GDP)	19	53.0
Government expenditure on secondary education (% GDP)	49	35.0
Government funding per primary student (% GDP per capita)	17	55.0
Government funding per secondary student (% GDP per capita)	60	31.0
Resources	81	31
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	49	85
Schools with access to computers in secondary education (%)	60	85
Early learning	41	83.0
Class attendance rate in early childhood education	23	86.0
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	21	81.7
Completion rate in upper secondary education, gender parity	60	80.0
Completion rate in upper secondary education, wealth parity	10	85.2
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>68</b>	<b>81.0</b>
Commence training and learning	41	81.0
Firms offering formal training (%)	100	21.6
Labour force with short-cycle tertiary education (%)	40	75.0
Participation rate in formal and non-formal education and training	13	71.1
TVET resources	101	30
Government expenditure on vocational education (%)	14	50.0
Share of students enrolled in secondary vocational programmes	41	31.0
Share of students enrolling in postsecondary vocational programmes	87	8
TVET quality and infrastructure	80	41.1
Extent of staff training	27	82.0
Quality of vocational training	30	59.0
Ratio of high-skill TVET occupations earnings to average wage	69	14.4
Ratio of medium-skill TVET occupations earnings to average wage	67	34.0
<b>TVET labour market</b>	<b>27</b>	<b>71.7</b>
Efficiency of the labour market	61	61.4
Firms considered with inappropriately educated workforce (%)	89	78.6
Employment educational mismatch (%)	21	81.0
Proportion of skilled production workers	11	81.0
Unemployment rate with vocational education	30	87.0
Real TVET unemployment	76	41.1
Share of TVET occupations	76	50.0
Manufacturing employment (%)	70	36.0
Quality and infrastructure	11	60.0
Enrollment in vocational education, gender parity	54	81.0
Useable employment rate	25	81.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>19</b>	<b>83.0</b>
Enrollment	61	34.0
Government expenditure per tertiary student	30	29.1
Teaching staff compensation (% tertiary expenditure)	40	26.6
Enrollment	41	33.7
Enrollment in bachelor's or equivalent level (%)	48	29.0
Enrollment in masters, doctoral or equivalent (%)	20	48.1
Resources	4	80.0
Rapit teacher ratio in tertiary education	11	80.0
Research staff in higher education (%)	116	116
<b>Learning environment</b>	<b>28</b>	<b>63.0</b>
Timely and academic freedom	41	81.0
Teachers in tertiary education, gender parity	13	80
Labour mobility rate	75	5.6
Academic freedom	24	80.0
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>18</b>	<b>70.7</b>
Attainment	9	85
Educational attainment rate, bachelor's or equivalent	11	86.0
Educational attainment rate, master's or equivalent	23	48.0
Educational attainment rate, doctoral or equivalent	9	80
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	9	71.0
University tertiary enrollment in R&D	1	78.0
CRIDE documents per 100 personnel in higher education	11	63.4
<b>Government's contribution to innovation and economic growth</b>		
<b>Inputs</b>	<b>9</b>	<b>71.4</b>
Government R&D expenditure	1	100
GDP (% GDP)	1	100
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality of research environment</b>	<b>11</b>	<b>60.0</b>
GERD performed by business enterprises (%)	9	90
GERD financed by business enterprises (%)	48	44.2
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	0.7
<b>Quality of research environment</b>	<b>20</b>	<b>60.0</b>
High-skilled employment (%)	17	52.4
Intellectual property payments (% total trade)	24	55.4
State of cluster development	30	68.0
<b>Outputs</b>	<b>10</b>	<b>70.0</b>
Government R&D expenditure	11	41.0
Average documents per researcher	116	116
Citations per document	52	29
Patent applications (per 100 billion GDP)	13	68.7
<b>Quality of research environment</b>	<b>11</b>	<b>60.0</b>
Intellectual property receipts (% total trade)	81	48.0
Research and development expenditure (per 100 billion GDP)	47	11.6
PCT applications (per 100 billion GDP)	7	80.2
Firms producing new goods and services (%)	101	26.0





# ISRAEL

	Rank	Value
<b>Business environment</b>		
Trademark applications per 100 million GDP	39	5.5
Cultural goods exports (% exports)	25	23.8
Printing and publishing output (% manufactured output)	42	20.1
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	37	30.3
Depth of innovative companies	1	80.0
ISO 5001 quality certificates (% GDP)	12	52.1
ISO 14001 environmental certificates (% GDP)	40	15.4
<b>Transport</b>		
CERD forecast from abroad (%)	1	100
Cost estimate per strategic storage deals (% GDP)	1	100
Computer software spending (% GDP)	55	21.0
<b>Government services</b>		
New business density per thousand population	45	36.2
Firms with new products/services (%)	48	30.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>		
<b>Infrastructure</b>		
<b>Coverage</b>		
3G/4G mobile network coverage (% population)	52	81.7
Secure Internet servers per 1 million population	43	20.0
Investment in telecommunication services (% GDP)	123	17.4
<b>Speed</b>		
Mobile internet and download speeds	67	19.0
Fixed broadband upload and download speeds	57	15.7
Fixed broadband subscriptions (by speed) per household (cents)	51	63.5
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	73	81.8
Mobile broadband basket (% QM per capita)	8	89.0
Internet and telephony competition	123	55.0
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile broadband subscriptions per fixed-line inhabitants	57	30.0
International Internet bandwidth per user	75	35.7
Households with Internet access at home (%)	69	55.0
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	104	19
ICT employment (%)	1	100
<b>Usage</b>		
<b>Services</b>		
Government online services	54	74.7
Fixed broadband internet traffic per subscription	104	19
Mobile broadband internet traffic per subscription	104	19
Internet users (%)	64	40
<b>Commerce</b>		
ICT/FIT patent applications (per 100 million GDP)	7	81.4
E-participation	69	71.4
Internet activities by individuals (%)	6	87.4
Trade in digitally deliverable services (% total trade)	22	81.0
<b>ECONOMY</b>		
<b>Economic competitiveness</b>		
Globalization leadership	44	10.1
Overhead capital formation (% GDP)	69	43.7
Logistics performance	34	57.7
Transport productive capacity	69	20
Building quality control	8	80.0

	Rank	Value
<b>Business agility</b>		
Ease of starting a business	25	84.1
Recovery recovery rate	35	86
Entrepreneurial employee activity rate	15	54.0
Growth of corporate transactions	11	65.7
<b>Corporate openness</b>		
Trust and dissemination	20	67.1
<b>Trade (% GDP)</b>		
Trade (% GDP)	112	19.7
High-technology trade (% total trade)	11	74.0
Market concentration	32	80.0
Market concentration	34	87.0
<b>Product openness</b>		
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	25	80.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>		
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	39	24.4
ISMC financing gap (% GDP)	104	19
Tax and contribution rate (% profit)	25	52.4
Bank nonperforming loans (%)	13	84.7
<b>Unmet needs index</b>		
Medium- and high-tech activities value added	15	49.0
Industry and services value added (% GDP)	25	80.0
Labour underutilization rate	25	84.0
Output per worker	25	80.0
<b>ENABLING ENVIRONMENT</b>		
<b>Governance</b>		
Political environment	54	41.0
Peace and stability	123	10.4
View and accountability	46	80.0
Quality of institutions	51	75.7
Rule of law	28	82.0
Control of corruption	42	70.7
Government effectiveness	26	83.0
<b>Socio-economic</b>		
Gender equity	57	76.0
Female-to-male ratio in parliament	55	30.0
Female-to-male labour force participation	33	86.0
Female-to-male ratio in internal wage	47	50.0
<b>Scarcity issues</b>		
Social protection coverage (% population)	58	83.0
Adult literacy rate	104	19
Youth not in employment, education or training (%)	81	70.0
<b>Standard of living</b>		
Poverty headcount ratio (% population)	104	19
GDP per capita	31	24.4
<b>Health and environment</b>		
<b>Health</b>		
Universal health coverage	17	60
Healthy life expectancy (years)	4	84.0
Under-five mortality rate	22	80.0
<b>Environmental performance</b>		
Renewable energy consumption (%)	134	2.0
Household footprint per capita	129	84.0
Natural hazard exposure	92	54

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 37/154

**GKI SCORE** 58.8

**WORLD AVERAGE** 48.4

# ITALY

## KEY INDICATORS

**GDP** US\$ billions ..... **2,322.139**  
**Population** ..... **60,461,828**  
**HDI** ..... **0.892**

## COUNTRY PERFORMANCE SUMMARY

Italy is a strong performer in terms of its knowledge infrastructure. It ranks 37th out of 154 countries in the Global Knowledge Index 2021 and 36th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

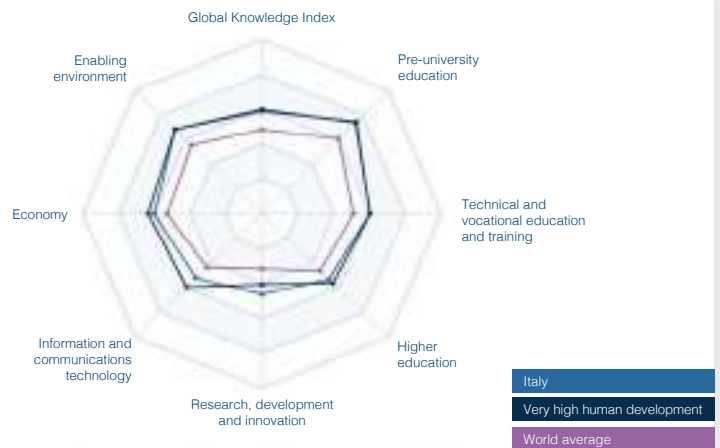
- + State of cluster development
- + Product concentration
- + Academic freedom
- + ISO 9001 quality certificates (% GDP)
- + Industrial design applications (per 100 billion GDP)

### AREAS OF IMPROVEMENT

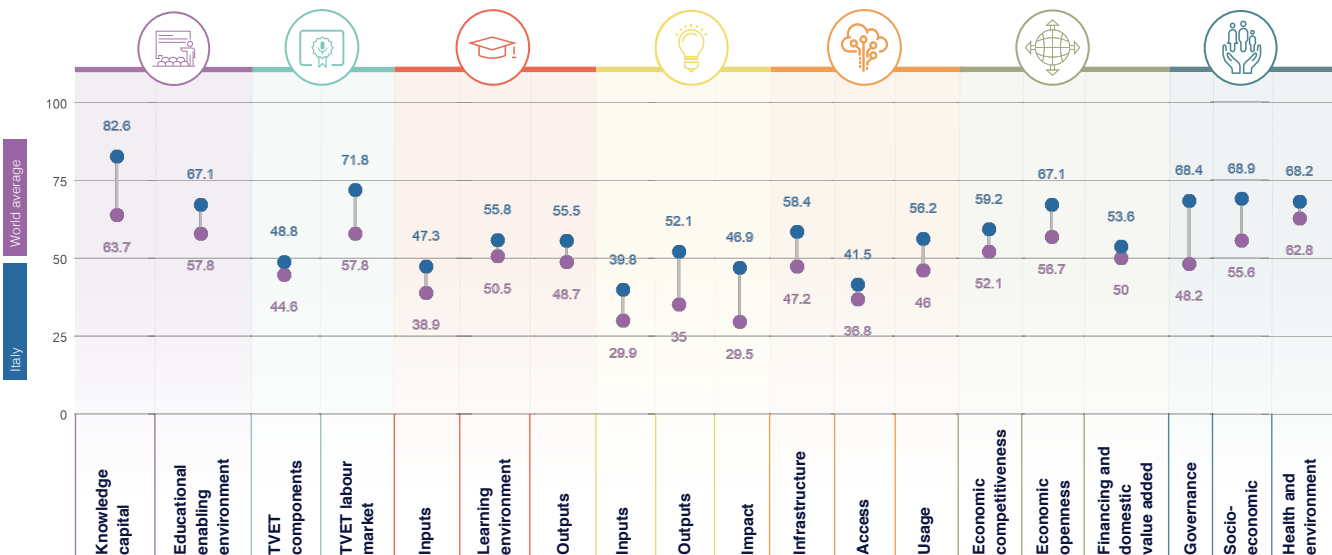
- Firms that spend on R&D (%)
- Firms producing new goods and services (%)
- Tax and contribution rate (% profit)
- Firms offering formal training (%)
- Tertiary graduates from ICT programmes (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	37	74.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	39	60.3
HIGHER EDUCATION	40	52.9
RESEARCH, DEVELOPMENT AND INNOVATION	20	46.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	52	52
ECONOMY	47	60
ENABLING ENVIRONMENT	30	68.5



## GKI PILLARS





# ITALY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	28	82.9
Enrolment	47	81.2
Net enrolment rate in primary education	79	80.4
Net enrolment rate in lower secondary education	44	86.8
Net enrolment rate in upper secondary education	32	82.5
Completion	57	85.3
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	37	86.0
Success rate rate in the last grade of lower secondary education	29	81.1
Completion	34	85
Assessment of TIMSS/PIRLS students in math, science and reading	39	84.5
Learning-adjusted years of schooling	34	77.7
<b>Educational enabling environment</b>	<b>81</b>	<b>87.5</b>
Expenditure	49	17.0
Government expenditure on primary education (% GDP)	168	21.1
Government expenditure on secondary education (% GDP)	42	34.8
Government funding per primary student (% GDP per capita)	81	88.6
Government funding per secondary student (% GDP per capita)	98	45.3
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	30	74.1
Class attendance rate in early childhood education	73	74.1
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	25	89.5
Completion rate in upper secondary education, gender parity	86	80.6
Completion rate in upper secondary education, wealth parity	21	83.3
Completion rate in upper secondary education, location parity	37	84.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>44</b>	<b>88.8</b>
Companies training apprentices	117	81
Firms offering formal training (%)	117	13.6
Labour force with short-cycle tertiary education (%)	32	80.1
Participation rate in formal and non-formal education and training	30	86.1
TVET resources	26	100.5
Government expenditure on vocational education (%)	67	13.9
Share of students enrolled in secondary vocational programmes	93	52
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	100	11
Extent of staff training	116	43.6
Quality of vocational training	42	50.4
Ratio of high-skill TVET occupations earnings to average wage	69	27.6
Ratio of medium-skill TVET occupations earnings to average wage	72	30.4
<b>TVET labour market</b>	<b>28</b>	<b>71.8</b>
Efficiency of the labour market	36	13.3
Firms considered with inappropriately educated workforce (%)	47	35.6
Employment educational mismatch (%)	30	76.4
Proportion of skilled production workers	87	47.8
Unemployment rate with vocational education	69	71.5
Real TVET unemployment	7	73.6
Share of TVET occupations	1	81.3
Manufacturing employment (%)	94	85.9
Quality and infrastructure	77	75.4
Enrolment in vocational education, gender parity	60	82.6
Useable employment rate	52	81.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>43</b>	<b>47.3</b>
Expenditure	41	35
Government expenditure per tertiary student	27	26.1
Teaching staff compensation (% tertiary expenditure)	86	21.9
Enrolment	11	112.5
Enrolment in bachelor's or equivalent level (%)	43	28.9
Enrolment in master's, doctoral or equivalent (%)	9	81.1
Resources	107	112.5
Ratios/teacher ratio in tertiary education	88	63.7
Researchers in higher education (%)	66	37.2
<b>Learning environment</b>	<b>83</b>	<b>83.8</b>
<b>Quality and academic freedom</b>	<b>60</b>	<b>100.8</b>
Teachers in tertiary education, gender parity	70	60.7
Labour mobility rate	72	30
Academic freedom	4	96.9
<b>Quality and infrastructure</b>	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>81</b>	<b>85.8</b>
Attainment	41	36.9
Educational attainment rate, bachelor's or equivalent	53	42
Educational attainment rate, master's or equivalent	22	64.1
Educational attainment rate, doctoral or equivalent	41	19.2
Employment	62	17.9
Labour force participation rate with advanced education	78	78.2
Unemployment rate with advanced education	66	85.0
Impact	38	81.8
University tertiary enrolment in R&D	40	86
OECD students per 1000 personnel in higher education	25	100.5
<b>Knowledge and innovation ecosystem</b>		
<b>Inputs</b>	<b>22</b>	<b>100.8</b>
Access to R&D resources	11	38
GDP (% GDP)	24	26
GERD per researcher	28	48.2
Researchers per thousand labour force	30	34.4
Tertiary graduates from STEM programmes (%)	47	45.2
<b>Quality and infrastructure</b>	11	100.8
GERD performed by business enterprises (%)	20	33.7
GERD financed by business enterprises (%)	18	66.4
Researchers in business enterprises (%)	28	83
Firms that spend on R&D (%)	100	0.6
<b>Quality and infrastructure</b>	11	100.8
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	55	15.4
State of cluster development	1	74.9
<b>Outputs</b>	<b>49</b>	<b>100.8</b>
Access to R&D resources	11	100.8
Average documents per researcher	24	85.3
Citations per document	28	34.2
Patent applications (per 100 billion GDP)	48	72
<b>Quality and infrastructure</b>	11	100.8
Intellectual property receipts (% total trade)	22	24.7
Research design applications (per 100 billion GDP)	6	80.3
PCT applications (per 100 billion GDP)	24	75
Firms producing new goods and services (%)	109	13.9

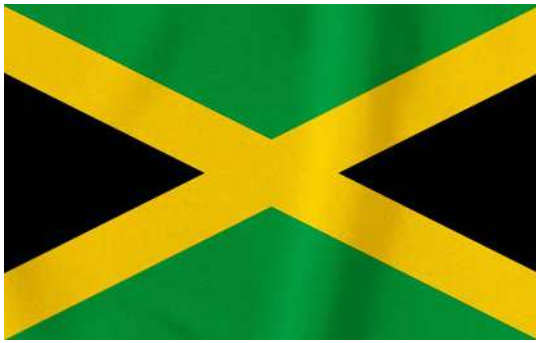


# ITALY

	Rank	Value
<b>Consumer Electronics</b>	51	80.0
Treatment applications per 100 million GDP	43	33.4
Cultural goods exports (% exports)	20	43.6
Printing and publishing output (% manufactured output)	51	25.0
<b>Energy</b>	75	66.0
<b>Finance</b>	7	77.1
Ratio of institutions' provisions	30	81
Depth of innovative companies	80	43.2
ISO 9001 quality certificates (% GDP)	1	100
ISO 14001 environmental certificates (% GDP)	44	62.3
<b>Insurance</b>	55	71.1
CERD forecast from abroad (%)	35	22.3
Joint ventures per strategic alliance deals (% GDP)	57	32.1
Computer software spending (% GDP)	11	46.0
<b>Government Services</b>	55	71.1
New business density per thousand population	51	14.0
Firms with one or more patents (%)	67	63.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	42	52
<b>Infrastructure</b>	49	66.4
<b>Coverage</b>	38	72
3G/LTE mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	35	27.1
Investment in telecommunication services (% GDP)	75	28.9
<b>Speed</b>	55	36.3
Mobile upload and download speeds	38	22.9
Fixed broadband upload and download speeds	43	19.8
Fixed broadband subscriptions (by speed) per hundred people	38	36.5
<b>Availability</b>	55	66.0
Fixed broadband latency (% QM per user)	42	83.9
Mobile broadband latency (% QM per capita)	10	64.0
Internet and telephony competition	97	52.3
<b>Access</b>	64	61.5
<b>Subscribers</b>	65	61.5
Active mobile broadband subscriptions per hundred inhabitants	48	41.2
International Internet bandwidth per user	97	34.1
Households with Internet access at home (%)	65	34.0
<b>Skills and employment</b>	55	32.5
Individuals with standard ICT skills (%)	39	45.5
Tertiary graduates from ICT programmes (%)	114	9.8
ICT employment (%)	26	42.5
<b>Usage</b>	49	66.2
<b>Services</b>	55	61.5
Government online services	55	62.0
Fixed broadband Internet traffic per subscription	26	27.1
Mobile broadband Internet traffic per subscription	27	25
Internet users (%)	65	34.0
<b>Commerce</b>	55	61.5
ICT FDI patent applications (per 100 million GDP)	42	52.3
E-participation	40	63.1
Internet activities by individuals (%)	47	44.1
Trade in digitally deliverable services (% total trade)	24	81
<b>ECONOMY</b>	47	60
<b>Economic Competitiveness</b>	48	65.2
<b>Efficiency</b>	55	61.5
Overhead capital formation (% GDP)	118	37
Logistics performance	68	64.5
Transport productive capacity	62	35.8
Building quality control	75	73.3

	Rank	Value
<b>Business agility</b>	61	60.0
Time of starting a business	84	66.6
Recovery recovery rate	33	71.2
Entrepreneurial employee activity rate	69	8
Growth of corporate transactions	1	100
<b>Customer experience</b>	44	67.1
<b>Trust and innovation</b>	29	61.1
Trade (% GDP)	100	21.1
High-technology trade (% total trade)	41	52.5
Market concentration	2	94.2
Market concentration	40	65.0
Product diversity	41	65.1
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	112	35.1
Cost dynamics	81	60.0
<b>Financing and domestic value added</b>	58	60.8
<b>Financing and costs</b>	59	61.0
Domestic credit to private sector (% GDP)	39	31.5
MSME financing gap (% GDP)	69	77.8
Tax and contribution rate (% profit)	100	46
Bank nonperforming loans (%)	30	62.1
Unsecured loans ratio	37	71.1
Medium- and high-tech activities value added	27	60.6
Industry and services value added (% GDP)	35	67.0
Labour underutilization rate	112	60.5
Output per worker	17	44.0
<b>ENABLING ENVIRONMENT</b>	33	66.5
<b>Governance</b>	43	65.4
<b>Political environment</b>	31	71
Peace and stability	45	59.0
View and accountability	23	62.1
Quality of institutions	55	62.7
Rule of law	66	60.0
Control of corruption	44	60.2
Government effectiveness	68	67.3
<b>Socio-economic</b>	32	66.8
<b>Gender equity</b>	25	71.7
Female-to-male ratio in parliament	37	66.0
Female-to-male labour force participation	100	66.0
Female-to-male ratio in internal wage	60	63.1
Gender inequality	41	61.1
Social protection coverage (% population)	35	61.5
Adult literacy rate	19	88.0
Youth not in employment, education or training (%)	62	63.0
<b>Standard of living</b>	44	63.6
Poverty headcount ratio (% population)	54	72.2
GDP per capita	29	29.0
<b>Health and environment</b>	35	66.2
<b>Health</b>	11	61.2
Universal health coverage	17	62
Healthy life expectancy (years)	12	67.7
Under-five mortality rate	15	69
<b>Environmental performance</b>	100	65.0
Renewable energy consumption (%)	69	17.7
Household footprint per capita	111	68.8
Natural hazard exposure	100	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# JAMAICA

## KEY INDICATORS

GDP US\$ billions	25.881
Population	2,961,161
HDI	0.734

**GKI RANK** 90/154

**GKI SCORE** 45.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Jamaica is a moderate performer in terms of its knowledge infrastructure. It ranks 90th out of 154 countries in the Global Knowledge Index 2021 and 27th out of the 39 countries with high human development.

### AREAS OF STRENGTH

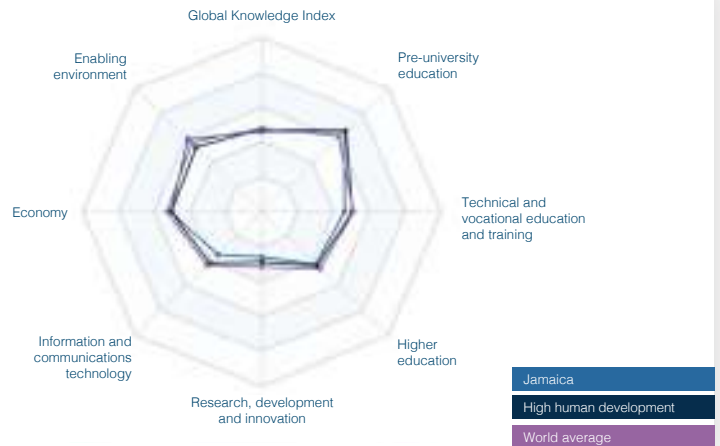
- + Ease of starting a business
- + Trademark applications (per 100 billion GDP)
- + Employment educational mismatch (%)
- + Completion rate in upper secondary education
- + Teaching staff compensation (% tertiary expenditure)

### AREAS OF IMPROVEMENT

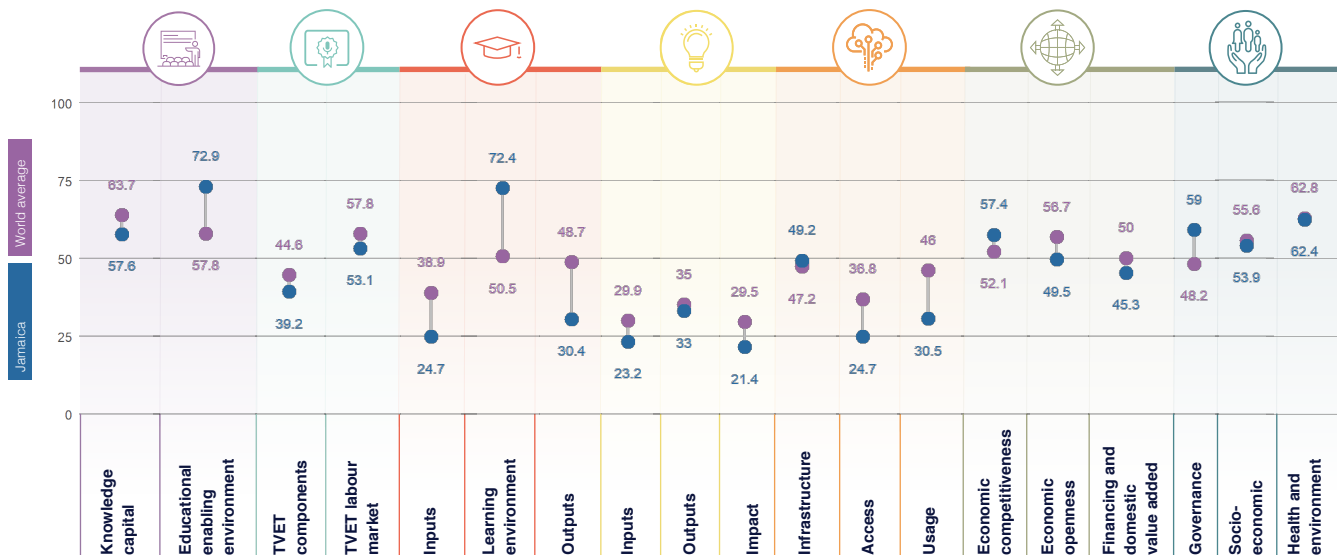
- Firms with new product/service (%)
- Individuals with standard ICT skills (%)
- Years of compulsory education in primary and secondary
- Share of students enrolled in secondary vocational programmes
- Growth of innovative companies

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	82	65.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	101	46.2
HIGHER EDUCATION	88	42.5
RESEARCH, DEVELOPMENT AND INNOVATION	105	25.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	102	34.8
ECONOMY	78	50.7
ENABLING ENVIRONMENT	60	58.5



## GKI PILLARS







# JAMAICA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	102	37.6
Enrollment	121	37
Net enrolment rate in primary education	106	79
Net enrolment rate in lower secondary education	108	80.0
Net enrolment rate in upper secondary education	109	47.0
Completion	81	70
Years of compulsory education in primary and secondary	132	66.0
Completion rate in upper secondary education	31	57.0
Success rate rate in the last grade of lower secondary education	88	86.6
Completion	81	43.7
Assessment of Trinidad students in math, science and reading	106	106
Learning-adjusted years of schooling	89	45.7
<b>Educational enabling environment</b>	<b>18</b>	<b>72.9</b>
Enrollment	21	41
Government expenditure on primary education (% GDP)	27	42.0
Government expenditure on secondary education (% GDP)	32	36
Government funding per primary student (% GDP per capita)	20	51.8
Government funding per secondary student (% GDP per capita)	13	69.4
Resources	66	61.1
Pupil-based teacher ratio in primary education	30	87.0
Pupil-based teacher ratio in secondary education	27	87.0
Schools with access to computers in primary education (%)	45	85.0
Schools with access to computers in secondary education (%)	70	72.6
Early learning	21	74.0
Class attendance rate in early childhood education	69	37
Proportion of children who are developmentally on track	7	85.0
Proportion of children with stimulating home learning environments	19	80
Pupil-based teacher ratio in preprimary education	17	84
Quality and infrastructure	21	57.0
Completion rate in upper secondary education, gender parity	20	57.0
Completion rate in upper secondary education, wealth parity	40	66.0
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>108</b>	<b>101.0</b>
Communications training and learning	111	11
Firms offering formal training (%)	77	31
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	106	106
TVET resources	81	11.4
Government expenditure on vocational education (%)	106	106
Share of students enrolled in secondary vocational programmes	138	9
Share of students enrolled in postsecondary vocational programmes	79	62.7
TVET quality and infrastructure	21	101.0
Extent of staff training	66	50.4
Quality of vocational training	34	60.0
Ratio of high-skill TVET occupations earnings to average wage	106	106
Ratio of median-skill TVET occupations earnings to average wage	106	106
<b>TVET labour market</b>	<b>100</b>	<b>60.5</b>
Efficiency of the labour market	81	11.4
Firms considered with inappropriately educated workforce (%)	65	60.0
Employment educational mismatch (%)	7	60.0
Proportion of skilled production workers	100	17.1
Unemployment rate with vocational education	106	106
Real TVET unemployment	110	11.0
Share of TVET occupations	81	47.0
Manufacturing employment (%)	129	20
Quality and infrastructure	106	61.1
Enrollment in vocational education, gender parity	106	106
Useable employment rate	81	62.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>127</b>	<b>34.7</b>
Expenditure	30	49.7
Government expenditure per tertiary student	68	12.8
Teaching staff compensation (% tertiary expenditure)	6	88.1
Enrollment	81	0.5
Enrollment in bachelor's or equivalent level (%)	100	68
Enrollment in masters, doctoral or equivalent (%)	106	106
Resources	106	106
Rap teacher ratio in tertiary education	106	106
Research in higher education (%)	106	106
<b>Learning environment</b>	<b>14</b>	<b>72.4</b>
Directly paid academic freedom	1	81
Teachers in tertiary education, gender parity	106	106
Labour mobility rate	106	106
Academic freedom	13	84
Quality and infrastructure	21	60.0
Class attendance rate in tertiary education, gender parity	68	71.0
Class attendance rate in tertiary education, wealth parity	22	49.0
Class attendance rate in tertiary education, location parity	15	27.0
<b>Outputs</b>	<b>101</b>	<b>30.4</b>
Attainment	71	11.0
Educational attainment rate, bachelor's or equivalent	84	16.0
Educational attainment rate, master's or equivalent	106	106
Educational attainment rate, doctoral or equivalent	106	106
Employment	106	106
Labour force participation rate with advanced education	106	106
Unemployment rate with advanced education	106	106
Impact	91	41.0
University tertiary enrollment in R&D	85	44.0
CRIDE students per 100 personnel in higher education	106	106
<b>Government's contribution to innovation and productivity</b>		
<b>Inputs</b>	<b>10</b>	<b>12.1</b>
Government R&D expenditure	106	106
GDP (% GDP)	106	106
GERD per researcher	106	106
Researchers per thousand labour force	106	106
Tertiary graduates from STEM programmes (%)	106	106
<b>Quality of innovation environment</b>	<b>10</b>	<b>10</b>
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	88	9.5
<b>Quality of business environment</b>	<b>10</b>	<b>10</b>
High-skill employment (%)	106	106
Intellectual property payments (% total trade)	57	27.0
State of cluster development	70	46.0
<b>Outputs</b>	<b>10</b>	<b>11</b>
Government R&D expenditure	106	11.1
Average documents per researcher	106	106
Citations per document	121	12.0
Patent applications (per 100 billion GDP)	81	41.0
<b>Government's contribution to innovation and productivity</b>	<b>10</b>	<b>10.0</b>
Intellectual property receipts (% total trade)	58	11.0
Research design applications (per 100 billion GDP)	13	48.0
PCT applications (per 100 billion GDP)	91	38.0
Firms producing new goods and services (%)	100	21.0



# JAMAICA

	Rank	Value
<b>Consumer &amp; business credit</b>	95	46.7
Treatment applications per 100 million GDP	8	84.2
Cultural goods exports (% exports)	78	8
Printing and publishing output (% manufactured output)	196	196
<b>Energy</b>	111	15.3
<b>Energy</b>	100	10
Risks of institutions' provisions	88	5.1
Depth of innovative companies	108	0.4
ISO 9001 quality certificates (% GDP)	100	0.4
ISO 14001 environmental certificates (% GDP)	34	0.8
<b>Finance</b>	100	100
CERD forecast from abroad (%)	106	106
Joint ventures per strategic industry deals (% GDP)	30	81.1
Computer software spending (% GDP)	22	23.0
<b>Government &amp; public services</b>	100	100
New business density per thousand population	71	7.8
Firms with new products/services (%)	100	49.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	102	34.9
<b>Infrastructure</b>	89	40.3
<b>Coverage</b>	88	14.5
3G/4G mobile network coverage (% population)	82	81.7
Secure Internet servers per 1 million population	104	2.2
Investment in telecommunication services (% GDP)	10	84
<b>Quality</b>	100	100
Mobile speed and download speeds	45	26.4
Fixed-broadband upload and download speeds	63	60.3
Fixed-broadband subscriptions (by speed) per hundred people	87	26.6
<b>Availability</b>	100	100
Fixed broadband bandwidth (% Gbps per capita)	88	80.9
Mobile broadband basket (% Gbps per capita)	100	40.8
Internet and telephony competition	1	100
<b>Access</b>	114	26.7
<b>Subscribers</b>	81	41.7
Active mobile-broadband subscriptions per fixed-line inhabitants	100	25.3
International Internet bandwidth per user	88	41.3
Households with Internet access at home (%)	81	84.4
<b>Skills and employment</b>	100	100
Individuals with standard ICT skills (%)	77	5.8
Tertiary graduates from ICT programmes (%)	196	196
ICT employment (%)	196	196
<b>Usage</b>	123	36.0
<b>Services</b>	100	100
Government online services	103	35.8
Fixed broadband Internet traffic per subscriber	71	11
Mobile broadband Internet traffic per subscriber	88	7.4
Internet users (%)	81	86.0
<b>Commerce</b>	100	100
ICT/FIT patent applications (per 100,000 GDP)	196	196
E-participation	103	36.0
Internet activities by individuals (%)	89	26.6
Trade in digitally deliverable services (% total trade)	100	26.0
<b>ECONOMY</b>	78	80.7
<b>Economic &amp; property records</b>	81	81.4
<b>REGISTRATION</b>	100	100
Overhead capital formation (% GDP)	88	80.2
Logistics performance	118	38
Transport productive capacity	28	41.3
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	100	41.3
Time of starting a business	5	87.4
Recovery recovery time	83	32.1
Entrepreneurial employee activity rate	75	8.8
Growth of corporate transactions	88	21.4
<b>Business operations</b>	100	40.0
<b>Trade and investment</b>	100	100
Trade (% GDP)	48	31.3
High-technology trade (% total trade)	113	15.0
Market concentration	103	88.8
Market concentration	88	87.1
<b>Product innovation</b>	100	100
Charitable financial openness	86	41.7
Foreign direct investment, net inflows (% GDP)	27	88
Cost dynamics	110	40
<b>Financing and domestic value added</b>	100	40.0
<b>Financing and costs</b>	112	51.0
Domestic credit to private sector (% GDP)	88	18.8
MSME financing gap (% GDP)	70	82.0
Tax and contribution rate (% profit)	87	72.4
Bank nonperforming loans (%)	106	106
<b>Unmet needs index</b>	100	100
Medium- and high-tech activities value added	88	21.8
Industry and services value added (% GDP)	88	87.3
Labour underutilization rate	89	33.8
Output per worker	100	7.8
<b>ENABLING ENVIRONMENT</b>	84	86.8
<b>Governance</b>	84	88
<b>Political environment</b>	88	81.4
Peace and stability	54	88.7
View and accountability	40	87.1
Quality of institutions	81	80.8
Rule of law	79	86.0
Control of corruption	82	88.0
Government effectiveness	88	87.8
<b>Socio-economic</b>	84	85.8
<b>Gender equity</b>	45	73.0
Female-to-male ratio in parliament	87	40
Female-to-male labour force participation	88	80.7
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	100	100
Social protection coverage (% population)	80	85.0
Adult literacy rate	79	84.7
Youth not in employment, education or training (%)	100	31.7
<b>Standard of living</b>	100	100
Poverty headcount ratio (% population)	83	72.5
GDP per capita	87	7.3
<b>Health and environment</b>	88	82.8
<b>Health</b>	76	80.8
Universal health coverage	88	88
Healthy life expectancy (years)	88	71.7
Under-five mortality rate	72	88.7
<b>Environmental performance</b>	100	100
Renewable energy consumption (%)	102	8
Household footprint per capita	88	80.1
Natural hazard exposure	113	48

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 23/154

**GKI SCORE** 63.3

**WORLD AVERAGE** 48.4

# JAPAN

## COUNTRY PERFORMANCE SUMMARY

Japan is a leading performer in terms of its knowledge infrastructure. It ranks 23rd out of 154 countries in the Global Knowledge Index 2021 and 23rd out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 4,932.855  
**Population** 126,476,458  
**HDI** 0.919

### AREAS OF STRENGTH

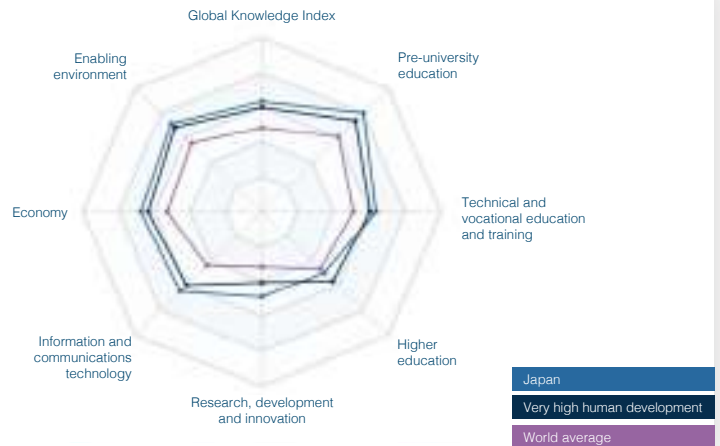
- + Insolvency recovery rate
- + Youth not in employment, education or training (%)
- + Healthy life expectancy (years)
- + Active mobile-broadband subscriptions per hundred inhabitants
- + Intellectual property receipts (% total trade)

### AREAS OF IMPROVEMENT

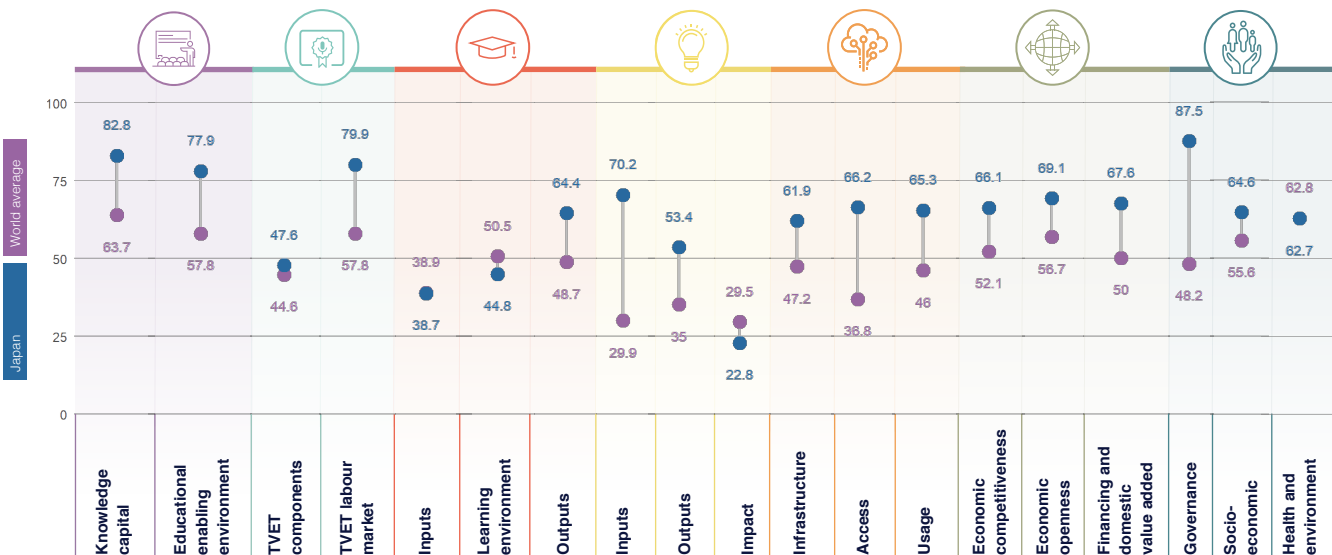
- Trade (% GDP)
- Female-to-male ratio in parliament
- Average documents per researcher
- Researchers in higher education (%)
- Natural hazard exposure

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	12	80.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	26	63.8
HIGHER EDUCATION	55	49.3
RESEARCH, DEVELOPMENT AND INNOVATION	13	48.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	17	64.5
ECONOMY	22	67.6
ENABLING ENVIRONMENT	26	71.6



## GKI PILLARS







# JAPAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	26	82.8
Enrollment	20	95.4
Net enrolment rate in primary education	87	83.3
Net enrolment rate in lower secondary education	39	87.3
Net enrolment rate in upper secondary education	13	89.6
Completion	87	81.2
Years of compulsory education in primary and secondary	87	89.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	116	116
Outcomes	5	83.0
Assessment of 15-year-old students in math, science and reading	8	33.0
Learning-adjusted years of schooling	4	80.8
<b>Educational enabling environment</b>		
Expenditure	3	77.0
Government expenditure on primary education (% GDP)	4	34.1
Government expenditure on secondary education (% GDP)	2	81.8
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	116	116
Class attendance rate in early childhood education	116	116
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communications training and learning	47	81.0
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	85	86.5
TVET resources	116	85.0
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	85	86.2
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	1	81.3
Extent of staff training	8	71
Quality of vocational training	17	85.5
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of median-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	116	116
Firms considered well-integrated with TVET (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	116	116
Real TVET unemployment	11	81.7
Share of TVET occupations	6	82.4
Manufacturing employment (%)	30	84.0
Quality and infrastructure	3	81.4
Enrollment in vocational education, gender parity	116	116
Useable employment rate	24	81.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	88	88.0
Government expenditure per tertiary student	24	35.0
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	32	88.1
Enrollment in bachelor's or equivalent level (%)	81	34.1
Enrollment in masters, doctoral or equivalent (%)	54	22.1
Resources	30	87.3
Pupil-teacher ratio in tertiary education	8	85.7
Researchers in higher education (%)	101	18.0
<b>Learning environment</b>		
Timely and academic freedom	116	116
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	50	18.5
Academic freedom	83	71.1
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Attainment	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	27	83.1
Labour force participation rate with advanced education	45	77.0
Unemployment rate with advanced education	14	84.0
Innovation	85	43.0
University tertiary collaboration in R&D	19	82.4
OSSE documents per F&D personnel in higher education	34	20.0
<b>Government's contribution and performance</b>		
Inputs	3	82.2
Quality and infrastructure	1	80
Output	5	80.2
OEFD per researcher	18	80.1
Researchers per thousand labour force	18	83.0
Tertiary graduate from STEM programmes (%)	116	116
<b>Government's contribution and performance</b>		
Output	3	71.8
OEFD performed by business enterprises (%)	3	87.8
OEFD financed by business enterprises (%)	3	80.0
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
Quality and infrastructure	1	80.2
High-skill employment (%)	13	87.0
Intellectual property payments (% total trade)	9	87.7
State of cluster development	11	87.7
<b>Outputs</b>		
Quality and infrastructure	11	81.1
Average documents per researcher	101	35.1
Citations per document	100	18.0
Patent applications (per 100 billion GDP)	3	80.0
<b>Government's contribution and performance</b>		
Output	2	83.4
Intellectual property receipts (% total trade)	2	28.6
Research design applications (per 100 billion GDP)	28	28.6
PCT applications (per 100 billion GDP)	2	80.0
Firms producing new goods and services (%)	116	116





# JAPAN

	Rank	Value
<b>Consumer Electronics</b>		
Smartphone applications (per 100 million GDP)	17	64.4
Cultural goods exports (% exports)	36	23.5
Printing and publishing output (% manufactured output)	20	43
<b>Media</b>	100	0.0
<b>Books</b>	35	11.1
Books or e-books penetration	7	65.4
Depth of innovative companies	28	60.5
ISO 9001 quality certificates (% GDP)	60	25.0
ISO 14001 environmental certificates (% GDP)	28	30.4
<b>Software</b>	17	64.5
CERD licensed from abroad (%)	63	1.2
Joint ventures per strategic alliance deals (% GDP)	43	16.9
Computer software spending (% GDP)	45	23.5
<b>Government Services</b>	107	1.1
New business density per thousand population	110	1.8
Firms with new products/services (%)	106	1.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	17	64.5
<b>Infrastructure</b>	88	67.8
<b>Coverage</b>	88	67.8
3G/4G mobile network coverage (% population)	17	60.0
Secure Internet servers per 1 million population	30	33.5
Investment in telecommunication services (% GDP)	105	16.0
<b>Speed</b>	35	63.0
Mobile internet and download speeds	17	22.0
Fixed broadband upload and download speeds	10	60.0
Fixed broadband subscriptions (by speed) per hundred people	28	71
<b>Availability</b>	61	63.0
Fixed broadband latency (% QM per user)	28	67.6
Mobile broadband latency (% QM per capita)	70	66.1
Internet and telephony competition	1	100
<b>Access</b>	7	66.2
<b>Subscribers</b>	0	71.0
Active mobile broadband subscriptions per hundred inhabitants	2	81.0
International Internet bandwidth per user	106	20.6
Households with Internet access at home (%)	8	97
<b>Skills and employment</b>	10	69.0
Individuals with standard ICT skills (%)	13	69.6
Tertiary graduates from ICT programmes (%)	106	1.9
ICT employment (%)	20	40.0
<b>Usage</b>	22	65.3
<b>Services</b>	66	61.7
Government online services	12	60.0
Fixed broadband internet traffic per subscriber	41	30
Mobile broadband internet traffic per subscriber	37	13.6
Internet users (%)	17	60.0
<b>Commerce</b>	16	61.0
ICT/FIT patent applications (per 100,000 GDP)	3	91
E-participation	4	60.0
Internet activities by individuals (%)	60	34.9
Trade in digitally deliverable services (% total trade)	6	75
<b>ECONOMY</b>	23	67.6
<b>Economic Competitiveness</b>	23	66.1
Infrastructure Investment	11	61.1
Overhead capital formation (% GDP)	67	60.4
Logistics performance	5	75.0
Transport productive capacity	31	40.7
Building quality control	20	60.7

	Rank	Value
<b>Business Agility</b>	66	63.0
Ease of starting a business	67	66.1
Recovery recovery rate	7	100
Entrepreneurial employee activity rate	49	15.0
Growth of corporate transactions	60	21.4
<b>Corporate openness</b>	34	65.0
Trust and dissemination	41	64.7
Tax (% GDP)	102	11.6
High-technology trade (% total trade)	11	70
Market concentration	38	66.4
Market concentration	72	60.0
Product diversity	10	73.0
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	100	30.0
Cost dynamics	40	60.6
<b>Financing and domestic value added</b>	14	67.2
<b>Financing and costs</b>	21	67.0
Domestic credit to private sector (% GDP)	3	75
MSME financing gap (% GDP)	106	1.9
Tax and contribution rate (% profit)	110	60.0
Bank nonperforming loans (%)	106	1.9
Unmet loan demand	0	67.4
Medium- and high-tech activities value added	8	66.4
Industry and services value added (% GDP)	6	60.0
Labour underutilization rate	7	61.1
Output per worker	34	31.0
<b>ENABLING ENVIRONMENT</b>	24	71.8
<b>Governance</b>	13	67.5
Political environment	16	63.0
Peace and stability	11	67.5
View and accountability	27	70.7
Quality of institutions	16	61.0
Rule of law	16	60.0
Control of corruption	19	60.4
Government effectiveness	21	63.3
<b>Socio-economic</b>	40	64.8
Gender equity	101	20.0
Female-to-male ratio in parliament	107	11
Female-to-male labour force participation	88	72.3
Female-to-male ratio in internal wage	67	60.1
Gender inequality	1	61
Social protection coverage (% population)	15	67.0
Adult literacy rate	106	1.9
Youth not in employment, education or training (%)	1	100
Standard of living	66	21.1
Poverty headcount ratio (% population)	106	1.9
GDP per capita	21	24.1
<b>Health and environment</b>	84	62.7
Health	0	61.0
Universal health coverage	12	65
Healthy life expectancy (years)	1	100
Under-five mortality rate	6	60.0
Environmental performance	100	21.0
Renewable energy consumption (%)	105	7.7
Household footprint per capita	110	60.6
Natural hazard exposure	101	10

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# JORDAN

KEY INDICATORS	
GDP US\$ billions	100.16
Population	10,203,140
HDI	0.729

**GKI RANK** 103/154

**GKI SCORE** 42.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Jordan is a modest performer in terms of its knowledge infrastructure. It ranks 103rd out of 154 countries in the Global Knowledge Index 2021 and 35th out of the 39 countries with high human development.

### AREAS OF STRENGTH

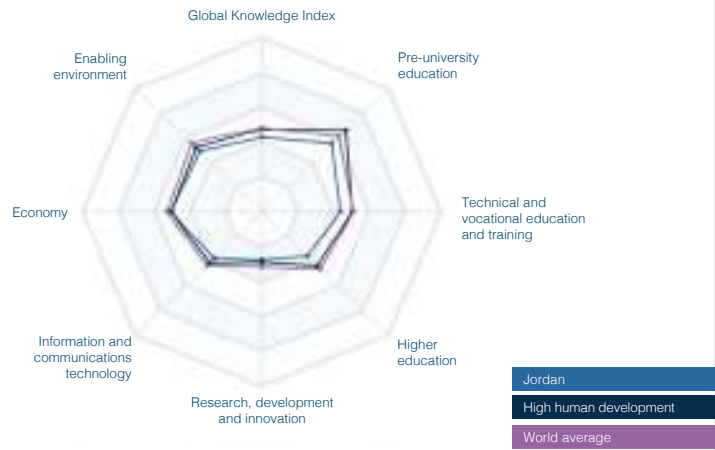
- + Gross attendance ratio for tertiary education, wealth parity
- + Proportion of children with stimulating home learning environment
- + Printing and publishing output (% manufactured output)
- + Mobile broadband Internet traffic per subscription
- + Tertiary graduates from ICT programmes (%)

### AREAS OF IMPROVEMENT

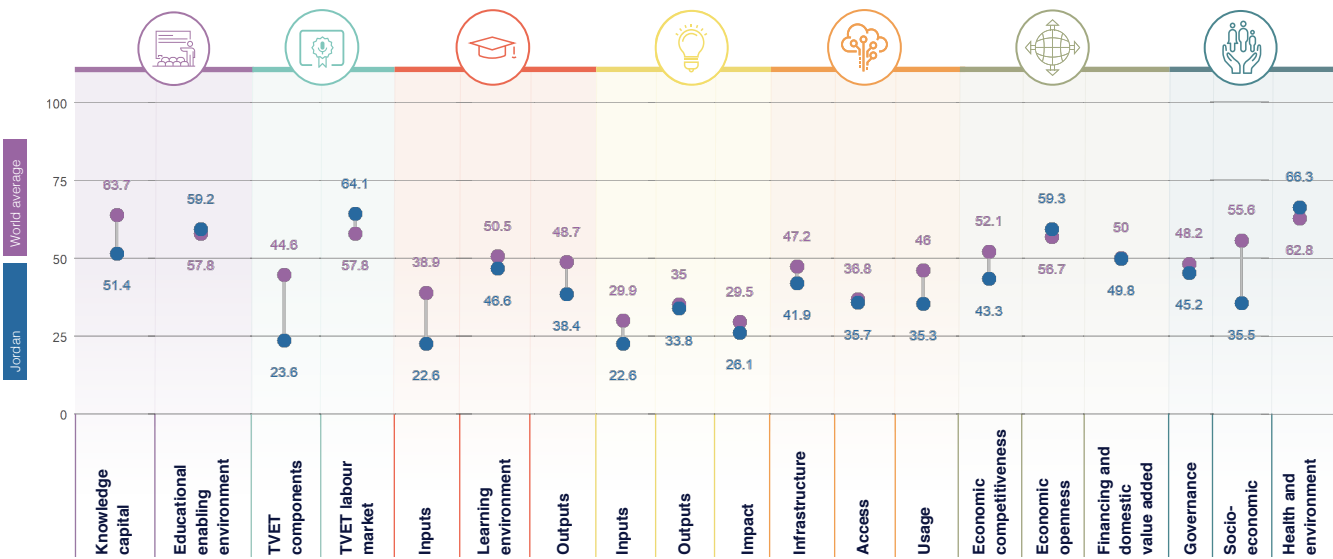
- Transport productive capacity
- Unemployment rate with advanced education
- Gross fixed capital formation (% GDP)
- Youth not in employment, education or training (%)
- Female-to-male labour force participation

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	105	55.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	112	43.9
HIGHER EDUCATION	125	35.9
RESEARCH, DEVELOPMENT AND INNOVATION	95	27.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	92	37.6
ECONOMY	77	50.8
ENABLING ENVIRONMENT	98	49



## GKI PILLARS





# JORDAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	111	51.4
Enrollment	108	43.0
Net enrolment rate in primary education	126	33.0
Net enrolment rate in lower secondary education	111	67.2
Net enrolment rate in upper secondary education	160	49.7
Completion	101	67.0
Years of compulsory education in primary and secondary	42	76.0
Completion rate in upper secondary education	69	50.4
Success rate rate in the last grade of lower secondary education	108	50.5
Completion	71	43.5
Assessment of 15-year-old students in math, science and reading	56	33.4
Learning-adjusted years of schooling	84	61.5
<b>Educational enabling environment</b>	<b>81</b>	<b>66.3</b>
Expenditure	60	25.0
Government expenditure on primary education (% GDP)	67	22.6
Government expenditure on secondary education (% GDP)	66	22.3
Government funding per primary student (% GDP per capita)	65	26.5
Government funding per secondary student (% GDP per capita)	60	22.6
Resources	66	30.1
Pupil-based teacher ratio in primary education	25	60.2
Pupil-based teacher ratio in secondary education	23	60.8
Schools with access to computers in primary education (%)	70	35.6
Schools with access to computers in secondary education (%)	1	100
Early learning	57	63.2
Class attendance rate in early childhood education	67	24.6
Proportion of children who are developmentally on track	41	54
Proportion of children with stimulating home learning environments	7	66.1
Pupil-based teacher ratio in preprimary education	26	60.6
Quality and infrastructure	71	61
Completion rate in upper secondary education, gender parity	80	36.4
Completion rate in upper secondary education, wealth parity	71	31.1
Completion rate in upper secondary education, location parity	81	37.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>166</b>	<b>22.8</b>
Domestic training expenditure	109	31.4
Firms offering formal training (%)	109	16.4
Labour force with short-cycle tertiary education (%)	116	119
Participation rate in formal and non-formal education and training	116	118
TVET resources	101	11.8
Government expenditure on vocational education (%)	114	116
Share of students enrolled in secondary vocational programmes	112	4.5
Share of students enrolled in postsecondary vocational programmes	116	118
TVET quality and infrastructure	60	47
Extent of staff training	83	63.6
Quality of vocational training	60	52.1
Ratio of high-skil TVET occupations earnings to average wage	51	26.0
Ratio of medium-skil TVET occupations earnings to average wage	33	50.7
<b>TVET labour market</b>	<b>66</b>	<b>64.5</b>
Efficiency of the labour market	106	32.0
Firms considered with inappropriately educated workforce (%)	17	65.6
Employment educational mismatch (%)	62	49.4
Proportion of skilled production workers	112	26
Unemployment rate with vocational education	60	29.2
Real TVET unemployment	60	21.6
Share of TVET occupations	41	65.0
Manufacturing employment (%)	101	25.5
Quality and infrastructure	56	64.0
Enrollment in vocational education, gender parity	60	60.6
Useable employment rate	32	60.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>132</b>	<b>22.6</b>
Expenditure	115	5
Government expenditure per tertiary student	114	3
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	71	11
Enrollment in bachelor's or equivalent level (%)	76	25.6
Enrollment in masters, doctoral or equivalent (%)	70	12.0
Resources	115	47.7
Rapiteacher ratio in tertiary education	118	47.7
Researcher in higher education (%)	116	116
<b>Learning environment</b>	<b>66</b>	<b>46.6</b>
Timely and academic freedom	115	37.0
Teachers in tertiary education, gender parity	66	36.0
Labour mobility rate	20	43.1
Academic freedom	125	30.0
Quality and infrastructure	51	66.6
Class attendance rate in tertiary education, gender parity	67	33.0
Class attendance rate in tertiary education, wealth parity	6	38.0
Class attendance rate in tertiary education, location parity	61	16.1
<b>Outputs</b>	<b>121</b>	<b>36.4</b>
Attainment	41	53.7
Educational attainment rate, bachelor's or equivalent	36	56.6
Educational attainment rate, master's or equivalent	55	7.6
Educational attainment rate, doctoral or equivalent	28	34.0
Employment	102	21
Labour force participation rate with advanced education	113	48.0
Unemployment rate with advanced education	132	24.0
Impact	56	41.0
University tertiary enrollment in R&D	67	48.0
OECD indicators per 100 personnel in higher education	116	116
<b>Government performance and economic data</b>		
<b>Inputs</b>	<b>10</b>	<b>22.2</b>
Government performance	11	22.2
GDP (% GDP)	48	14.1
GERD per researcher	64	23.6
Researchers per thousand labour force	52	14.0
Tertiary graduates from STEM programmes (%)	26	62.0
<b>Quality and infrastructure</b>	<b>11</b>	<b>22.2</b>
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	118	3.4
<b>Quality and infrastructure</b>	<b>11</b>	<b>22.2</b>
High-skilled employment (%)	27	46.0
Intellectual property payments (% total trade)	60	4.2
State of cluster development	29	67.0
<b>Outputs</b>	<b>16</b>	<b>22.2</b>
Government performance	11	22.2
Average documents per researcher	48	67.2
Citations per document	100	11.0
Patent applications (per 100 billion GDP)	63	43.0
<b>Quality and infrastructure</b>	<b>11</b>	<b>22.2</b>
Intellectual property receipts (% total trade)	76	6
Research design applications (per 100 billion GDP)	75	4.4
PCT applications (per 100 billion GDP)	50	56.0
Firms producing new goods and services (%)	67	22.0





# JORDAN

	Rank	Value
<b>Consumer Electronics</b>		
Treatment applications per 100 million GDP	72	10.0
Cultural goods exports (% exports)	39	21.3
Printing and publishing output (% manufactured output)	11	81.0
<b>Energy</b>	85	25.1
<b>Finance</b>	55	27.1
Access to venture capital	60	10.6
Depth of innovative companies	30	59.4
ISO 9001 quality certificates (% GDP)	50	22.1
ISO 14001 environmental certificates (% GDP)	60	12.0
<b>Infrastructure</b>	55	27.1
CERD forecast from abroad (%)	106	11.9
Cost savings per strategic alliance deals (% GDP)	89	10.6
Computer software spending (% GDP)	41	24.3
<b>Internationalization</b>	100	2.5
New business density per thousand population	100	2.5
Firms with new products/services (%)	65	69.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>42</b>	<b>32.3</b>
<b>Infrastructure</b>	81	41.9
<b>Coverage</b>	89	23.5
3G/4G mobile network coverage (% population)	29	69.0
Secure Internet servers per 1 million population	98	2
Investment in telecommunication services (% GDP)	64	24.6
<b>Quality</b>	70	36
Mobile upload and download speeds	56	21.4
Fixed broadband upload and download speeds	34	23.0
Fixed broadband subscriptions (y-speed) per hundred people	62	6.8
<b>Availability</b>	100	66.2
Fixed broadband bandwidth (% Gbps per capita)	119	60.2
Mobile broadband bandwidth (% Gbps per capita)	119	42.0
Internet and telephony competition	65	53.0
<b>Access</b>	84	30.7
<b>Subscriptions</b>	55	31.1
Active mobile broadband subscriptions per hundred inhabitants	67	29.0
International Internet bandwidth per user	87	38.3
Households with Internet access at home (%)	100	37.0
<b>Skills and employment</b>	60	30.3
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	14	50.0
ICT employment (%)	66	14.3
<b>Usage</b>	100	35.3
<b>Services</b>	60	40.0
Government online services	100	35.0
Fixed broadband Internet traffic per subscription	23	34.0
Mobile broadband Internet traffic per subscription	73	35.0
Internet users (%)	63	40
<b>Commerce</b>	100	21.0
ICT FDI parent applications (per 100 million GDP)	64	41.1
E-participation	100	33.0
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	143	0.2
<b>ECONOMY</b>	<b>77</b>	<b>60.8</b>
<b>Economic Competitiveness</b>	111	43.3
<b>Infrastructure Investment</b>	141	22.0
Overhead capital formation (% GDP)	143	10.0
Logistics performance	65	42.2
Transport productive capacity	148	7.9
Building quality control	75	73.0

	Rank	Value
<b>Business Agility</b>	60	31.1
Ease of starting a business	100	64.0
Recovery recovery rate	100	29.0
Entrepreneurial employee activity rate	75	4.5
Growth of corporate transactions	11	65.7
<b>Corporate openness</b>	64	26.0
Trust and development	50	27.0
Tax (% GDP)	85	25.7
High-technology trade (% total trade)	100	30.0
Market concentration	60	38.0
Market concentration	60	67.4
Product diversity	51	60.0
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	69	42.0
Cost dynamics	100	30.7
<b>Financing and domestic value added</b>	<b>77</b>	<b>40.8</b>
<b>Financing and costs</b>	41	41.0
Domestic credit to private sector (% GDP)	40	31.0
IMRS financing gap (% GDP)	27	67.1
Tax and contribution rate (% profit)	36	79
Bank nonperforming loans (%)	30	77.7
Unmet loan demand	100	30.7
Medium and high-tech activities value added	67	37.0
Industry and services value added (% GDP)	65	64.2
Labour underutilization rate	100	31.0
Output per worker	61	16.0
<b>ENABLING ENVIRONMENT</b>	<b>84</b>	<b>41</b>
<b>Governance</b>	76	45.2
<b>Political environment</b>	104	31.3
Peace and stability	69	50.0
View and accountability	110	27.0
Quality of institutions	69	50.7
Rule of law	68	60.1
Control of corruption	66	50.0
Government effectiveness	67	57.2
<b>Socio-economic</b>	137	35.5
<b>Gender equity</b>	100	16.0
Female-to-male ratio in parliament	100	16
Female-to-male labour force participation	100	16.6
Female-to-male ratio in internal wage	100	19
Gender inequality	117	49.0
Social protection coverage (% population)	84	63.0
Adult literacy rate	31	67.3
Youth not in employment, education or training (%)	100	15.0
<b>Standard of living</b>	60	43.4
Poverty headcount ratio (% population)	36	26.0
GDP per capita	60	6.4
<b>Health and environment</b>	61	66.3
<b>Health</b>	60	60.0
Universal health coverage	40	70
Healthy life expectancy (years)	49	76.0
Under-five mortality rate	61	60.2
<b>Environmental performance</b>	61	61.0
Renewable energy consumption (%)	100	7.5
Household footprint per capita	64	69.2
Natural hazard exposure	72	59

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 78/154

**GKI SCORE** 48

**WORLD AVERAGE** 48.4

# KAZAKHSTAN

## KEY INDICATORS

**GDP** US\$ billions ..... **475.184**  
**Population** ..... **18,776,707**  
**HDI** ..... **0.825**

## COUNTRY PERFORMANCE SUMMARY

Kazakhstan is a moderate performer in terms of its knowledge infrastructure. It ranks 78th out of 154 countries in the Global Knowledge Index 2021 and 60th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

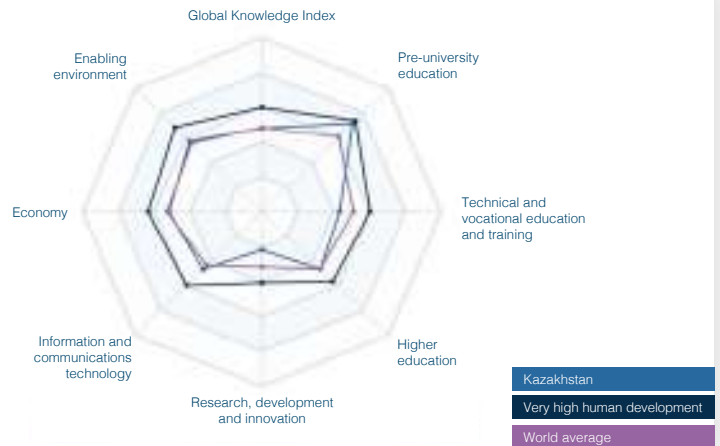
- + Completion rate in upper secondary education
- + Net enrolment rate in lower secondary education
- + Pupil-trained teacher ratio in secondary education
- + Poverty headcount ratio (% population)
- + Gross attendance ratio for tertiary education, location parity

### AREAS OF IMPROVEMENT

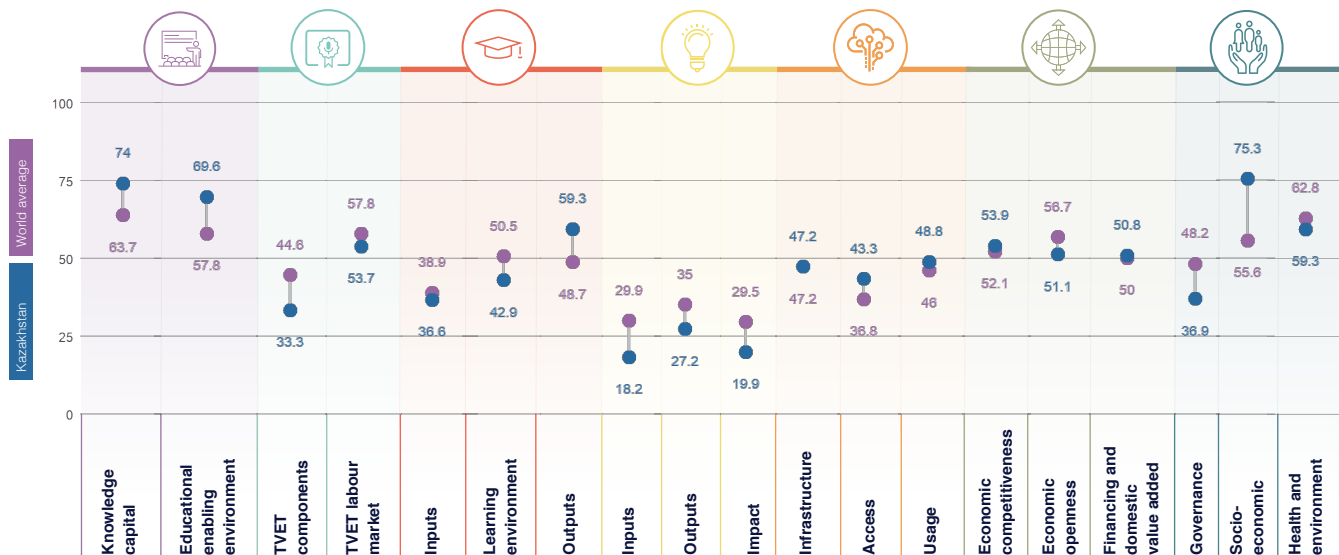
- Educational attainment rate, master's or equivalent
- Ratio of high-skill TVET occupations earnings to average wage
- Government expenditure on vocational education (%)
- Government funding per primary student (% of GDP per capita)
- Government expenditure on primary education (% of GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	54	71.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	113	43.5
HIGHER EDUCATION	72	46.3
RESEARCH, DEVELOPMENT AND INNOVATION	124	21.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	68	46.4
ECONOMY	72	51.9
ENABLING ENVIRONMENT	62	57.1



## GKI PILLARS





# KAZAKHSTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	82	71.8
Enrollment	31	83.0
Net enrolment rate in primary education	106	100.0
Net enrolment rate in lower secondary education	2	100
Net enrolment rate in upper secondary education	50	89.0
Completion	14	83.0
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	1	100
Success rate rate in the last grade of lower secondary education	8	87.5
Completion	77	40.0
Assessment of "Olympiad" students in math, science and reading	60	27.0
Learning-adjusted years of schooling	33	65.0
<b>Educational enabling environment</b>		
Expenditure	115	17.0
Government expenditure on primary education (% GDP)	100	2
Government expenditure on secondary education (% GDP)	35	36.0
Government funding per primary student (% GDP per capita)	107	8
Government funding per secondary student (% GDP per capita)	43	33.0
Resources	61	60.1
Pupil-based teacher ratio in primary education	22	80.7
Pupil-based teacher ratio in secondary education	1	100
Schools with access to computers in primary education (%)	55	70.1
Schools with access to computers in secondary education (%)	57	83.0
Early learning	24	71.0
Class attendance rate in early childhood education	66	44.0
Proportion of children who are developmentally on track	14	73.7
Proportion of children with stimulating home learning environments	18	87.0
Pupil-based teacher ratio in preprimary education	6	88.2
Quality and infrastructure	9	81.0
Completion rate in upper secondary education, gender parity	14	87.0
Completion rate in upper secondary education, wealth parity	14	83.7
Completion rate in upper secondary education, location parity	24	84.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	108	14.0
Firms offering formal training (%)	61	25.7
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	40	22.0
TVET resources	37	33.0
Government expenditure on vocational education (%)	78	8
Share of students enrolled in secondary vocational programmes	72	15.7
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	100	30.0
Extent of staff training	77	48.3
Quality of vocational training	80	46.0
Ratio of high-skill TVET occupations earnings to average wage	113	4.5
Ratio of medium-skill TVET occupations earnings to average wage	44	46.1
<b>TVET labour market</b>		
Efficiency of the labour market	106	41.4
Firms considered well-integrated with workforce (%)	89	30
Employment educational mismatch (%)	108	78
Proportion of skilled production workers	78	62.0
Unemployment rate with vocational education	116	116
Real TVET unemployment	113	51.4
Share of TVET occupations	70	56.0
Manufacturing employment (%)	148	5.2
Quality and infrastructure	65	61.0
Enrollment in vocational education, gender parity	39	87.0
Useable employment rate	81	70.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	111	5.1
Government expenditure per tertiary student	60	3.1
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	30	37.1
Enrollment in bachelor's or equivalent level (%)	18	42.7
Enrollment in masters, doctoral or equivalent (%)	79	11.5
Resources	31	34.7
Pupil-teacher ratio in tertiary education	79	36.7
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
Timely and academic freedom	107	34.0
Teachers in tertiary education, gender parity	117	12.0
Labour mobility rate	48	19.4
Academic freedom	114	42.0
Quality and infrastructure	11	61
Class attendance rate in tertiary education, gender parity	8	64.0
Class attendance rate in tertiary education, wealth parity	21	49.0
Class attendance rate in tertiary education, location parity	9	38.3
<b>Outputs</b>		
Attainment	30	44.7
Educational attainment rate, bachelor's or equivalent	9	89.0
Educational attainment rate, master's or equivalent	68	0.3
Educational attainment rate, doctoral or equivalent	116	116
Employment	9	60.4
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	33	80.8
Impact	69	43.0
University tertiary enrollment in OECD	71	43.0
OECD students per 100 persons in higher education	116	116
<b>Entrepreneurship, innovation and services trade</b>		
<b>Inputs</b>		
Government expenditure	100	16.2
Government R&D expenditure	108	10.1
GDP (% GDP)	100	2.2
OEFD per researcher	68	7.7
Researchers per thousand labour force	62	2.5
Tertiary graduates from STEM programmes (%)	66	44.4
<b>Quality and infrastructure</b>		
OEFD performed by business enterprises (%)	71	7.4
OEFD financed by business enterprises (%)	33	56.7
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	114	2.4
Quality of research innovation	107	30.1
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	65	7.4
State of cluster development	128	33.0
<b>Outputs</b>		
Government R&D expenditure	10	60.0
Average documents per researcher	80	45.0
Citations per document	112	11.3
Patent applications (per 100 billion GDP)	38	55.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	104	2.1
Research design applications (per 100 billion GDP)	100	1
PCT applications (per 100 billion GDP)	53	45.7
Firms producing new goods and services (%)	96	22.0

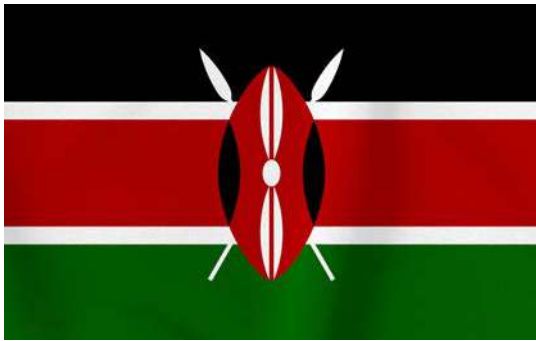


# KAZAKHSTAN

	Rank	Value
<b>Consumer Innovation Adoption</b>	97	5.5
Treatment applications (per 100 million GDP)	89	14.0
Cultural goods exports (% exports)	85	5.8
Printing and publishing output (% manufactured output)	100	7.9
<b>Finance</b>	100	6.0
Access to institutions' provisions	81	9.8
Depth of innovative companies	100	4.0
ISO 9001 quality certificates (% GDP)	117	0.6
ISO 14001 environmental certificates (% GDP)	80	0.8
<b>Language</b>	100	0.0
CERD freedom from abuse (%)	81	0.1
Joint ventures per strategic industry deals (% GDP)	85	8
Computer software spending (% GDP)	118	1.2
<b>Government Services</b>	90	10.0
New business density per thousand population	62	0.8
Firms with new products/services (%)	86	31.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	68	66.8
<b>Infrastructure</b>	71	47.3
<b>Coverage</b>	100	11.0
30MHz mobile network coverage (% population)	104	20.0
Secure Internet servers per 1 million population	57	60.7
Investment in telecommunication services (% GDP)	118	7.8
<b>Quality</b>	76	10.0
Mobile upload and download speeds	77	16.7
Fixed broadband upload and download speeds	44	19.4
Fixed broadband subscriptions (y-speed) per hundred people	73	20.6
<b>Availability</b>	71	31.1
Fixed broadband latency (% QM per capita)	70	60.0
Mobile broadband basket (% QM per capita)	44	60.0
Internet and telephone competition	80	63.0
<b>Access</b>	84	40.0
<b>Subscribers</b>	41	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	72	36.0
International Internet bandwidth per user	88	40.7
Households with Internet access at home (%)	32	80.0
<b>Skills and employment</b>	71	20.1
Individuals with standard ICT skills (%)	49	33.0
Tertiary graduates from ICT programmes (%)	89	28.0
ICT employment (%)	104	19
<b>Usage</b>	71	40.0
<b>Services</b>	40	10.0
Government online services	11	62.8
Fixed broadband Internet traffic per subscription	60	14.4
Mobile broadband Internet traffic per subscription	29	27.8
Internet users (%)	37	60.0
<b>Commerce</b>	80	11.0
ICT FDI parent applications (per 100 million GDP)	101	20.0
E-participation	25	60.1
Internet activities by individuals (%)	66	34
Trade in digitally deliverable services (% total trade)	77	30.2
<b>ECONOMY</b>	72	81.8
<b>Economic Competitiveness</b>	73	11.0
<b>Infrastructure Investment</b>	61	44.0
Overhead capital formation (% GDP)	62	81.0
Logistics performance	71	40.2
Transport productive capacity	108	12.1
Building quality control	20	60.7

	Rank	Value
<b>Business Agility</b>	80	60
Ease of starting a business	19	60.4
Recovery recovery rate	88	43.0
Entrepreneurial employee activity rate	54	12.0
Growth of corporate transactions	13	60.7
<b>Corporate openness</b>	82	61.0
Trust and dissatisfaction	10	10.1
Tax (% GDP)	66	20.0
High-technology trade (% total trade)	20	17.4
Market concentration	108	48.0
Market concentration	38	60.0
Product diversity	80	60.1
Climate financial openness	85	22.4
Foreign direct investment, net inflows (% GDP)	100	30.0
Cost dynamics	41	60
<b>Financing and domestic value added</b>	71	60.0
<b>Financing and costs</b>	100	11.0
Domestic credit to private sector (% GDP)	100	0.0
IMRS financing gap (% GDP)	80	60.0
Tax and contribution rate (% profit)	86	78.0
Bank nonperforming loans (%)	84	60.7
Unmet loan demand	14	40
Medium- and high-tech activities value added	91	17.4
Industry and services value added (% GDP)	34	60.0
Labour underutilization rate	10	60.4
Output per worker	80	20.0
<b>ENABLING ENVIRONMENT</b>	62	47.1
<b>Governance</b>	88	30.0
Political environment	111	27.0
Peace and stability	86	30.0
View and accountability	102	10.0
Quality of institutions	70	40.0
Rule of law	80	30.0
Control of corruption	80	30.0
Government effectiveness	80	60.1
<b>Socio-economic</b>	17	70.0
Gender equity	44	10.1
Female-to-male ratio in parliament	86	37.0
Female-to-male labour force participation	31	81.4
Female-to-male ratio in internal wage	55	67.0
Gender inequality	9	10.1
Social protection coverage (% population)	1	10.0
Adult literacy rate	10	60.7
Youth not in employment, education or training (%)	29	60.7
Standard of living	10	10.0
Poverty headcount ratio (% population)	4	64.7
GDP per capita	80	27.0
<b>Health and environment</b>	118	60.0
Health	80	10.4
Universal health coverage	40	70
Healthy life expectancy (years)	70	60.0
Under-five mortality rate	60	62.0
Environmental performance	100	10.0
Renewable energy consumption (%)	140	1.0
Household footprint per capita	100	60.8
Natural hazard exposure	60	60

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# KENYA

**GKI RANK** 105/154

**GKI SCORE** 42.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Kenya is a modest performer in terms of its knowledge infrastructure. It ranks 105th out of 154 countries in the Global Knowledge Index 2021 and 8th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Labour force participation rate with advanced education
- + Printing and publishing output (% manufactured output)
- + International Internet bandwidth per user
- + Ratio of high-skill TVET occupations earnings to average wage
- + Female-to-male labour force participation

### AREAS OF IMPROVEMENT

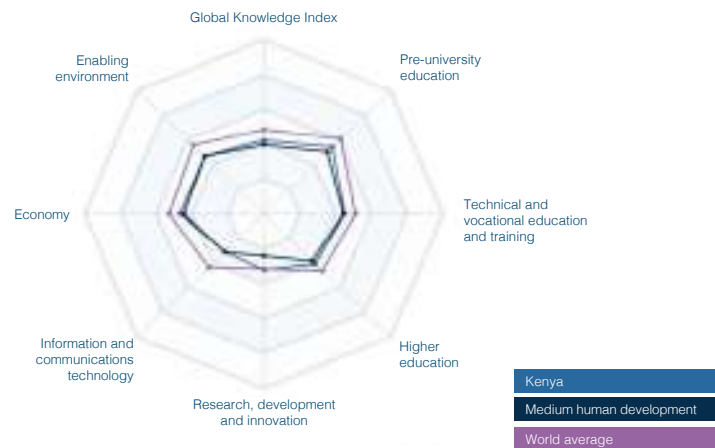
- Net enrolment rate in primary education
- Pupil-teacher ratio in tertiary education
- Trade (% GDP)
- Industry and services value added (% GDP)
- Teaching staff compensation (% tertiary expenditure)

### KEY INDICATORS

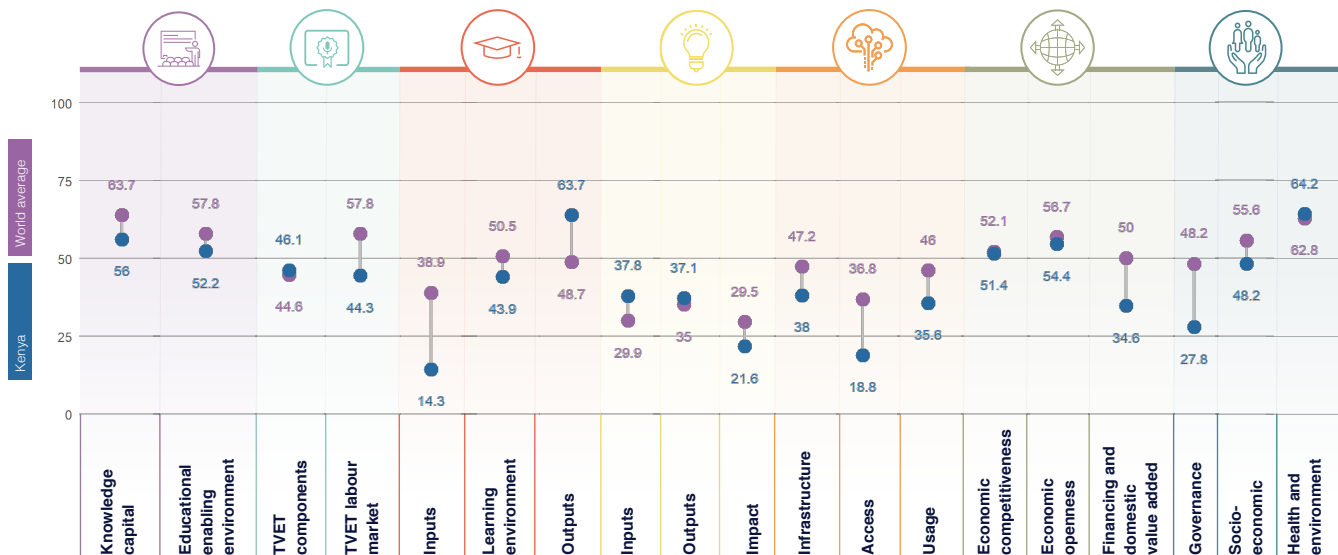
**GDP US\$ billions** 226.939  
**Population** 53,771,300  
**HDI** 0.601

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	106	54.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	106	45.2
HIGHER EDUCATION	102	40.6
RESEARCH, DEVELOPMENT AND INNOVATION	62	32.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	111	30.8
ECONOMY	102	46.8
ENABLING ENVIRONMENT	112	46.7



## GKI PILLARS







# KENYA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	166	51.1
Enrollment	108	42.0
Net enrolment rate in primary education	100	42.0
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	32	10.1
Years of compulsory education in primary and secondary	9	82.3
Completion rate in upper secondary education	81	42.0
Success rate rate in the last grade of lower secondary education	81	82.1
Completion	32	32
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	70	50
<b>Educational enabling environment</b>		
Expenditure	41	17.0
Government expenditure on primary education (% GDP)	33	43.2
Government expenditure on secondary education (% GDP)	18	44.8
Government funding per primary student (% GDP per capita)	85	26
Government funding per secondary student (% GDP per capita)	116	116
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	31	17.0
Class attendance rate in early childhood education	88	80.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	38	25.4
Quality and infrastructure	31	10.0
Completion rate in upper secondary education, gender parity	80	14.0
Completion rate in upper secondary education, wealth parity	81	15.6
Completion rate in upper secondary education, location parity	77	12.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	31	41.0
Firms offering formal training (%)	45	45.9
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
<b>TVET resources</b>		
Government expenditure on vocational education (%)	51	22.6
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolled in postsecondary vocational programmes	81	31.7
<b>TVET quality and infrastructure</b>		
Extent of staff training	81	53.1
Quality of vocational training	50	54.4
Ratio of high-skill TVET occupations earnings to average wage	7	81.1
Ratio of medium-skill TVET occupations earnings to average wage	14	60.5
<b>TVET labour market</b>		
Efficiency of the labour market	31	31
Firms considered with inappropriately educated workforce (%)	10	86.4
Employment educational mismatch (%)	81	50.7
Proportion of skilled production workers	88	33.8
Unemployment rate with vocational education	80	29.1
Real TVET unemployment	116	116
Share of TVET occupations	104	19.0
Manufacturing employment (%)	118	21.8
Quality and infrastructure	116	41
Enrollment in vocational education, gender parity	116	116
Useable employment rate	110	40

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrollment	118	61.1
Government expenditure per tertiary student	81	13.2
Teaching staff compensation (% tertiary expenditure)	88	9
Enrollment	110	0
Enrollment in bachelor's or equivalent level (%)	112	9
Enrollment in masters, doctoral or equivalent (%)	100	5
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	100	23.7
Researcher in higher education (%)	116	116
<b>Learning environment</b>		
Directly paid academic freedom	31	41.4
Teachers in tertiary education, gender parity	83	61.0
Labour mobility rate	90	4.8
Academic freedom	67	29.7
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	31	67.0
Class attendance rate in tertiary education, wealth parity	41	34.4
Class attendance rate in tertiary education, location parity	31	3.8
<b>Outputs</b>		
Research	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	31	10.0
Labour force participation rate with advanced education	11	88.4
Unemployment rate with advanced education	100	63.0
<b>Input</b>		
University tertiary enrollment in FTE	38	81.8
CRIDE students per FTE personnel in higher education	116	116
<b>Government's contribution and economic role</b>		
Research	31	17.2
Government expenditure	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Government's contribution and economic role</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	21	41.0
<b>Quality of research environment</b>		
High-skill employment (%)	43	29.0
Intellectual property payments (% total trade)	54	19.0
State of cluster development	38	62.5
<b>Inputs</b>		
Government expenditure	31	10.0
Average documents per researcher	116	116
Citations per document	96	17.4
Patent applications (per 100 billion GDP)	50	86.4
<b>Government's contribution and economic role</b>		
Intellectual property receipts (% total trade)	27	34.0
Research design applications (per 100 billion GDP)	68	3.8
PCT applications (per 100 billion GDP)	100	37.5
Firms producing new goods and services (%)	26	86.0



# KENYA

	Rank	Value
<b>Consumer electronics</b>	87	89.0
Smartphone applications (per 100 million GDP)	87	15.0
Cultural goods exports (% exports)	85	3.3
Printing and publishing output (% manufactured output)	1	100
<b>Finance</b>	111	31.0
<b>Banking</b>	85	37.0
Ratio of institutions' provisions	81	15.4
Depth of innovative companies	25	81.0
ISO 9001 quality certificates (% GDP)	80	3.3
ISO 14001 environmental certificates (% GDP)	100	2.4
<b>Insurance</b>	95	9.1
CERD received from abroad (%)	116	116
Joint ventures per strategic industry deals (% GDP)	87	8.8
Computer software spending (% GDP)	77	13.2
<b>Government services</b>	110	11.0
New business density per thousand population	75	3.3
Firms with web presence (relative %)	89	85.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	111	32.0
<b>Infrastructure</b>	100	30
<b>Coverage</b>	99	33.0
3G/4G mobile network coverage (% population)	86	82.0
Secure Internet servers per 1 million population	85	2.7
Investment in telecommunication services (% GDP)	65	21.0
<b>Speed</b>	99	31
Mobile upload and download speeds	86	19.0
Fixed broadband upload and download speeds	83	0.7
Fixed broadband subscriptions (y-speed) per hundred people	110	1.7
<b>Availability</b>	87	83.4
Fixed broadband latency (% QM per capita)	128	50.4
Mobile broadband basket (% QM per capita)	112	40.0
Internet and telephony competition	1	100
<b>Access</b>	120	16.0
<b>Subscribers</b>	102	11.0
Active mobile-broadband subscriptions per hundred inhabitants	118	19.0
International Internet bandwidth per user	8	83.1
Households with Internet access at home (%)	104	17.0
<b>Skills and employment</b>	100	9.0
Individuals with standard ICT skills (%)	114	19
Tertiary graduates from ICT programmes (%)	116	19
ICT employment (%)	106	9.8
<b>Usage</b>	104	23.0
<b>Services</b>	111	25.0
Government online services	75	87.7
Fixed broadband Internet traffic per subscription	114	1.8
Mobile broadband Internet traffic per subscription	110	1.8
Internet users (%)	104	16.0
<b>Commerce</b>	88	30
ICT/FIT patent applications (per 100,000 GDP)	77	34.0
E-participation	87	89.0
Internet activities by individuals (%)	116	19
Trade in digitally deliverable services (% total trade)	100	25.0
<b>ECONOMY</b>	101	86.0
<b>Economic complexity</b>	73	31.4
Manufacture innovation	100	41
Overhead capital formation (% GDP)	123	31.7
Logistics performance	66	45.4
Transport productive capacity	122	16.1
Building quality control	80	86.7

	Rank	Value
<b>Business agility</b>	88	82.0
Ease of starting a business	112	82.7
Recovery recovery rate	90	34.0
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	80	21.4
<b>Corporate openness</b>	73	54.4
Trust and development	87	20.0
<b>Trade (% GDP)</b>	108	10
High-technology trade (% total trade)	84	42.0
Market concentration	89	28.6
Market concentration	88	34.0
Product diversity	76	30
Climate financial openness	82	30
Foreign direct investment, net inflows (% GDP)	100	36.1
Cost dynamics	80	20
<b>Financing and domestic value added</b>	108	24.0
<b>Financing and costs</b>	114	41
Domestic credit to private sector (% GDP)	101	11.0
MSME financing gap (% GDP)	80	40.4
Tax and contribution rate (% profit)	80	20.0
Bank nonperforming loans (%)	100	39.0
Unmet loan demand	100	21.0
Medium- and high-tech activities value added	99	16
Industry and services value added (% GDP)	147	20
Labour underutilization rate	80	89.0
Output per worker	108	3.4
<b>ENABLING ENVIRONMENT</b>	112	46.7
<b>Governance</b>	114	27.0
Political environment	112	24.0
Peace and stability	100	14.0
View and accountability	86	25.7
Quality of institutions	107	35.0
Rule of law	107	31.0
Control of corruption	124	21.0
Government effectiveness	86	26.4
<b>Socio-economic</b>	100	40.2
Gender equity	70	87.1
Female-to-male ratio in parliament	80	27.0
Female-to-male labour force participation	81	83.0
Female-to-male ratio in internal wage	80	85.0
Gender inequality	112	21.0
Social protection coverage (% population)	100	7.8
Adult literacy rate	86	26.0
Youth not in employment, education or training (%)	83	83.7
Standard of living	112	20.0
Poverty headcount ratio (% population)	85	40.4
GDP per capita	122	3.2
<b>Health and environment</b>	72	64.2
<b>Health</b>	100	63.0
Universal health coverage	114	35
Healthy life expectancy (years)	122	49
Under-five mortality rate	117	84.0
Environmental performance	81	23.0
Renewable energy consumption (%)	82	20
Household footprint per capita	18	86.0
Natural resource exposure	100	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 21/154

**GKI SCORE** 63.8

**WORLD AVERAGE** 48.4

# KOREA (REPUBLIC OF)

## KEY INDICATORS

GDP US\$ billions ..... 2,187,804  
 Population ..... 51,269,183  
 HDI ..... 0.916

## COUNTRY PERFORMANCE SUMMARY

Korea (Republic of) is a leading performer in terms of its knowledge infrastructure. It ranks 21st out of 154 countries in the Global Knowledge Index 2021 and 21st out of the 61 countries with very high human development.

### AREAS OF STRENGTH

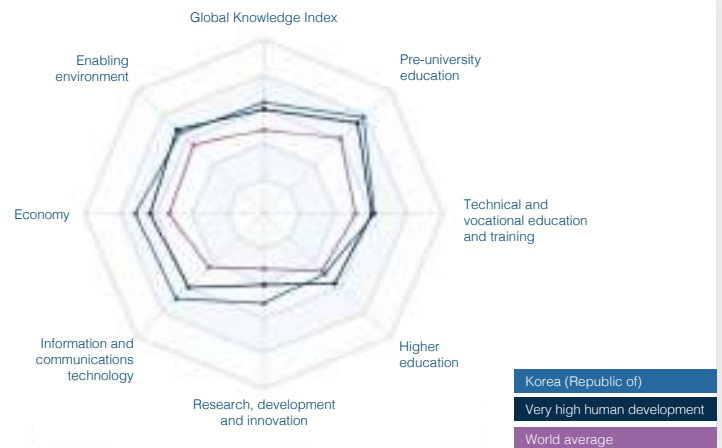
- + GERD performed by business enterprises (%)
- + Researchers in business enterprises (%)
- + Patent applications (per 100 billion GDP)
- + Government online services
- + Bank non-performing loans (%)

### AREAS OF IMPROVEMENT

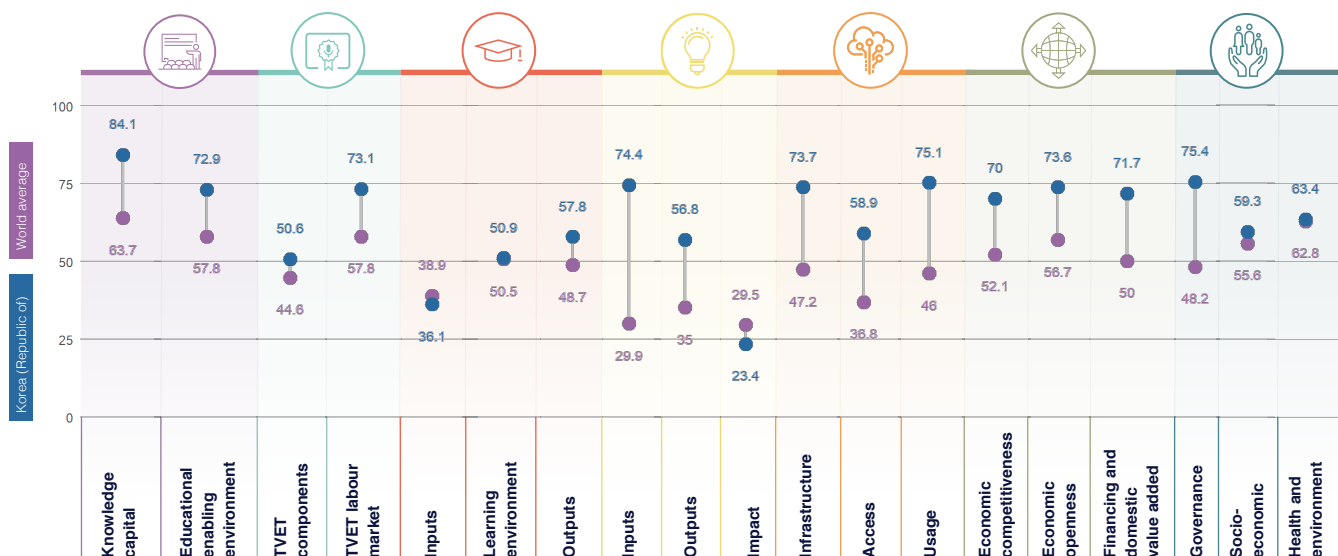
- Average documents per researcher
- Renewable energy consumption (%)
- Ecological footprint per capita
- Printing and publishing output (% manufactured output)
- Researchers in higher education (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	25	78.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	34	61.8
HIGHER EDUCATION	64	48.3
RESEARCH, DEVELOPMENT AND INNOVATION	8	51.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	11	69.2
ECONOMY	7	71.7
ENABLING ENVIRONMENT	35	66



## GKI PILLARS







# KOREA (REPUBLIC OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	28	84.1
Enrollment	42	84.0
Net enrolment rate in primary education	4	100
Net enrolment rate in lower secondary education	85	85.2
Net enrolment rate in upper secondary education	27	81.5
Completion	71	73.5
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	41	80.3
Completion	0	82.0
Assessment of 15-year-old students in math, science and reading	6	73.8
Learning-adjusted years of schooling	6	80.4
<b>Educational enabling environment</b>		
Expenditure	22	41.5
Government expenditure on primary education (% GDP)	71	21.6
Government expenditure on secondary education (% GDP)	52	21.2
Government funding per primary student (% GDP per capita)	5	88.0
Government funding per secondary student (% GDP per capita)	8	54.3
Resources	1	100
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
<b>Early learning</b>		
Class attendance rate in early childhood education	116	72.5
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	9	80
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	33	80
Participation rate in formal and non-formal education and training	116	116
<b>TVET resources</b>		
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	78	14.5
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and infrastructure</b>		
Extent of staff training	81	88.2
Quality of vocational training	22	83.0
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of median-skill TVET occupations earnings to average wage	42	46.0
<b>TVET labour market</b>		
Efficiency of the labour market	64	16.1
Firms considered with inequality educated workforce (%)	116	116
Employment educational mismatch (%)	73	55.0
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	116	80.4
Real TVET unemployment	11	11.5
Share of TVET occupations	9	80.1
Manufacturing employment (%)	30	85.0
Quality and infrastructure	60	76.0
Enrollment in vocational education, gender parity	74	73.7
Useable employment rate	25	80.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	11	23.7
Government expenditure per tertiary student	44	22.2
Teaching staff compensation (% tertiary expenditure)	81	25.8
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	6	48.7
Enrollment in masters, doctoral or equivalent (%)	50	21.7
<b>Resources</b>		
Rp/teacher ratio in tertiary education	21	78.1
Researchers in higher education (%)	100	8.7
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	74	24.1
Student mobility rate	71	11.5
Academic freedom	48	87
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Attainment	38	42.0
Educational attainment rate, bachelor's or equivalent	21	74.7
Educational attainment rate, master's or equivalent	44	78.7
Educational attainment rate, doctoral or equivalent	26	37
Employment	14	31.7
Labour force participation rate with advanced education	84	87.5
Unemployment rate with advanced education	30	80.1
<b>Impact</b>		
University tertiary enrollment in R&D	27	87.8
OECD students per 1000 personnel in higher education	27	46.5
<b>Government's contribution to innovation and economic growth</b>		
<b>Inputs</b>		
Government R&D expenditure	3	12.2
GDP (% GDP)	2	64.0
OEFD per researcher	17	48.0
Researchers per thousand labour force	2	84
Tertiary graduates from STEM programmes (%)	22	84.7
<b>Government's contribution to innovation and economic growth</b>		
<b>OEFD performed by business enterprises (%)</b>		
OEFD financed by business enterprises (%)	3	84.0
Researchers in business enterprises (%)	1	100
Firms that spend on R&D (%)	116	116
<b>Quality of innovation and economic growth</b>		
High-skill employment (%)	14	80.3
Intellectual property payments (% total trade)	21	42.0
State of cluster development	23	81
<b>Outputs</b>		
<b>Government's contribution to innovation and economic growth</b>		
Average documents per researcher	98	37.5
Citations per document	84	22.4
Patent applications (per 100 billion GDP)	1	100
<b>Government's contribution to innovation and economic growth</b>		
Intellectual property receipts (% total trade)	13	42
Research design applications (per 100 billion GDP)	1	100
PCT applications (per 100 billion GDP)	5	88.5
Firms producing new goods and services (%)	116	116



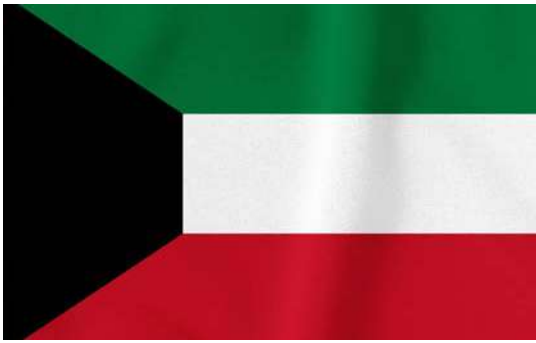


# KOREA (REPUBLIC OF)

	Rank	Value
<b>Business environment</b>	10	81.1
Treatment applications per 100 million GDP	6	85.2
Cultural goods exports (% exports)	30	33.3
Printing and publishing output (% manufactured output)	106	3.8
<b>Energy</b>	189	15.3
<b>Finance</b>	2	99
Access to investors' protection	11	73.2
Depth of innovative companies	35	55.0
ISO 9001 quality certificates (% GDP)	58	32
ISO 14001 environmental certificates (% GDP)	42	19.0
<b>Industry</b>	17	77.1
CERD freedom from abuse (%)	85	3.7
Cost savings per strategic alliance deals (% GDP)	39	17.8
Computer software spending (% GDP)	62	16.7
<b>International trade</b>	108	15.7
New business density per thousand population	54	12.7
Firms with new products/services (%)	106	19
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	11	82.2
<b>Infrastructure</b>	4	73.7
<b>Coverage</b>	15	41.3
3G/4G mobile network coverage (% population)	17	89.0
Secure Internet servers per 1 million population	52	14.5
Investment in telecommunication services (% GDP)	69	22.1
<b>Quality</b>	3	88.1
Mobile upload and download speeds	2	86.7
Fixed broadband upload and download speeds	3	89.3
Fixed broadband subscriptions (by speed) per hundred people	4	89.8
<b>Availability</b>	17	57.2
Fixed broadband bandwidth (% Gbps per capita)	31	88.9
Mobile broadband basket (% Gbps per capita)	10	84.0
Internet and telephony competition	89	80
<b>Access</b>	18	38.8
<b>Subscribers</b>	12	85.3
Active mobile-broadband subscriptions per fixed-line inhabitants	24	51.2
International Internet bandwidth per user	88	44.5
Households with Internet access at home (%)	2	89.0
<b>Skills and employment</b>	15	51.1
Individuals with standard ICT skills (%)	11	72.8
Tertiary graduates from ICT programmes (%)	87	33.8
ICT employment (%)	24	56.9
<b>Usage</b>	7	75.1
<b>Services</b>	10	82.5
Government online services	1	100
Fixed broadband Internet traffic per subscriber	11	44.8
Mobile broadband Internet traffic per subscriber	22	26.9
Internet users (%)	62	86.3
<b>Commerce</b>	3	81.8
eTPU/eT purchase applications (per 100 million GDP)	5	83.3
e-participation	1	100
Internet activities by individuals (%)	15	83.8
Trade in digitally deliverable services (% total trade)	40	50.0
<b>ECONOMY</b>	7	71.7
<b>Economic complexity/structure</b>	11	70
Manufacture innovation	8	71.2
Overhead capital formation (% GDP)	16	79.2
Logistics performance	23	65.5
Transport productive capacity	18	40.8
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	30	76.4
Ease of starting a business	30	83.4
Recovery recovery time	14	81.5
Entrepreneurial employee activity rate	37	26.8
Growth of corporate transactions	13	85.7
<b>Corporate openness</b>	23	75.3
<b>Trade and investment</b>	12	81.0
Trade (% GDP)	76	27.9
High-technology trade (% total trade)	7	81.2
Market concentration	49	87.8
Market concentration	88	68.5
Product diversity	19	11.0
Contract financial openness	1	100
Foreign direct investment, net inflows (% GDP)	128	32
Cost dynamics	1	100
<b>Financing and domestic value added</b>	8	71.7
<b>Financing and costs</b>	5	78.0
Domestic credit to private sector (% GDP)	7	83.8
MSME financing gap (% GDP)	109	19
Tax and contribution rate (% profit)	94	34.4
Bank nonperforming loans (%)	1	100
Unmet loan demand	11	91
Medium- and high-tech activities value added	5	75
Industry and services value added (% GDP)	25	85.8
Labour underutilization rate	42	79.2
Output per worker	32	39
<b>ENABLING ENVIRONMENT</b>	11	84
<b>Governance</b>	27	75.4
Political environment	36	67.4
Peace and stability	45	82.7
View and accountability	27	33
Quality of institutions	15	83.5
Rule of law	23	88.8
Control of corruption	36	75
Government effectiveness	17	88.8
<b>Socio-economic</b>	87	59.3
Gender equity	81	84.4
Female-to-male ratio in parliament	100	23.5
Female-to-male labour force participation	81	31.8
Female-to-male ratio in internal wage	45	85.4
Gender inequality	10	75.7
Social protection coverage (% population)	43	70.5
Adult literacy rate	100	100
Youth not in employment, education or training (%)	21	74.7
<b>Standard of living</b>	81	27.0
Poverty headcount ratio (% population)	106	19
GDP per capita	26	27.0
<b>Health and environment</b>	81	83.4
Health	8	83.8
Universal health coverage	5	85
Healthy life expectancy (years)	3	89.0
Under-five mortality rate	15	85.0
Environmental performance	108	22.0
Renewable energy consumption (%)	120	2.3
Household footprint per capita	117	84.8
Natural hazard exposure	121	41

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# KUWAIT

**GKI RANK** 48/154

**GKI SCORE** 54.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Kuwait is a strong performer in terms of its knowledge infrastructure. It ranks 48th out of 154 countries in the Global Knowledge Index 2021 and 45th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Pupil-trained teacher ratio in primary education
- + Fixed broadband basket (% GNI per capita)
- + Mobile broadband Internet traffic per subscription
- + Industry and services value added (% GDP)
- + Fixed broadband Internet traffic per subscription

### AREAS OF IMPROVEMENT

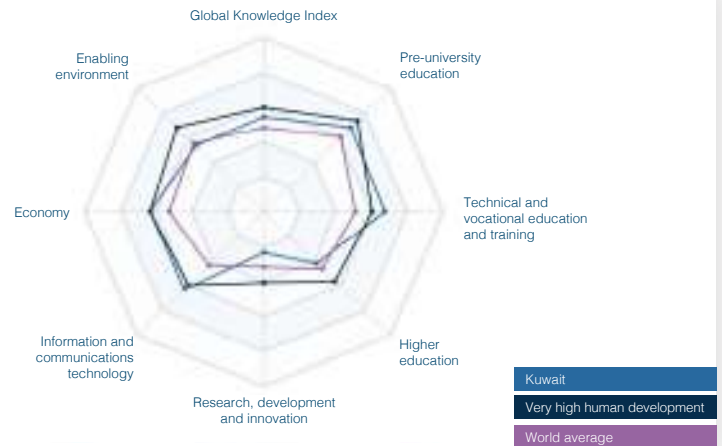
- ICT PCT patent applications (per 100 billion GDP)
- Ecological footprint per capita
- Female-to-male ratio in parliament
- Renewable energy consumption (%)
- GERD financed from abroad (%)

### KEY INDICATORS

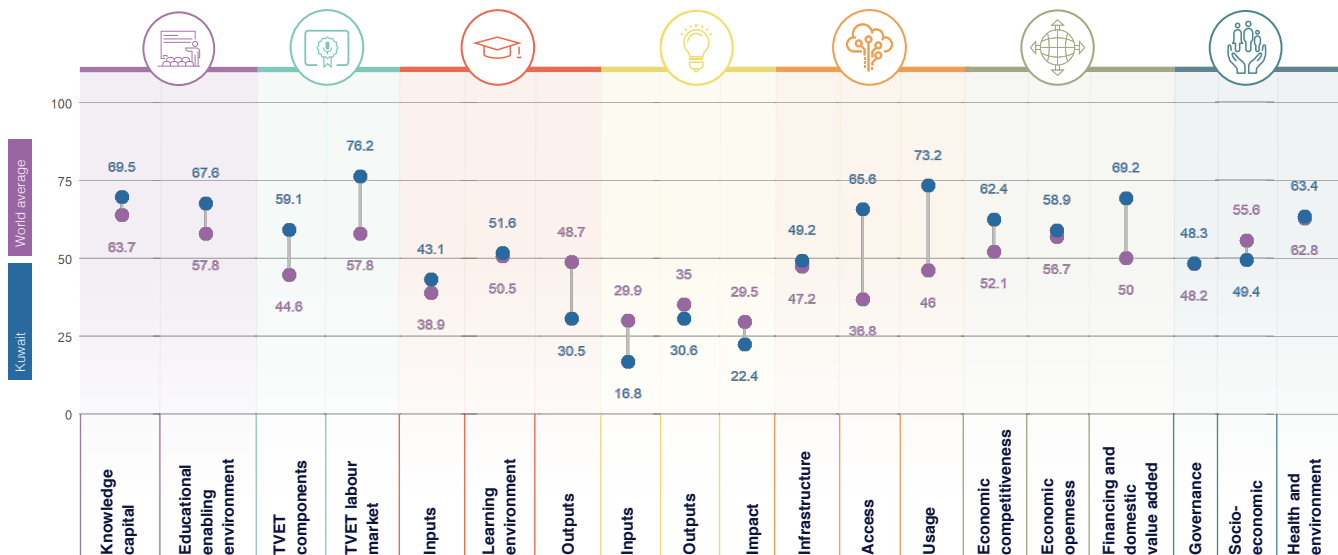
**GDP US\$ billions** 209.738  
**Population** 4,270,563  
**HDI** 0.806

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	66	68.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	12	67.6
HIGHER EDUCATION	94	41.7
RESEARCH, DEVELOPMENT AND INNOVATION	117	23.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	21	62.7
ECONOMY	35	63.5
ENABLING ENVIRONMENT	75	53.7



## GKI PILLARS





# KUWAIT

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	78	48.8
Enrollment	73	81.3
Net enrolment rate in primary education	73	81.6
Net enrolment rate in lower secondary education	70	81.3
Net enrolment rate in upper secondary education	88	38.0
Completion	78	72.0
Years of compulsory education in primary and secondary	87	89.2
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	28	75.6
Completion	80	45.0
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	88	48.8
<b>Educational enabling environment</b>		
Expenditure	80	20.0
Government expenditure on primary education (% GDP)	80	26
Government expenditure on secondary education (% GDP)	88	31.1
Government funding per primary student (% GDP per capita)	88	32.8
Government funding per secondary student (% GDP per capita)	73	25.0
Resources	1	100
Pupil-based teacher ratio in primary education	1	100
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	33	73.0
Class attendance rate in early childhood education	98	47.8
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	2	88.0
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communications training expenditure	11	23.0
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	47	75.0
Participation rate in formal and non-formal education and training	116	116
<b>TVET resources</b>		
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	115	3.8
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>		
Extent of staff training	88	51.1
Quality of vocational training	82	45.7
Ratio of high-skil TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	8	22.7
Firms considered well-integrated with workforce (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	30	83.7
High TVET unemployment	71	53.0
Share of TVET occupations	8	80.2
Manufacturing employment (%)	143	11.0
Quality and infrastructure	1	100.0
Enrollment in vocational education, gender parity	116	116
Useable employment rate	3	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	88	37.0
Enrollment in masters, doctoral or equivalent (%)	117	2.3
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	116	116
Researchers in higher education (%)	28	68.7
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	116	116
Academic freedom	104	21.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Research	78	14.0
Educational attainment rate, bachelor's or equivalent	71	27.4
Educational attainment rate, master's or equivalent	88	1.0
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	40	48.8
University tertiary enrollment in R&D	88	44.0
OECD students per 1000 personnel in higher education	32	48.0
<b>Government's contribution to the innovation system</b>		
<b>Inputs</b>		
Government R&D expenditure	116	116
GDP (% GDP)	115	1
GERD per researcher	77	15.0
Researchers per thousand labour force	71	5.8
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	88	1.2
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
<b>Quality and infrastructure</b>		
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	116	116
State of cluster development	48	51.0
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	20	70.0
Citations per document	77	23.1
Patent applications (per 100 billion GDP)	118	23.2
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	116	116
Research and development expenditure (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	115	24.5
Firms producing new goods and services (%)	116	116





# KUWAIT

	Rank	Value
<b>Consumer Innovation Adoption</b>		
Treatment applications per 100 million GDP	83	11.1
Cultural goods exports (% exports)	88	4.8
Printing and publishing output (% manufactured output)	89	13.0
<b>Health</b>	100	0.0
<b>Energy</b>	75	22
Renewable investment percentage	76	11
Depth of innovative companies	80	52.0
ISO 9001 quality certificates (% GDP)	78	12.1
ISO 14001 environmental certificates (% GDP)	89	12
<b>Education</b>	85	10.7
CERD received from abroad (%)	100	0
Joint venture per strategic industry deals (% GDP)	41	15.1
Computer software spending (% GDP)	25	32.1
<b>Government Services</b>	100	100
New business density per thousand population	26	23.3
Firms with new products/services (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	23	62.2
<b>Infrastructure</b>	88	48.3
<b>Coverage</b>	80	44
3G/4G mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	84	3.7
Investment in telecommunication services (% GDP)	79	20.4
<b>Speed</b>	80	22.0
Mobile upload and download speeds	18	48.7
Fixed broadband upload and download speeds	39	20.0
Fixed broadband subscriptions (by speed) per hundred people	100	2.8
<b>Availability</b>	10	70.7
Fixed broadband latency (% QM per capita)	1	100
Mobile broadband basket (% QM per capita)	20	75.0
Internet and telephony competition	121	55.1
<b>Access</b>	8	68.8
<b>Subscribers</b>	12	80
Active mobile-broadband subscriptions per fixed-line inhabitants	12	86.3
International Internet bandwidth per user	30	81.1
Households with Internet access at home (%)	5	89.8
<b>Skills and employment</b>	10	52.2
Individuals with standard ICT skills (%)	20	62.9
Tertiary graduates from ICT programmes (%)	106	106
ICT employment (%)	106	106
<b>Usage</b>	88	73.2
<b>Services</b>	1	62.7
Government online services	31	84.1
Fixed broadband Internet traffic per subscriber	1	100
Mobile broadband Internet traffic per subscriber	1	100
Internet users (%)	6	89.5
<b>Commerce</b>	10	60.0
ICT FDI parent applications (per 100 million GDP)	100	30.6
E-participation	11	80.0
Internet activities by individuals (%)	37	80.9
Trade in digitally deliverable services (% total trade)	82	31.5
<b>ECONOMY</b>	33	63.6
<b>Economic Competitiveness</b>	23	62.4
<b>Infrastructure Investment</b>	41	15.1
Overhead capital formation (% GDP)	106	106
Logistics performance	63	46.5
Transport productive capacity	67	21.4
Building quality control	8	80.0

	Rank	Value
<b>Business Agility</b>	21	40
Ease of starting a business	75	88.4
Recovery recovery rate	89	25
Entrepreneurial employee activity rate	15	52.7
Growth of corporate transactions	1	100
<b>Corporate openness</b>	87	28.0
<b>Trade and Investment</b>	100	0.0
Trade (% GDP)	36	41
High-technology trade (% total trade)	110	37.1
Market concentration	142	38.8
Market concentration	81	80.1
<b>Product openness</b>	10	80.5
China's financial openness	80	70
Foreign direct investment, net inflows (% GDP)	142	25.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	11	65.2
<b>Financing and costs</b>	10	70.2
Domestic credit to private sector (% GDP)	35	34.4
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	4	84.0
Bank nonperforming loans (%)	20	82.4
<b>Unmet needs index</b>	13	61.2
Medium- and high-tech activities value added	37	45.5
Industry and services value added (% GDP)	1	100
Labour underutilization rate	50	75.0
Output per worker	37	90.1
<b>ENABLING ENVIRONMENT</b>	75	63.7
<b>Governance</b>	88	48.3
<b>Political environment</b>	76	42.3
Peace and stability	55	54.7
View and accountability	107	30
Quality of institutions	54	52.5
Rule of law	61	62.6
Control of corruption	65	53.0
Government effectiveness	88	45.7
<b>Socio-economic</b>	39	48.4
<b>Gender equity</b>	122	51.4
Female-to-male ratio in parliament	100	1.8
Female-to-male labour force participation	100	52.8
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	100	81.0
Social protection coverage (% population)	107	15.0
Adult literacy rate	88	85.4
Youth not in employment, education or training (%)	119	41.3
<b>Standard of living</b>	10	68.8
Poverty headcount ratio (% population)	106	106
GDP per capita	11	49.8
<b>Health and environment</b>	78	63.4
<b>Health</b>	81	61.0
Universal health coverage	40	70
Healthy life expectancy (years)	30	89.0
Under-five mortality rate	54	84.0
<b>Environmental performance</b>	107	31
Renewable energy consumption (%)	100	0
Household footprint per capita	142	39.1
Natural hazard exposure	0	84

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 85/154

**GKI SCORE** 46.8

**WORLD AVERAGE** 48.4

# KYRGYZSTAN

## KEY INDICATORS

**GDP** US\$ billions ..... **31.024**  
**Population** ..... **6,524,191**  
**HDI** ..... **0.697**

## COUNTRY PERFORMANCE SUMMARY

Kyrgyzstan is a moderate performer in terms of its knowledge infrastructure. It ranks 85th out of 154 countries in the Global Knowledge Index 2021 and 2nd out of the 27 countries with medium human development.

### AREAS OF STRENGTH

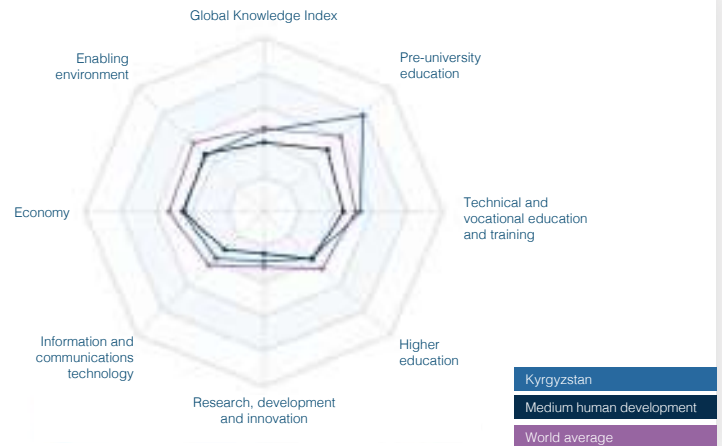
- + Gross attendance ratio for tertiary education, gender parity
- + Citations per document
- + Gross intake ratio to the last grade of lower secondary education
- + Inbound mobility rate
- + Net enrolment rate in primary education

### AREAS OF IMPROVEMENT

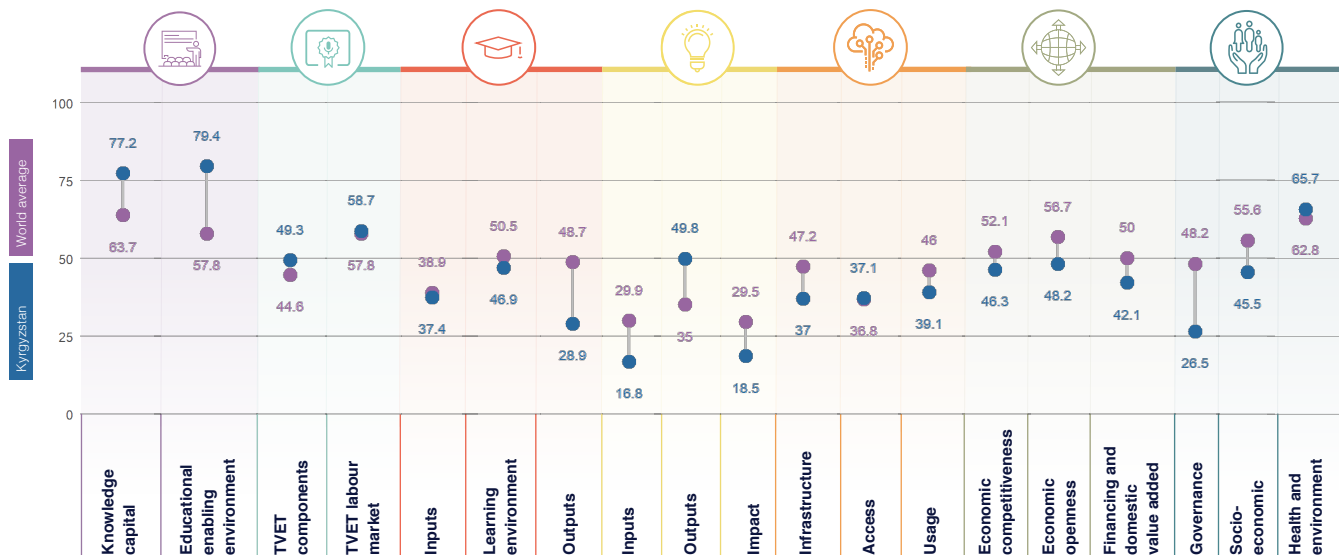
- Medium- and high-tech activities value added
- Government expenditure per tertiary student
- ISO 14001 environmental certificates (% GDP)
- Research institutions prominence
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	26	78.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	62	54
HIGHER EDUCATION	116	37.7
RESEARCH, DEVELOPMENT AND INNOVATION	87	28.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	91	37.7
ECONOMY	111	45.5
ENABLING ENVIRONMENT	115	45.9



## GKI PILLARS





# KYRGYZSTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	83	77.3
Enrollment	37	93.1
Net enrolment rate in primary education	12	99.0
Net enrolment rate in lower secondary education	20	95.5
Net enrolment rate in upper secondary education	60	89.4
Completion	33	91.7
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	33	90.0
Success rate rate in the last grade of lower secondary education	19	87.8
Completion	45	90.0
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	84	80.8
<b>Educational enabling environment</b>	<b>9</b>	<b>76.4</b>
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	81	80.5
Pupil-based teacher ratio in primary education	55	80
Pupil-based teacher ratio in secondary education	29	89.7
Schools with access to computers in primary education (%)	40	80.0
Schools with access to computers in secondary education (%)	60	87.5
Early learning	71	82.0
Class attendance rate in early childhood education	100	25.9
Proportion of children who are developmentally on track	39	55.7
Proportion of children with stimulating home learning environments	19	69.4
Pupil-based teacher ratio in preprimary education	50	82.7
Quality and infrastructure	11	80.0
Completion rate in upper secondary education, gender parity	30	84.0
Completion rate in upper secondary education, wealth parity	27	80.7
Completion rate in upper secondary education, location parity	35	81.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>66</b>	<b>60.3</b>
Companies training apprentices	71	63.1
Firms offering formal training (%)	98	51.1
Labour force with short-cycle tertiary education (%)	30	75.1
Participation rate in formal and non-formal education and training	116	116
TVET resources	11	60.4
Government expenditure on vocational education (%)	60	17.7
Share of students enrolled in secondary vocational programmes	67	32.0
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	111	60.0
Extent of staff training	127	40.9
Quality of vocational training	104	30.0
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of median-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>	<b>80</b>	<b>60.7</b>
Efficiency of the labour market	116	54.1
Firms considered with inappropriately educated workforce (%)	101	57.0
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	87	40.0
Unemployment rate with vocational education	37	64.4
Real TVET unemployment	61	54.0
Share of TVET occupations	40	34
Manufacturing employment (%)	62	43.0
Quality and infrastructure	60	60.0
Enrollment in vocational education, gender parity	79	69.0
Useable employment rate	62	67.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>81</b>	<b>37.4</b>
Expenditure	128	119
Government expenditure per tertiary student	122	0.0
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	34	37.4
Enrollment in bachelor's or equivalent level (%)	78	18.6
Enrollment in masters, doctoral or equivalent (%)	47	35.0
Resources	34	66
Ratio teacher ratio in tertiary education	38	86
Researchers in higher education (%)	116	116
<b>Learning environment</b>	<b>88</b>	<b>46.9</b>
Timely and academic freedom	110	41.1
Teachers in tertiary education, gender parity	113	11.0
Labour mobility rate	12	54.0
Academic freedom	100	53.0
Quality and infrastructure	52	50.7
Class attendance rate in tertiary education, gender parity	1	69.0
Class attendance rate in tertiary education, wealth parity	47	30.0
Class attendance rate in tertiary education, location parity	21	21.0
<b>Outputs</b>	<b>144</b>	<b>26.9</b>
Efficiency	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	111	23.0
University tertiary enrollment in R&D	126	28.0
OECD indicators per 100 personnel in higher education	116	116
<b>INNOVATION, KNOWLEDGE AND SKILLS</b>		
<b>Inputs</b>	<b>100</b>	<b>10.0</b>
Share of R&D expenditure	11	10.0
GDP (% GDP)	100	1.6
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	81	36.4
Quality and infrastructure	110	10.0
GERD performed by business enterprises (%)	77	0.8
GERD financed by business enterprises (%)	81	0.8
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	71	20
Quality and infrastructure	110	10.0
High-skilled employment (%)	46	27.0
Intellectual property payments (% total trade)	50	4.5
State of cluster development	128	29.1
<b>Outputs</b>	<b>122</b>	<b>10.0</b>
Quality and infrastructure	1	10.0
Average documents per researcher	116	116
Citations per document	1	100
Patent applications (per 100 billion GDP)	31	60.0
Quality and infrastructure	110	10.0
Intellectual property receipts (% total trade)	78	7.9
Research design applications (per 100 billion GDP)	82	3.4
PCT applications (per 100 billion GDP)	57	50.7
Firms producing new goods and services (%)	34	67.0



# KYRGYZSTAN

	Rank	Value
<b>Consumer electronics</b>	100	5.1
Treatment applications per 100 million GDP	80	0.8
Cultural goods exports (% exports)	100	3.3
Printing and publishing output (% manufactured output)	80	11.1
<b>Energy</b>	110	16.5
<b>Energy</b>	100	3.3
Risks of institutions' persistence	115	8
Depth of innovative companies	128	37.5
ISO 9001 quality certificates (% GDP)	145	0.7
ISO 14001 environmental certificates (% GDP)	149	0.4
<b>Environment</b>	117	5.5
CERD received from abroad (%)	75	6.3
Joint ventures per strategic industry deals (% GDP)	112	3.8
Computer software spending (% GDP)	85	7
<b>Government services</b>	117	10.1
New business density per thousand population	84	0.2
Firms with new products/services (%)	49	22.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	81	37.7
<b>Infrastructure</b>	188	37
<b>Coverage</b>	70	40.2
3G/4G mobile network coverage (% population)	88	66.4
Secure Internet servers per 1 million population	83	3.7
Investment in telecommunication services (% GDP)	33	43.6
<b>Quality</b>	100	8.7
Mobile internet and download speeds	116	119
Fixed broadband upload and download speeds	116	119
Fixed broadband subscriptions (y-speed) per hundred people	100	8.7
<b>Availability</b>	108	11
Fixed broadband latency (% QM per capita)	109	81.2
Mobile broadband basket (% QM per capita)	108	40.0
Internet and telephony competition	108	75
<b>Access</b>	78	37.5
<b>Subscribers</b>	117	11
Active mobile-broadband subscriptions per hundred inhabitants	13	54.2
International Internet bandwidth per user	85	37.7
Households with Internet access at home (%)	75	30.1
<b>Skills and employment</b>	87	11.1
Individuals with standard ICT skills (%)	116	119
Tertiary graduates from ICT programmes (%)	77	26.0
ICT employment (%)	79	11.7
<b>Usage</b>	89	38.5
<b>Services</b>	100	10.4
Government online services	79	83.7
Fixed broadband internet traffic per subscription	60	17.6
Mobile broadband internet traffic per subscription	81	55.4
Internet users (%)	112	34.0
<b>Commerce</b>	81	11.7
ICT/FIT patent applications (per 100,000 GDP)	46	30
E-participation	89	71.4
Internet activities by individuals (%)	116	119
Trade in digitally deliverable services (% total trade)	106	12.0
<b>ECONOMY</b>	111	40.3
<b>Economic competitiveness</b>	81	40.3
REGISTRATION BURDEN	100	46.0
Overhead capital formation (% GDP)	43	60.4
Logistics performance	100	38.7
Transport productive capacity	109	20.2
Building quality control	75	23.3

	Rank	Value
<b>Business agility</b>	100	40.3
Cost of starting a business	85	93
Recovery recovery rate	85	44.1
Entrepreneurial employee activity rate	116	119
Growth of corporate transactions	118	8
<b>Business openness</b>	113	40.3
Trade and investment	123	20.0
Trade (% GDP)	86	33.0
High-technology trade (% total trade)	80	40.0
Market concentration	100	82.2
Market concentration	100	73.1
Product diversity	81	40.0
Contract financial openness	75	53.6
Foreign direct investment, net inflows (% GDP)	102	33.0
Data dynamics	80	50
<b>Financing and domestic value added</b>	118	40.3
<b>Financing and credit</b>	111	11.4
Domestic credit to private sector (% GDP)	111	18
MSME financing gap (% GDP)	79	80.0
Tax and contribution rate (% profit)	88	75.8
Bank nonperforming loans (%)	100	57.0
Unmet loan demand	111	37.0
Medium- and high-tech activities value added	128	2.6
Industry and services value added (% GDP)	102	55.0
Labour underutilization rate	79	87.0
Output per worker	117	5.2
<b>ENABLING ENVIRONMENT</b>	115	40.8
<b>Governance</b>	118	25.5
Political environment	100	31.7
Peace and stability	87	31.0
View and accountability	100	31.0
Quality of institutions	100	21.0
Rule of law	100	18.0
Control of corruption	140	13
Government effectiveness	100	21.7
<b>Socio-economic</b>	111	45.5
Gender equity	141	35
Female-to-male ratio in parliament	113	20.0
Female-to-male labour force participation	126	55.4
Female-to-male ratio in internal wage	119	119
Gender inequality	71	61.2
Social protection coverage (% population)	89	40
Adult literacy rate	11	89.0
Youth not in employment, education or training (%)	100	53.1
Standard of living	101	33.2
Poverty headcount ratio (% population)	77	64.0
GDP per capita	119	3.8
<b>Health and environment</b>	89	65.7
Health	80	36
Universal health coverage	75	70
Healthy life expectancy (years)	71	72.2
Under-five mortality rate	99	85.0
Environmental performance	86	66.8
Renewable energy consumption (%)	79	26.1
Household footprint per capita	81	80.9
Natural hazard exposure	100	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# LAO

PEOPLE'S DEMOCRATIC REPUBLIC

## KEY INDICATORS

GDP US\$ billions	56.792
Population	7,275,556
HDI	0.613

**GKI RANK** 121/154

**GKI SCORE** 38

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Lao People's Democratic Republic is a modest performer in terms of its knowledge infrastructure. It ranks 121st out of 154 countries in the Global Knowledge Index 2021 and 19th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

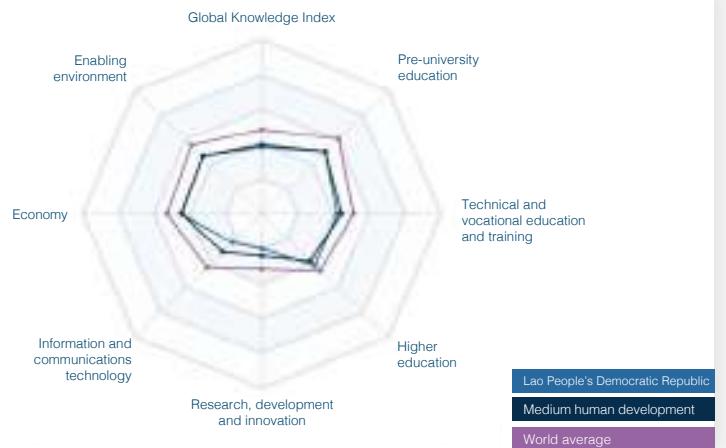
- + Enrolment in vocational education, gender parity
- + Female-to-male labour force participation
- + Tertiary graduates from ICT programmes (%)
- + Proportion of children who are developmentally on track
- + Foreign direct investment, net inflows (% GDP)

### AREAS OF IMPROVEMENT

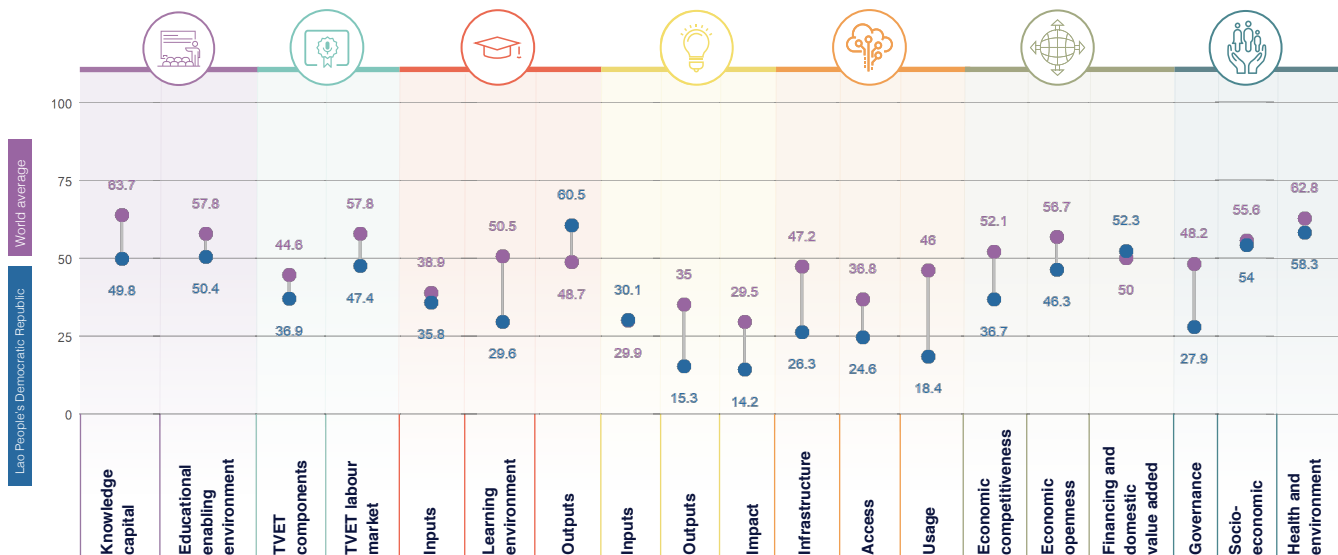
- Printing and publishing output (% manufactured output)
- Research institutions prominence
- Trade in digitally deliverable services (% total trade)
- Extent of corporate transparency
- Voice and accountability

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	115	50.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	123	42.1
HIGHER EDUCATION	90	42
RESEARCH, DEVELOPMENT AND INNOVATION	131	19.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	138	23.1
ECONOMY	115	45.1
ENABLING ENVIRONMENT	111	46.7



## GKI PILLARS







# LAO PEOPLE'S DEMOCRATIC REPUBLIC

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	118	50.1
Enrollment	117	53.2
Net enrolment rate in primary education	102	74.2
Net enrolment rate in lower secondary education	118	57.5
Net enrolment rate in upper secondary education	169	45.2
Completion	111	52.2
Years of compulsory education in primary and secondary	67	63.2
Completion rate in upper secondary education	52	41.1
Success rate rate in the last grade of lower secondary education	109	46.2
Completion	100	50.1
Assessment of Grade 5 students in math, science and reading	198	198
Learning-adjusted years of schooling	115	35.1
<b>Educational enabling environment</b>		
Expenditure	165	10.5
Government expenditure on primary education (% GDP)	87	24.7
Government expenditure on secondary education (% GDP)	102	15.7
Government funding per primary student (% GDP per capita)	100	21.5
Government funding per secondary student (% GDP per capita)	98	15.4
Resources	51	81.3
Pupil-based teacher ratio in primary education	41	84.5
Pupil-based teacher ratio in secondary education	32	84.1
Schools with access to computers in primary education (%)	198	198
Schools with access to computers in secondary education (%)	198	198
Early learning	55	52.8
Class attendance rate in early childhood education	107	29.2
Proportion of children who are developmentally on track	7	65.2
Proportion of children with stimulating home learning environments	82	77
Pupil-based teacher ratio in preprimary education	42	86.5
Quality and infrastructure	55	49.5
Completion rate in upper secondary education, gender parity	44	84
Completion rate in upper secondary education, wealth parity	100	5.8
Completion rate in upper secondary education, location parity	99	36
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	55	36.5
Firms offering formal training (%)	82	26.1
Labour force with short-cycle tertiary education (%)	35	70
Participation rate in formal and non-formal education and training	85	0.2
<b>TVET resources</b>		
Government expenditure on vocational education (%)	72	3.7
Share of students enrolled in secondary vocational programmes	158	1.7
Share of students enrolled in postsecondary vocational programmes	1	108
<b>TVET quality and infrastructure</b>		
Extent of staff training	89	89.8
Quality of vocational training	90	45.7
Ratio of high-skil TVET occupations earnings to average wage	99	15.1
Ratio of medium-skill TVET occupations earnings to average wage	52	45.0
<b>TVET labour market</b>		
Efficiency of the labour market	12	12.2
Firms considered with inappropriately educated workforce (%)	94	26.5
Employment educational mismatch (%)	87	44.7
Proportion of skilled production workers	86	82.2
Unemployment rate with vocational education	42	82.7
Real TVET unemployment	101	76
Share of TVET occupations	149	5.7
Manufacturing employment (%)	122	21.2
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	6	56.2
Useable employment rate	128	21.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	87	17.5
Government expenditure per tertiary student	107	4.6
Teaching staff compensation (% tertiary expenditure)	98	20.8
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	117	5.8
Enrollment in masters, doctoral or equivalent (%)	118	2
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	24	82.2
Researchers in higher education (%)	198	198
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	62	80
Labour mobility rate	100	2
Academic freedom	188	0.8
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	36	81.0
Class attendance rate in tertiary education, wealth parity	84	19.8
Class attendance rate in tertiary education, location parity	71	7.4
<b>Outputs</b>		
<b>Attainment</b>		
Educational attainment rate, bachelor's or equivalent	198	198
Educational attainment rate, master's or equivalent	198	198
Educational attainment rate, doctoral or equivalent	198	198
<b>Employment</b>		
Labour force participation rate with advanced education	58	72.5
Unemployment rate with advanced education	68	82.7
<b>Impact</b>		
University tertiary enrollment in R&D	98	24.8
CRIDE indicators per 100 personnel in higher education	198	198
<b>Government's contribution to economic growth</b>		
<b>Inputs</b>		
Government expenditure	10	10.2
GDP (% GDP)	198	198
GERD per researcher	198	198
Researchers per thousand labour force	198	198
Tertiary graduates from STEM programmes (%)	97	42.6
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	198	198
GERD financed by business enterprises (%)	198	198
Researchers in business enterprises (%)	198	198
Firms that spend on R&D (%)	118	0.8
<b>Quality and infrastructure</b>		
High-skilled employment (%)	25	52.2
Intellectual property payments (% total trade)	154	6
State of cluster development	47	88.9
<b>Outputs</b>		
<b>Government's contribution to economic growth</b>		
Average documents per researcher	198	198
Citations per document	98	22.2
Patent applications (per 100 billion GDP)	128	0.8
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	117	6
Research and development expenditure (per 100 billion GDP)	198	198
PCT applications (per 100 billion GDP)	55	43.7
Firms producing new goods and services (%)	92	57



# LAO PEOPLE'S DEMOCRATIC REPUBLIC

	Rank	Value
<b>Business environment</b>	100	0
Treatment applications (per 100 million GDP)	117	2.2
Cultural goods exports (% exports)	98	3.3
Printing and publishing output (% manufactured output)	100	0
<b>Energy</b>	140	15.2
<b>Finance</b>	111	10.2
Access to institutions' provisions	115	8
Depth of innovative companies	62	52.1
ISO 9001 quality certificates (% GDP)	125	2.1
ISO 14001 environmental certificates (% GDP)	123	1.8
<b>Infrastructure</b>	100	0
CERD received from abroad (%)	106	1.8
Cost savings per strategic alliance deals (% GDP)	100	4.1
Computer software spending (% GDP)	106	1.8
<b>Government services</b>	100	0
New business density per thousand population	102	0.1
Firms with new products/services (%)	108	48.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	108	22.2
<b>Infrastructure</b>	143	26.3
<b>Coverage</b>	141	21.4
30MHz mobile network coverage (% population)	125	22.1
Secure Internet servers per 1 million population	125	1.2
Investment in telecommunication services (% GDP)	128	6
<b>Quality</b>	80	16.2
Mobile upload and download speeds	62	25.3
Fixed broadband upload and download speeds	48	16.4
Fixed broadband subscriptions (y speed) per hundred people	115	0.8
<b>Availability</b>	140	10.4
Fixed broadband bandwidth (% Gbps per capita)	119	8.1
Mobile broadband basket (% Gbps per capita)	100	50.3
Internet and telephony competition	145	18.0
<b>Access</b>	112	24.8
<b>Subscribers</b>	100	10.0
Active mobile-broadband subscriptions per hundred inhabitants	116	20.0
International Internet bandwidth per user	128	27.4
Households with Internet access at home (%)	152	1.4
<b>Skills and employment</b>	80	22.7
Individuals with standard ICT skills (%)	106	1.8
Tertiary graduates from ICT programmes (%)	11	81.3
ICT employment (%)	104	4.2
<b>Usage</b>	140	15.4
<b>Services</b>	140	14.0
Government online services	145	19.8
Fixed broadband Internet traffic per subscriber	106	1.8
Mobile broadband Internet traffic per subscriber	110	2
Internet users (%)	120	21.4
<b>Commerce</b>	140	21.0
ICT FDI parent applications (per 100 million GDP)	57	46.4
E-participation	147	21.4
Internet activities by individuals (%)	106	1.8
Trade in digitally deliverable services (% total trade)	104	8
<b>ECONOMY</b>	115	48.5
<b>Economic Competitiveness</b>	127	36.7
<b>Efficiency</b>	110	40.1
Overhead capital formation (% GDP)	27	80.2
Logistics performance	63	42.5
Transport productive capacity	117	17.5
Building quality control	128	42.3

	Rank	Value
<b>Business agility</b>	100	0
Cost of starting a business	148	82.7
Recovery recovery time	108	1.8
Entrepreneurial employee activity rate	106	1.8
Growth of corporate transactions	118	8
<b>Corporate openness</b>	118	48.3
<b>Trade and investment</b>	110	21.7
Trade (% GDP)	65	30.2
High-technology trade (% total trade)	110	23.7
Market concentration	71	78.9
Market concentration	120	71.9
<b>Product openness</b>	100	0
China's financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	55	83.0
Cost dynamics	124	28.4
<b>Financing and domestic value added</b>	84	22.3
<b>Financing and costs</b>	20	71.0
Domestic credit to private sector (% GDP)	108	1.8
IMRS financing gap (% GDP)	77	80.2
Tax and contribution rate (% profit)	25	83.8
Bank nonperforming loans (%)	108	1.8
<b>Unmet needs index</b>	110	21.7
Medium- and high-tech activities value added	125	4.1
Industry and services value added (% GDP)	137	47.0
Labour underutilization rate	59	73.8
Output per worker	118	5.8
<b>ENABLING ENVIRONMENT</b>	111	46.7
<b>Governance</b>	113	27.9
<b>Political environment</b>	80	30.4
Peace and stability	35	89.3
View and accountability	124	28.4
Quality of institutions	132	19.4
Rule of law	125	20.7
Control of corruption	136	18.0
Government effectiveness	138	22.6
<b>Socio-economic</b>	83	54
<b>Gender equity</b>	95	81.0
Female-to-male ratio in parliament	80	28.1
Female-to-male labour force participation	8	88.5
Female-to-male ratio in internal wage	108	1.8
<b>Gender equality</b>	80	28.1
Social protection coverage (% population)	117	9.8
Adult literacy rate	80	88.0
Youth not in employment, education or training (%)	20	80.3
<b>Standard of living</b>	75	30.0
Poverty headcount ratio (% population)	49	74.0
GDP per capita	108	6.8
<b>Health and environment</b>	114	28.3
<b>Health</b>	110	21.7
Universal health coverage	100	31
Healthy life expectancy (years)	110	69.0
Under-five mortality rate	121	82.2
<b>Economic and performance</b>	87	60.7
Renewable energy consumption (%)	45	43.0
Household footprint per capita	88	88.8
Natural hazard exposure	100	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# LATVIA

**GKI RANK** 31/154

**GKI SCORE** 60.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Latvia is a leading performer in terms of its knowledge infrastructure. It ranks 31st out of 154 countries in the Global Knowledge Index 2021 and 31st out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Labour force with short-cycle tertiary education (%)
- + Academic freedom
- + Adult literacy rate
- + Mobile broadband Internet traffic per subscription
- + Pupil-trained teacher ratio in secondary education

### AREAS OF IMPROVEMENT

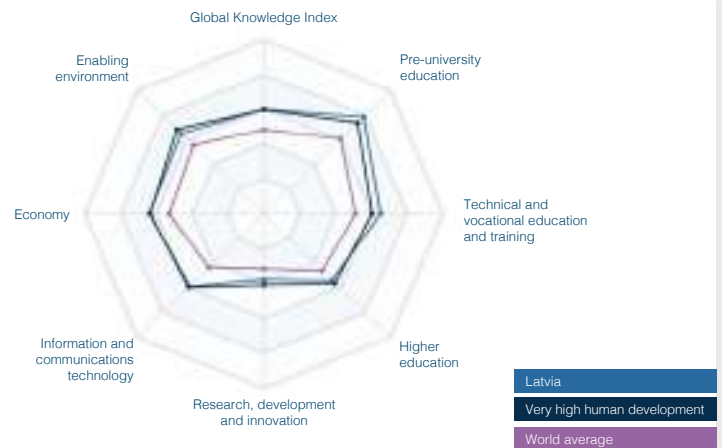
- Natural hazard exposure
- Investment in telecommunication services (% GDP)
- Firms constrained with inadequately educated workforce (%)
- Ecological footprint per capita
- Labour force participation rate with advanced education

### KEY INDICATORS

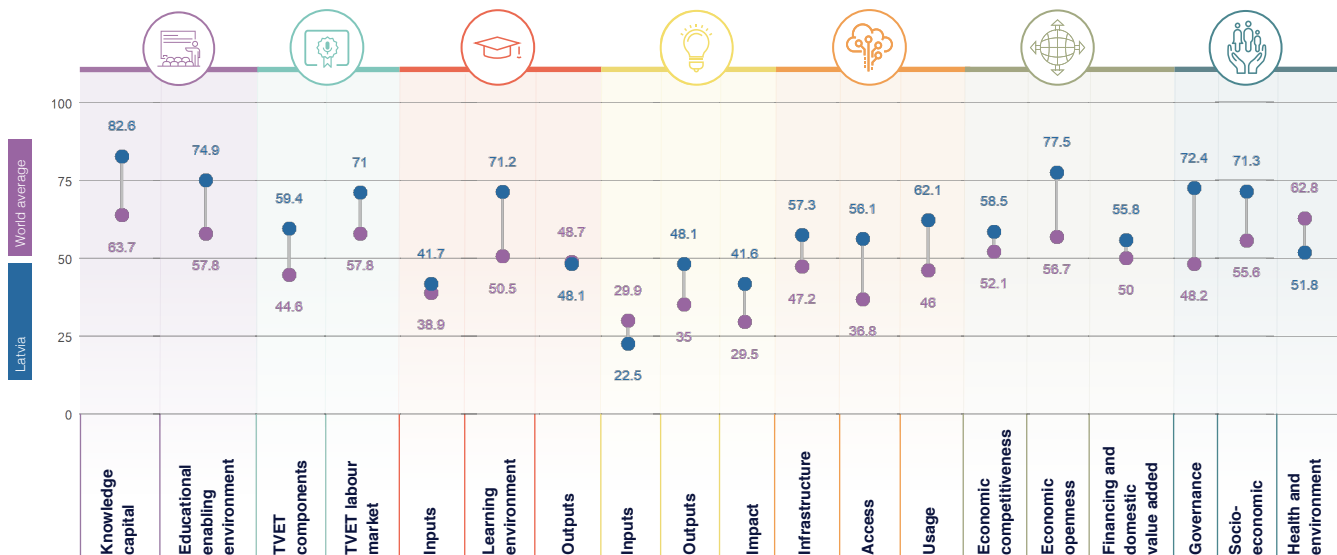
**GDP US\$ billions** 56.918  
**Population** 1,886,202  
**HDI** 0.866

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	20	78.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	22	65.2
HIGHER EDUCATION	39	53.7
RESEARCH, DEVELOPMENT AND INNOVATION	38	37.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	34	58.5
ECONOMY	33	64
ENABLING ENVIRONMENT	40	65.2



## GKI PILLARS







# LATVIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	28	78.9
Enrolment	28	83.2
Net enrolment rate in primary education	20	96.4
Net enrolment rate in lower secondary education	37	87.8
Net enrolment rate in upper secondary education	28	84.5
Completion	51	70
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	34	87.4
Success rate rate in the last grade of lower secondary education	42	80.5
Completion	25	72.5
Assessment of 15-year-old students in math, science and reading	27	82.8
Learning-adjusted years of schooling	23	82.7
<b>Educational enabling environment</b>		
Expenditure	51	33.5
Government expenditure on primary education (% GDP)	72	20.6
Government expenditure on secondary education (% GDP)	70	20.5
Government funding per primary student (% GDP per capita)	39	88.8
Government funding per secondary student (% GDP per capita)	41	36.1
Resources	55	84
Pupil-based teacher ratio in primary education	5	86.5
Pupil-based teacher ratio in secondary education	4	89.2
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	55	83
Class attendance rate in early childhood education	88	81.8
Proportion of children who are developmentally on track	104	106
Proportion of children with stimulating home learning environments	104	106
Pupil-based teacher ratio in preprimary education	5	86.2
Quality and infrastructure	17	85.1
Completion rate in upper secondary education, gender parity	33	85.9
Completion rate in upper secondary education, wealth parity	30	72.6
Completion rate in upper secondary education, location parity	42	81.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	44	76.5
Firms offering formal training (%)	20	86
Labour force with short-cycle tertiary education (%)	1	100
Participation rate in formal and non-formal education and training	20	84.3
TVET enrolment	25	76.4
Government expenditure on vocational education (%)	23	46
Share of students enrolled in secondary vocational programmes	39	32.1
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	38	42.1
Extent of staff training	81	87.1
Quality of vocational training	82	53.5
Ratio of high-skil TVET occupations earnings to average wage	83	17.7
Ratio of medium-skil TVET occupations earnings to average wage	70	29.0
<b>TVET labour market</b>		
Efficiency of the labour market	71	66.1
Firms considered with inappropriately educated workforce (%)	113	28.6
Employment educational mismatch (%)	25	35.5
Proportion of skilled production workers	16	83.5
Unemployment rate with vocational education	60	76
Real TVET unemployment	34	75.3
Share of TVET occupations	25	86.0
Manufacturing employment (%)	47	44
Quality and infrastructure	3	61.5
Enrolment in vocational education, gender parity	27	80.9
Useable employment rate	22	82.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	31	24.5
Government expenditure per tertiary student	50	18.2
Teaching staff compensation (% tertiary expenditure)	57	28.8
Enrolment	31	41.4
Enrolment in bachelor's or equivalent level (%)	68	27.7
Enrolment in masters, doctoral or equivalent (%)	25	89.2
Resources	57	58.2
Rp/teacher ratio in tertiary education	21	85.9
Research in higher education (%)	79	33.2
<b>Learning environment</b>		
Timely and academic freedom	21	71.2
Teachers in tertiary education, gender parity	28	74.8
Labour mobility rate	28	26.5
Academic freedom	21	87
Quality and infrastructure	104	106
Class attendance rate in tertiary education, gender parity	104	106
Class attendance rate in tertiary education, wealth parity	104	106
Class attendance rate in tertiary education, location parity	104	106
<b>Outputs</b>		
Attainment	23	57.1
Educational attainment rate, bachelor's or equivalent	43	55.8
Educational attainment rate, master's or equivalent	7	64.6
Educational attainment rate, doctoral or equivalent	13	83
Employment	122	53.1
Labour force participation rate with advanced education	152	13.5
Unemployment rate with advanced education	51	86.8
Impact	81	37.1
University tertiary enrolment in R&D	41	48.5
OECD students per 1000 personnel in higher education	72	24.7
<b>Knowledge, innovation and services</b>		
Index	104	12.3
Share of GDP expenditure	81	35
GDP (% GDP)	51	12.0
GERD per researcher	73	18.8
Researchers per thousand labour force	42	22.1
Tertiary graduates from STEM programmes (%)	76	26.8
<b>Quality of innovation environment</b>		
GERD performed by business enterprises (%)	95	4.4
GERD financed by business enterprises (%)	60	28.9
Researchers in business enterprises (%)	81	23.0
Firms that spend on R&D (%)	64	21.5
Quality of innovation environment	104	12.3
High-skilled employment (%)	104	106
Intellectual property payments (% total trade)	104	5.8
State of cluster development	58	48.0
<b>Support</b>		
Access to ICT infrastructure	104	106
Average documents per researcher	32	64.0
Citations per document	23	38.9
Patent applications (per 100 billion GDP)	33	69.2
<b>Infrastructure and innovation ecosystem</b>		
Intellectual property receipts (% total trade)	75	0.2
Research design applications (per 100 billion GDP)	26	28.2
PCT applications (per 100 billion GDP)	37	67.5
Firms producing new goods and services (%)	88	51.7





# LATVIA

	Rank	Value
<b>Business environment</b>		
Trademark applications per 100 million GDP	56	30
Cultural goods exports (% exports)	28	34.9
Printing and publishing output (% manufactured output)	1	65.0
<b>Energy</b>		
Renewable	35	41.9
Renewable	35	41.9
Risks of institutions' persistence	71	11.3
Depth of innovative companies	40	55.3
ISO 9001 quality certificates (% GDP)	30	61.0
ISO 14001 environmental certificates (% GDP)	40	50
<b>Environment</b>		
CERO forecast from abroad (%)	12	56.7
Cost of waste per storage volume dealt (% GDP)	56	12.9
Computer software spending (% GDP)	34	9.8
<b>Government services</b>		
New business density per thousand population	45	39.0
Firms with one paid employee (%)	66	68.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>34</b>	<b>52.5</b>
<b>Infrastructure</b>		
Coverage	67	44.1
3G/4G mobile network coverage (% population)	71	60.0
Secure Internet servers per 1 million population	37	20.0
Investment in telecommunication services (% GDP)	109	14.0
<b>Quality</b>		
Mobile speed and download speeds	62	30.9
Fixed broadband upload and download speeds	13	40
Fixed broadband subscriptions (by speed) per hundred people	43	52.1
<b>Availability</b>		
Fixed broadband latency (% QM per user)	49	63.1
Mobile broadband latency (% QM per capita)	30	70.0
Internet and telephone competition	65	50.0
<b>Access</b>		
Subscribers		
Active mobile-broadband subscriptions per fixed-line inhabitants	9	62.0
International Internet bandwidth per user	38	48.8
Households with Internet access at home (%)	34	69.0
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	34	47.4
Tertiary graduates from ICT programmes (%)	69	31.8
ICT employment (%)	21	56.0
<b>Usage</b>		
Services		
Government online services	51	55.2
Fixed broadband Internet traffic per subscription	16	33.0
Mobile broadband Internet traffic per subscription	9	66.1
Internet users (%)	21	66.0
<b>Outcomes</b>		
ICT FDI patent applications (per 100 million GDP)	40	52.0
E-participation		
Internet activities by individuals (%)	12	64.3
Trade in digitally deliverable services (% total trade)	47	50.0
<b>ECONOMY</b>	<b>33</b>	<b>64</b>
<b>Economic competitiveness</b>		
OECD innovation leadership	10	55.0
Overhead capital formation (% GDP)	65	31
Logistics performance	70	45.2
Transport productive capacity	39	37.0
Building quality control	47	60

	Rank	Value
<b>Business agility</b>		
Time of starting a business	29	64.1
Recovery time	58	45
Entrepreneurial employee activity rate	35	29.0
Growth of corporate transactions	13	65.7
<b>Business openness</b>		
Trade and investment	11	74.0
Trade (% GDP)	24	60.0
High-technology trade (% total trade)	20	62.0
Market concentration	34	61.0
Market concentration	31	63.0
Product diversity	19	60.0
Chronic financial openness	1	100
Foreign direct investment, net inflows (% GDP)	75	47.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	<b>59</b>	<b>52.3</b>
Financing and costs		
Domestic credit to private sector (% GDP)	69	12.0
IMRS financing gap (% GDP)	1	61.7
Tax and contribution rate (% profit)	66	69.4
Bank nonperforming loans (%)	60	67.0
Unsecured loans ratio	11	66.4
Medium- and high-tech activities value added	72	35.0
Industry and services value added (% GDP)	60	61.1
Labour underutilization rate	68	35
Output per worker	40	20
<b>ENABLING ENVIRONMENT</b>	<b>41</b>	<b>64.3</b>
<b>Governance</b>		
Political environment	36	60.0
Peace and stability	47	60.4
View and accountability	25	74.4
Quality of institutions	52	77.0
Rule of law	30	61.0
Control of corruption	37	75.0
Government effectiveness	36	76.0
<b>Socio-economic</b>		
Gender equity	42	73.0
Female-to-male ratio in parliament	50	40.0
Female-to-male labour force participation	61	60
Female-to-male ratio in internal wage	1	100
Gender inequality	11	69.0
Social protection coverage (% population)	45	66.4
Adult literacy rate	5	89.0
Youth not in employment, education or training (%)	22	65.0
Standard of living	60	63.0
Poverty headcount ratio (% population)	79	63.0
GDP per capita	41	26.7
<b>Health and environment</b>	<b>146</b>	<b>51.8</b>
Health		
Universal health coverage	71	71
Healthy life expectancy (years)	110	63.0
Under-five mortality rate	52	65.1
Environmental performance		
Renewable energy consumption (%)	60	22.1
Household footprint per capita	146	31
Natural hazard exposure	125	30

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# LEBANON

**GKI RANK** **92/154**

**GKI SCORE** **44.8**  
**WORLD AVERAGE** **48.4**

## COUNTRY PERFORMANCE SUMMARY

Lebanon is a moderate performer in terms of its knowledge infrastructure. It ranks 92nd out of 154 countries in the Global Knowledge Index 2021 and 29th out of the 39 countries with high human development.

- ### AREAS OF STRENGTH
- + Pupil-teacher ratio in tertiary education
  - + Teaching staff compensation (% tertiary expenditure)
  - + Cultural goods exports (% exports)
  - + Teachers in tertiary education, gender parity
  - + Share of TVET occupations

- ### AREAS OF IMPROVEMENT
- Labour force with short-cycle tertiary education (%)
  - Female-to-male ratio in parliament
  - Gross fixed capital formation (% GDP)
  - Government funding per secondary student (% of GDP per capita)
  - Government expenditure on secondary education (% of GDP)

### KEY INDICATORS

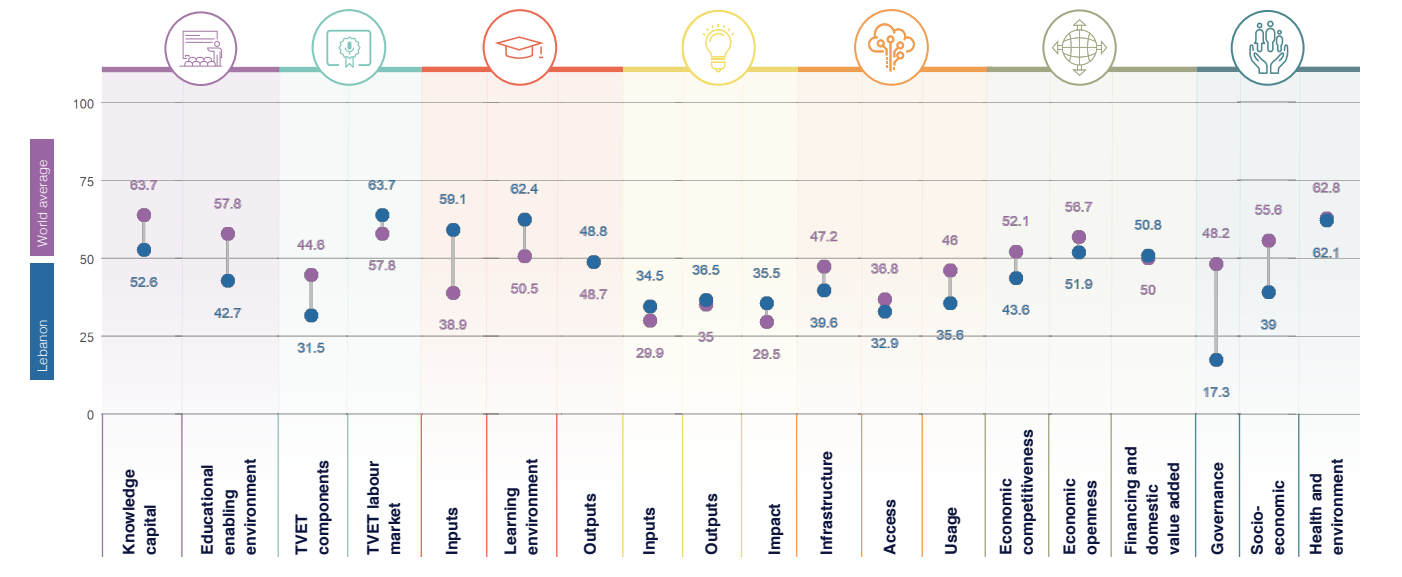
GDP US\$ billions	79.51
Population	6,825,442
HDI	0.744

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	116	47.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	89	47.6
HIGHER EDUCATION	31	56.7
RESEARCH, DEVELOPMENT AND INNOVATION	49	35.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	98	36
ECONOMY	92	48.8
ENABLING ENVIRONMENT	139	39.5



## GKI PILLARS





# LEBANON

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	168	82.8
Enrollment	196	116
Net enrolment rate in primary education	196	116
Net enrolment rate in lower secondary education	196	116
Net enrolment rate in upper secondary education	196	116
Completion	61	35.0
Years of compulsory education in primary and secondary	82	36.0
Completion rate in upper secondary education	196	116
Success rate rate in the last grade of lower secondary education	196	116
Completion	113	33.0
Assessment of 15-year-old students in math, science and reading	71	17.4
Learning-adjusted years of schooling	104	33.0
<b>Educational enabling environment</b>	<b>100</b>	<b>40.7</b>
Expenditure	101	1
Government expenditure on primary education (% GDP)	196	116
Government expenditure on secondary education (% GDP)	103	1.8
Government funding per primary student (% GDP per capita)	196	116
Government funding per secondary student (% GDP per capita)	119	3.4
Resources	61	35.0
Pupil-based teacher ratio in primary education	196	116
Pupil-based teacher ratio in secondary education	196	116
Schools with access to computers in primary education (%)	55	67.7
Schools with access to computers in secondary education (%)	53	66.0
Early learning	61	40.0
Class attendance rate in early childhood education	196	116
Proportion of children who are developmentally on track	196	116
Proportion of children with stimulating home learning environments	43	49.0
Pupil-based teacher ratio in preprimary education	196	116
Quality and infrastructure	196	116
Completion rate in upper secondary education, gender parity	196	116
Completion rate in upper secondary education, wealth parity	196	116
Completion rate in upper secondary education, location parity	196	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>100</b>	<b>21.5</b>
Commence training and learning	100	37
Firms offering formal training (%)	95	34.5
Labour force with short-cycle tertiary education (%)	80	25.0
Participation rate in formal and non-formal education and training	196	116
TVET resources	100	37.0
Government expenditure on vocational education (%)	196	116
Share of students enrolled in secondary vocational programmes	51	27.0
Share of students enrolled in postsecondary vocational programmes	196	116
TVET quality and infrastructure	196	40.0
Extent of staff training	81	44.0
Quality of vocational training	100	43.1
Ratio of high-skill TVET occupations earnings to average wage	81	39.0
Ratio of medium-skill TVET occupations earnings to average wage	83	40.5
<b>TVET labour market</b>	<b>94</b>	<b>43.7</b>
Efficiency of the labour market	100	33.1
Firms considered well-integrated with workforce (%)	25	30
Employment educational mismatch (%)	62	60.5
Proportion of skilled graduates employed	81	61.5
Unemployment rate with vocational education	81	64.2
High TVET unemployment	196	116
Share of TVET occupations	15	33.0
Manufacturing employment (%)	81	36.5
Quality and infrastructure	100	67.7
Enrollment in vocational education, gender parity	196	116
Useable employment rate	79	67.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>14</b>	<b>58.1</b>
Expenditure	17	53.0
Government expenditure per tertiary student	72	11.6
Teaching staff compensation (% tertiary expenditure)	1	309
Enrollment	61	21.4
Enrollment in bachelor's or equivalent level (%)	66	23.7
Enrollment in masters, doctoral or equivalent (%)	52	14.0
Resources	1	309
Pupil-teacher ratio in tertiary education	1	309
Research in higher education (%)	196	116
<b>Learning environment</b>	<b>40</b>	<b>62.4</b>
Timely and academic freedom	41	62.4
Teachers in tertiary education, gender parity	12	60.1
Labour mobility rate	30	30.6
Academic freedom	50	62.0
Quality and infrastructure	196	116
Class attendance rate in tertiary education, gender parity	196	116
Class attendance rate in tertiary education, wealth parity	196	116
Class attendance rate in tertiary education, location parity	196	116
<b>Outputs</b>	<b>72</b>	<b>46.8</b>
Efficiency	196	116
Educational attainment rate, bachelor's or equivalent	196	116
Educational attainment rate, master's or equivalent	196	116
Educational attainment rate, doctoral or equivalent	196	116
Employment	117	36.4
Labour force participation rate with advanced education	112	52.0
Unemployment rate with advanced education	113	54.0
Impact	59	63.0
University tertiary enrollment in FTE	60	43.0
UNITE indicators per FTE personnel in higher education	196	116
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>61</b>	<b>33.3</b>
Commence training and learning	100	37
GDP (% GDP)	196	116
GERD per researcher	196	116
Researchers per thousand labour force	196	116
Tertiary graduates from STEM programmes (%)	52	43.3
Quality and infrastructure	196	116
GERD performed by business enterprises (%)	196	116
GERD financed by business enterprises (%)	196	116
Researchers in business enterprises (%)	196	116
Firms that spend on R&D (%)	88	13.0
Quality and infrastructure	100	37
High-skill employment (%)	12	62.1
Intellectual property payments (% total trade)	117	1
State of cluster development	56	48.0
<b>Outputs</b>	<b>60</b>	<b>33.3</b>
Commence training and learning	100	37
Average documents per researcher	196	116
Citations per document	38	23.0
Patent applications (per 100 billion GDP)	63	62.0
Quality and infrastructure	100	37
Intellectual property receipts (% total trade)	48	15.0
Research design applications (per 100 billion GDP)	196	116
PCT applications (per 100 billion GDP)	54	35.4
Firms producing new goods and services (%)	114	6.3





# LEBANON

	Rank	Value
<b>Consumer electronics</b>	99	30
Treatment applications per 100 million GDP	100	1.4
Cultural goods exports (% exports)	8	55.6
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>	85	25.5
<b>Finance</b>	75	30
Access to investors' protection	68	16.2
Depth of innovative companies	71	50.7
ISO 9001 quality certificates (% GDP)	45	59.0
ISO 14001 environmental certificates (% GDP)	82	0.1
<b>Infrastructure</b>	100	0.0
CERD forecast from abroad (%)	106	106
Cost indexes per storage volume deals (% GDP)	60	6.7
Computer software spending (% GDP)	100	0.4
<b>Government services</b>	75	30
New business density per thousand population	106	106
Firms with web presence (%)	20	37
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	88	30
<b>Infrastructure</b>	87	30.3
<b>Coverage</b>	85	3.1
30MHz mobile network coverage (% population)	28	60.0
Secure Internet servers per 1 million population	25	2.8
Investment in telecommunication services (% GDP)	24	60.0
<b>Quality</b>	75	11.5
Mobile speed and download speeds	35	43.4
Fixed broadband upload and download speeds	81	4.2
Fixed broadband subscriptions (y speed) per fixed-line phone	67	6.2
<b>Availability</b>	106	50.1
Fixed broadband bandwidth (% Gbps per capita)	72	25.4
Mobile broadband basket (% Gbps per capita)	117	40
Internet and telephony competition	145	31.0
<b>Access</b>	80	22.0
<b>Subscribers</b>	77	41.5
Active mobile-broadband subscriptions per fixed-line inhabitants	98	27.0
International Internet bandwidth per user	110	20.6
Households with Internet access at home (%)	47	64.0
<b>Skills and employment</b>	100	16.0
Individuals with standard ICT skills (%)	106	0.8
Tertiary graduates from ICT programmes (%)	100	14.0
ICT employment (%)	80	21.0
<b>Usage</b>	100	22.8
<b>Services</b>	57	16.1
Government online services	102	41.0
Fixed broadband Internet traffic per subscription	29	30.0
Mobile broadband Internet traffic per subscription	100	2.7
Internet users (%)	59	37
<b>Commerce</b>	100	0.1
ICT FDI pure applications (per 100 million GDP)	66	41.1
E-participation	106	33.0
Internet activities by individuals (%)	106	0.8
Trade in digitally deliverable services (% total trade)	112	20
<b>ECONOMY</b>	81	60.3
<b>Economic complexity indexes</b>	113	43.0
<b>Manufacturing</b>	101	41.0
Overhead capital formation (% GDP)	142	17.0
Logistics performance	60	42.0
Transport productive capacity	69	26.0
Building quality control	8	60.0

	Rank	Value
<b>Business agility</b>	104	40
Ease of starting a business	107	26.0
Recovery recovery rate	94	33.4
Entrepreneurial employee activity rate	82	13.4
Growth of corporate transactions	89	42.0
<b>Corporate openness</b>	88	21.0
<b>Trade and investment</b>	57	21.0
Trade (% GDP)	71	58.7
High-technology trade (% total trade)	90	41.0
Market concentration	75	34.8
Market concentration	20	64.7
Product diversity	10	64.1
China's financial openness	76	44.0
Foreign direct investment, net inflows (% GDP)	30	60.0
Cost dynamics	108	36.0
<b>Financing and domestic value added</b>	73	60.0
<b>Financing and costs</b>	50	27.1
Domestic credit to private sector (% GDP)	25	40.4
IMRS financing gap (% GDP)	31	37.0
Tax and contribution rate (% profit)	85	26.4
Bank nonperforming loans (%)	110	35
<b>Unmet needs index</b>	10	64.0
Medium- and high-tech activities value added	74	23.0
Industry and services value added (% GDP)	55	24.7
Labour underutilization rate	94	60.1
Output per worker	65	17.7
<b>ENABLING ENVIRONMENT</b>	108	26.5
<b>Governance</b>	108	27.0
Political environment	108	20.4
Peace and stability	142	8
View and accountability	100	22.0
Quality of institutions	144	14.0
Rule of law	108	10.0
Control of corruption	142	12
Government effectiveness	100	11.0
<b>Socio-economic</b>	128	30
Gender equity	102	15.0
Female-to-male ratio in parliament	147	4.8
Female-to-male labour force participation	142	25.7
Female-to-male ratio in internal wage	106	10.8
<b>Scarcity index</b>	15	60.0
Social protection coverage (% population)	70	60.0
Adult literacy rate	94	65.7
Youth not in employment, education or training (%)	79	64.0
<b>Standard of living</b>	91	30.0
Poverty headcount ratio (% population)	60	61.0
GDP per capita	84	10
<b>Health and environment</b>	83	60.1
<b>Health</b>	10	60.4
Universal health coverage	65	75
Healthy life expectancy (years)	86	72.6
Under-five mortality rate	51	60.0
<b>Environmental performance</b>	108	30.0
Renewable energy consumption (%)	102	4.8
Household footprint per capita	81	31.7
Natural hazard exposure	100	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# LESOTHO

**GKI RANK** 110/154

**GKI SCORE** 40.5  
**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**  
Lesotho is a modest performer in terms of its knowledge infrastructure. It ranks 110th out of 154 countries in the Global Knowledge Index 2021 and 1st out of the 27 countries with low human development.

- AREAS OF STRENGTH**
- + Manufacturing employment (%)
  - + Firms with new product/service (%)
  - + Government expenditure on primary education (% of GDP)
  - + Tax and contribution rate (% profit)
  - + Government funding per secondary student (% of GDP per capita)

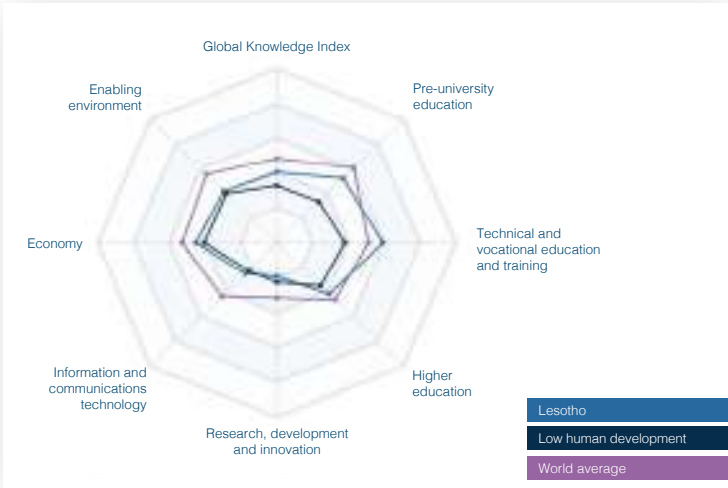
- AREAS OF IMPROVEMENT**
- Enrolment in master's, doctoral or equivalent (%)
  - Firms that spend on R&D (%)
  - Joint ventures per strategic alliance deals (% GDP)
  - Fixed-broadband subscriptions by speed per hundred people
  - Healthy life expectancy (years)

**KEY INDICATORS**

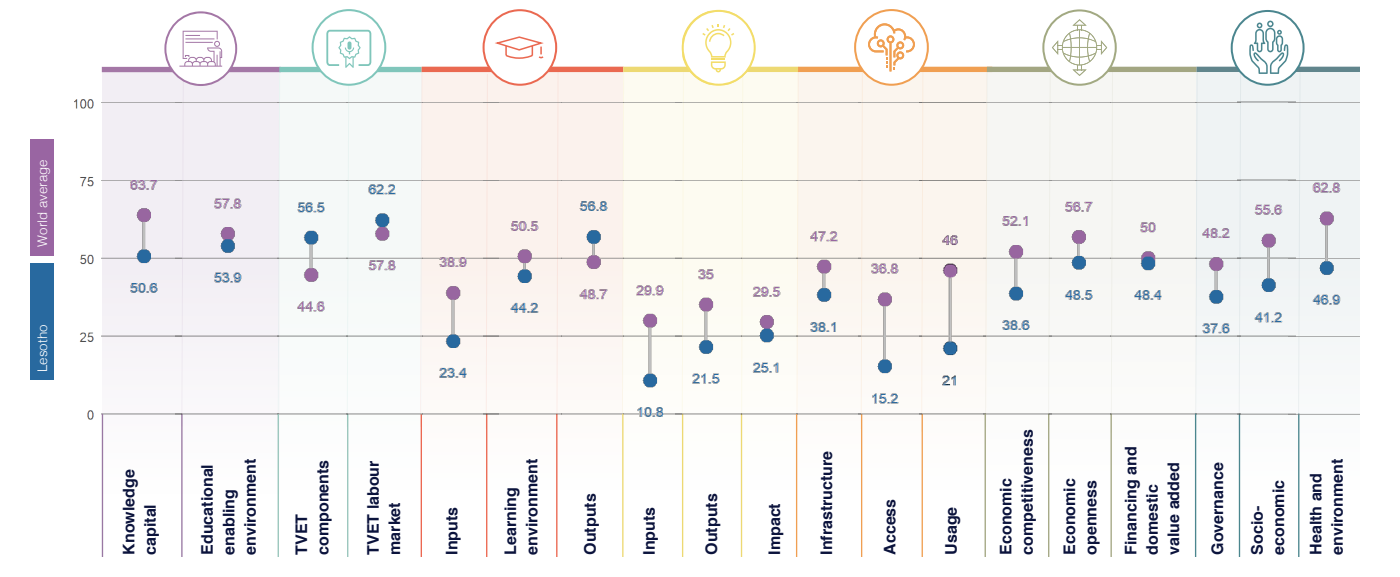
GDP US\$ billions	5.094
Population	2,142,252
HDI	0.527

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	112	52.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	41	59.3
HIGHER EDUCATION	96	41.4
RESEARCH, DEVELOPMENT AND INNOVATION	137	19.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	130	24.8
ECONOMY	114	45.2
ENABLING ENVIRONMENT	128	41.9



## GKI PILLARS





# LESOTHO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	114	52.3
Enrollment	114	50.4
Net enrolment rate in primary education	70	80.6
Net enrolment rate in lower secondary education	100	70.6
Net enrolment rate in upper secondary education	88	60.7
Completion	111	35.2
Years of compulsory education in primary and secondary	126	52.8
Completion rate in upper secondary education	112	21.7
Success rate rate in the last grade of lower secondary education	121	24.2
Completion	117	21.7
Assessment of Grade 6 students in math, science and reading	116	116
Learning-adjusted years of schooling	107	25.7
<b>Educational enabling environment</b>	<b>88</b>	<b>83.8</b>
Expenditure	4	62.0
Government expenditure on primary education (% GDP)	2	92
Government expenditure on secondary education (% GDP)	23	42.8
Government funding per primary student (% GDP per capita)	16	55.6
Government funding per secondary student (% GDP per capita)	5	80.1
Resources	81	60.5
Full-time teacher ratio in primary education	70	85.2
Full-time teacher ratio in secondary education	82	87.8
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	10	46.2
Class attendance rate in early childhood education	88	81.7
Proportion of children who are developmentally on track	30	58.2
Proportion of children with stimulating home learning environments	64	14.3
Full-time teacher ratio in preprimary education	25	80.1
Quality and infrastructure	109	33.2
Completion rate in upper secondary education, gender parity	108	32.4
Completion rate in upper secondary education, wealth parity	120	1.3
Completion rate in upper secondary education, location parity	81	40.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>89</b>	<b>86.8</b>
Companies training apprentices	76	61.1
Firms offering formal training (%)	85	37.8
Labour force with short-cycle tertiary education (%)	5	81.8
Participation rate in formal and non-formal education and training	116	116
TVET resources	10	61.7
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	119	3.3
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	31	91
Extent of staff training	118	42.5
Quality of vocational training	122	39.7
Ratio of high-skil TVET occupations earnings to average wage	11	26.0
Ratio of median-skil TVET occupations earnings to average wage	29	52.0
<b>TVET labour market</b>	<b>81</b>	<b>80.2</b>
Efficiency of the labour market	76	61.0
Firms considered with inappropriately educated workforce (%)	93	71.5
Employment educational mismatch (%)	49	30.3
Proportion of skilled production workers	81	84.0
Unemployment rate with vocational education	100	56.2
Real TVET unemployment	5	91
Share of TVET occupations	28	87.9
Manufacturing employment (%)	1	109
Quality and infrastructure	126	31.0
Enrollment in vocational education, gender parity	118	22.0
Useable employment rate	100	50.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>121</b>	<b>23.4</b>
Expenditure	121	23
Government expenditure per tertiary student	104	2
Teaching staff compensation (% tertiary expenditure)	88	9
Enrollment	121	1.1
Enrollment in bachelor's or equivalent level (%)	126	2.1
Enrollment in masters, doctoral or equivalent (%)	126	0
Resources	61	88.3
Right teacher ratio in tertiary education	86	87.3
Research staff in higher education (%)	30	85.7
<b>Learning environment</b>	<b>87</b>	<b>44.2</b>
Directly paid academic freedom	71	33.0
Teachers in tertiary education, gender parity	21	80
Labour mobility rate	112	7.2
Academic freedom	88	88.2
Quality and infrastructure	61	35.5
Class attendance rate in tertiary education, gender parity	121	31
Class attendance rate in tertiary education, wealth parity	44	32.0
Class attendance rate in tertiary education, location parity	74	11.6
<b>Outputs</b>	<b>48</b>	<b>56.8</b>
Efficiency	114	114
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	10	71.0
Labour force participation rate with advanced education	6	50.1
Unemployment rate with advanced education	100	99
Impact	71	35.1
University tertiary enrollment in FTE	81	30.0
UNITE indicators per FTE personnel in higher education	45	41.2
<b>INNOVATION, RESEARCH AND DEVELOPMENT</b>		
<b>Inputs</b>	<b>122</b>	<b>12.2</b>
Access to FDI resources	122	0
GDP (% GDP)	116	0.6
GERD per researcher	86	18.7
Researchers per thousand labour force	106	0.2
Tertiary graduates from STEM programmes (%)	101	28.0
Quality and infrastructure	117	11
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	88	1
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	121	0
Quality and infrastructure	119	122
High-skilled employment (%)	49	25.0
Intellectual property payments (% total trade)	99	4.5
State of cluster development	111	38.1
<b>Outputs</b>	<b>128</b>	<b>12.2</b>
Access to FDI resources	117	10.1
Average documents per researcher	18	71.0
Citations per document	118	6.8
Patent applications (per 100 billion GDP)	116	116
Quality and infrastructure	116	11
Intellectual property receipts (% total trade)	10	4.2
Research and development expenditure (per 100 billion GDP)	114	114
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	115	6.2



# LESOTHO

	Rank	Value
<b>Consumer electronics</b>		
Treatment applications per 100 million GDP	106	106
Cultural goods exports (% exports)	105	1
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>	<b>85</b>	<b>20.5</b>
<b>Energy</b>	<b>100</b>	<b>100</b>
Access to electricity's proximity	115	0
Depth of innovative companies	117	40.7
ISO 9001 quality certificates (% GDP)	127	1.3
ISO 14001 environmental certificates (% GDP)	121	1.8
<b>Industry</b>	<b>110</b>	<b>10</b>
CERD received from abroad (%)	55	14.0
Joint ventures per strategic industry deals (% GDP)	102	0
Computer software spending (% GDP)	106	106
<b>Internationalization</b>	<b>90</b>	<b>90</b>
New business density per thousand population	52	14
Firms with new products/services (%)	1	100
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>100</b>	<b>24.9</b>
<b>Infrastructure</b>	<b>101</b>	<b>20.5</b>
<b>Coverage</b>	<b>91</b>	<b>10.1</b>
3G/4G mobile network coverage (% population)	100	80.1
Secure Internet servers per 1 million population	121	1.4
Investment in telecommunication services (% GDP)	1	60.1
<b>Quality</b>	<b>106</b>	<b>0</b>
Mobile internet and download speeds	106	106
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (y speed) per hundred people	108	0
<b>Availability</b>	<b>105</b>	<b>10.1</b>
Fixed broadband latency (% QM per capita)	100	66.7
Mobile broadband basket (% QM per capita)	104	31.5
Internet and telephony competition	111	89.2
<b>Access</b>	<b>120</b>	<b>10.2</b>
<b>Subscribers</b>	<b>100</b>	<b>10.0</b>
Active mobile-broadband subscriptions per fixed-line inhabitants	87	27.0
International Internet bandwidth per user	108	18.7
Households with Internet access at home (%)	149	2.9
<b>Skills and employment</b>	<b>110</b>	<b>10</b>
Individuals with standard ICT skills (%)	79	5.0
Tertiary graduates from ICT programmes (%)	80	30
ICT employment (%)	100	4.7
<b>Usage</b>	<b>142</b>	<b>21</b>
<b>Services</b>	<b>100</b>	<b>10.0</b>
Government online services	100	35.0
Fixed broadband internet traffic per subscriber	100	0.2
Mobile broadband internet traffic per subscriber	100	0.5
Internet users (%)	100	20.1
<b>Commerce</b>	<b>144</b>	<b>10.0</b>
ICT/FIT patent applications (per 100,000 GDP)	106	106
E-participation	109	34.0
Internet activities by individuals (%)	80	34
Trade in digitally deliverable services (% total trade)	100	11.0
<b>ECONOMY</b>	<b>111</b>	<b>40.2</b>
<b>Economic complexity/structure</b>	<b>120</b>	<b>10.0</b>
<b>REGISTRATION</b>	<b>100</b>	<b>11.1</b>
Overhead capital formation (% GDP)	27	87.0
Logistics performance	100	31.0
Transport productive capacity	80	22.7
Building quality control	147	32.0

	Rank	Value
<b>Business agility</b>	<b>100</b>	<b>100.0</b>
Ease of starting a business	75	66.2
Recovery recovery time	104	33.5
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	118	0
<b>Customer experience</b>	<b>100</b>	<b>40.0</b>
<b>Trust and development</b>	<b>94</b>	<b>10</b>
Trade (% GDP)	17	89.0
High-technology trade (% total trade)	142	17.1
Market concentration	80	70.7
Market concentration	104	77.4
<b>Product innovation</b>	<b>100</b>	<b>40</b>
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	25	80.0
Cost dynamics	80	50
<b>Financing and domestic value added</b>	<b>83</b>	<b>40.4</b>
<b>Financing and costs</b>	<b>91</b>	<b>10.0</b>
Domestic credit to private sector (% GDP)	104	7.0
MSME financing gap (% GDP)	90	60
Tax and contribution rate (% profit)	0	64.0
Bank nonperforming loans (%)	68	82.0
<b>Unmet needs index</b>	<b>100</b>	<b>100.0</b>
Medium- and high-tech activities value added	109	106
Industry and services value added (% GDP)	85	80.0
Labour underutilization rate	142	24.0
Output per worker	100	2.8
<b>ENABLING ENVIRONMENT</b>	<b>126</b>	<b>41.8</b>
<b>Governance</b>	<b>88</b>	<b>37.0</b>
<b>Political environment</b>	<b>90</b>	<b>40.4</b>
Peace and stability	81	34.0
View and accountability	76	40.0
Quality of institutions	86	34.0
Rule of law	86	33.0
Control of corruption	80	51.0
Government effectiveness	100	16.0
<b>Socio-economic</b>	<b>124</b>	<b>41.2</b>
<b>Gender equity</b>	<b>80</b>	<b>30.4</b>
Female-to-male ratio in parliament	80	30.4
Female-to-male labour force participation	86	31.6
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	<b>100</b>	<b>100.0</b>
Social protection coverage (% population)	100	6.8
Adult literacy rate	86	88.0
Youth not in employment, education or training (%)	100	30.0
<b>Standard of living</b>	<b>100</b>	<b>10.0</b>
Poverty headcount ratio (% population)	117	30
GDP per capita	100	1.8
<b>Health and environment</b>	<b>100</b>	<b>40.0</b>
<b>Health</b>	<b>100</b>	<b>20.0</b>
Universal health coverage	101	40
Healthy life expectancy (years)	100	0
Under-five mortality rate	145	20.7
<b>Environmental performance</b>	<b>90</b>	<b>80.0</b>
Renewable energy consumption (%)	50	20.0
Household footprint per capita	80	80
Natural hazard exposure	27	74

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# LIBERIA

**GKI RANK** 129/154

**GKI SCORE** 35.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Liberia is a weak performer in terms of its knowledge infrastructure. It ranks 129th out of 154 countries in the Global Knowledge Index 2021 and 7th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Gross enrolment ratio in early childhood education
- + Firms with new product/service (%)
- + Labour force with short-cycle tertiary education (%)
- + Labour force participation rate with advanced education
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

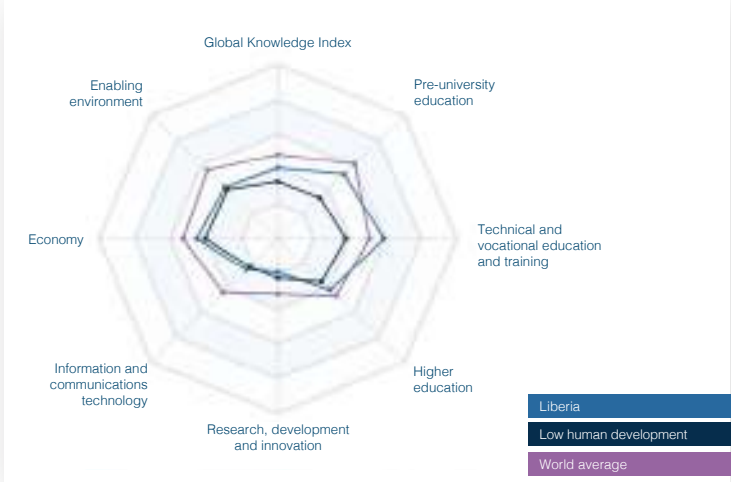
- Learning-adjusted years of schooling
- Gross attendance ratio for tertiary education, location parity
- New business density per thousand population
- Building quality control
- Extent of corporate transparency

### KEY INDICATORS

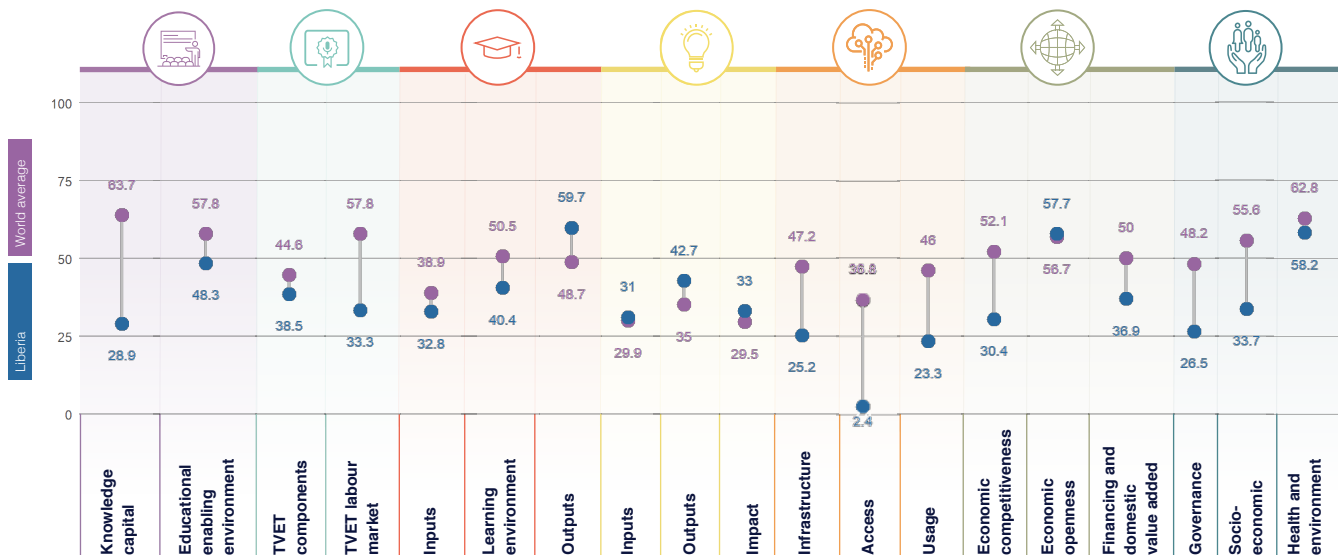
**GDP US\$ billions** ..... 6.847  
**Population** ..... 5,057,677  
**HDI** ..... 0.48

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	131	38.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	142	35.9
HIGHER EDUCATION	81	44.3
RESEARCH, DEVELOPMENT AND INNOVATION	48	35.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	152	17
ECONOMY	130	41.7
ENABLING ENVIRONMENT	140	39.4



## GKI PILLARS







# LIBERIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	143	28.8
Enrollment	115	50.0
Net enrolment rate in primary education	106	20
Net enrolment rate in lower secondary education	109	70.5
Net enrolment rate in upper secondary education	87	36.0
Completion	141	20
Years of compulsory education in primary and secondary	132	46.2
Completion rate in upper secondary education	129	9.1
Success rate rate in the last grade of lower secondary education	126	26.7
Completion	141	0
Assessment of 15-year-old students in math, science and reading	116	114
Learning-adjusted years of schooling	148	8
<b>Educational enabling environment</b>		
Expenditure	75	50.7
Government expenditure on primary education (% GDP)	81	28.6
Government expenditure on secondary education (% GDP)	49	22.1
Government funding per primary student (% GDP per capita)	87	32.8
Government funding per secondary student (% GDP per capita)	80	26.5
Resources	81	81.3
Pupil-based teacher ratio in primary education	82	75.5
Pupil-based teacher ratio in secondary education	82	81.1
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	41	60.0
Class attendance rate in early childhood education	1	100
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	76	36.7
Quality and infrastructure	101	25.0
Completion rate in upper secondary education, gender parity	121	23
Completion rate in upper secondary education, wealth parity	107	4.5
Completion rate in upper secondary education, location parity	113	16.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	95	11.0
Firms offering formal training (%)	86	27
Labour force with short-cycle tertiary education (%)	2	60.0
Participation rate in formal and non-formal education and training	116	116
TVET enrolment	108	11.5
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	93	11.8
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	109	41.0
Extent of staff training	86	45.3
Quality of vocational training	127	36.3
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	80	67.2
Firms considered well-integrated with labour (%)	45	25.0
Employment educational mismatch (%)	108	116
Proportion of skilled production workers	86	48.5
Unemployment rate with vocational education	87	35.0
Real TVET unemployment	141	14.0
Share of TVET occupations	146	11.7
Manufacturing employment (%)	129	17.0
Quality and infrastructure	109	41
Enrollment in vocational education, gender parity	116	116
Useable employment rate	129	56

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	115	2.7
Government expenditure per tertiary student	118	2.7
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	116	116
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	71	82.0
Pupil-teacher ratio in tertiary education	83	62.0
Researcher in higher education (%)	116	116
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	114	12.4
Labour mobility rate	116	116
Academic freedom	72	62.0
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	15	60.0
Class attendance rate in tertiary education, wealth parity	85	3.4
Class attendance rate in tertiary education, location parity	76	6
<b>Outputs</b>		
Skilled labour	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	51	67.2
Labour force participation rate with advanced education	5	67.7
Unemployment rate with advanced education	62	78.0
<b>Impact</b>		
University tertiary enrollment in R&D	113	32.1
CRIDE documents per 100 personnel in higher education	116	116
<b>Government's contribution to innovation and economic growth</b>		
<b>Inputs</b>		
Government R&D expenditure	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality of R&amp;D infrastructure</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	20.4
Quality of research infrastructure	11	67.2
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	116	116
State of cluster development	98	41.7
<b>Outputs</b>		
<b>Government's contribution to innovation and economic growth</b>		
Average documents per researcher	116	116
Citations per document	38	23.0
Patent applications (per 100 billion GDP)	116	116
<b>Government's contribution to innovation and economic growth</b>		
Intellectual property receipts (% total trade)	116	116
Research and development expenditure (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	85	55.0
Firms producing new goods and services (%)	22	68.7



# LIBERIA

	Rank	Value
<b>Business environment</b>	100	27.5
Treatment applications per 100 million GDP	109	109
Cultural goods exports (% exports)	104	109
Printing and publishing output (% manufactured output)	106	109
<b>Energy</b>	81	31.1
<b>Finance</b>	81	31.1
Access to venture capital financing	104	109
Depth of innovative companies	82	43.3
ISO 9001 quality certificates (% GDP)	107	4.4
ISO 14001 environmental certificates (% GDP)	81	6.2
<b>Infrastructure</b>	100	11.1
CERD licensed from abroad (%)	109	109
Cost of contracts per strategic contract deals (% GDP)	104	109
Computer software spending (% GDP)	106	109
<b>International trade</b>	81	31.1
New business density per thousand population	100	8
Firms with new products/services (%)	2	81.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	102	17
<b>Infrastructure</b>	143	30.3
<b>Coverage</b>	100	11.1
30MHz mobile network coverage (% population)	149	26.1
Secure Internet servers per 1 million population	143	0.3
Investment in telecommunication services (% GDP)	143	0.8
<b>Quality</b>	81	31.1
Mobile internet and download speeds	81	25.0
Fixed broadband upload and download speeds	75	8.1
Fixed broadband subscriptions (y-speed) per hundred people	106	109
<b>Accessibility</b>	107	41.0
Fixed broadband basket (% GNI per capita)	106	109
Mobile broadband basket (% GNI per capita)	108	20.2
Internet and telephony competition	114	84.7
<b>Access</b>	104	2.4
<b>Subscriptions</b>	100	0.1
Active mobile-broadband subscriptions per hundred inhabitants	102	4
International Internet bandwidth per user	101	0.8
Households with Internet access at home (%)	103	2.7
<b>Skills and employment</b>	100	10
Individuals with standard ICT skills (%)	104	109
Tertiary graduates from ICT programmes (%)	106	109
ICT employment (%)	104	109
<b>Usage</b>	107	23.3
<b>Services</b>	100	11.1
Government online services	148	28.7
Fixed broadband internet traffic per subscription	104	109
Mobile broadband internet traffic per subscription	106	109
Internet users (%)	103	17.7
<b>Statistics</b>	100	11.1
ICT FDI patent applications (per 100 million GDP)	104	109
E-participation	143	23.0
Internet activities by individuals (%)	104	109
Trade in digitally deliverable services (% total trade)	109	30.0
<b>ECONOMY</b>	100	81.7
<b>Economic competitiveness</b>	102	30.4
<b>Infrastructure investment</b>	100	11.1
Overhead capital formation (% GDP)	100	41.0
Logistics performance	138	30.7
Transport productive capacity	104	13.1
Building quality control	104	12.0

	Rank	Value
<b>Business agility</b>	100	33.0
Cost of starting a business	81	80.0
Recovery recovery rate	101	18.0
Entrepreneurial employee activity rate	106	109
Growth of corporate transactions	108	8
<b>Customer experience</b>	81	31.7
Trust and dissatisfaction	100	11.0
<b>Tax</b>	81	31.7
Tax (% GDP)	81	31.7
High-technology trade (% total trade)	104	109
Market concentration	107	85
Market concentration	104	109
Product diversity	10	81.1
Contract financial openness	80	71.7
Foreign direct investment, net inflows (% GDP)	25	81.7
Cost dynamics	104	109
<b>Financing and domestic value added</b>	102	30.0
<b>Financing and costs</b>	143	23.4
Domestic credit to private sector (% GDP)	107	5.7
MSME financing gap (% GDP)	104	109
Tax and contribution rate (% profit)	111	81.1
Bank nonperforming loans (%)	104	109
Unmet loan demand	10	81.1
Medium- and high-tech activities value added	104	109
Industry and services value added (% GDP)	144	32.0
Labour underutilization rate	11	81.0
Output per worker	100	0.8
<b>ENABLING ENVIRONMENT</b>	144	36.4
<b>Governance</b>	117	25.5
Political environment	80	33.0
Peace and stability	85	34
View and accountability	84	40
Quality of institutions	142	14.4
Rule of law	106	14.0
Control of corruption	107	10.7
Government effectiveness	108	8.7
<b>Socio-economic</b>	140	35.7
Gender equity	103	10.3
Female-to-male ratio in parliament	100	12.5
Female-to-male labour force participation	21	88.7
Female-to-male ratio in internal wage	104	109
Gender inequality	100	10.1
Social protection coverage (% population)	100	3.8
Adult literacy rate	117	23.0
Youth not in employment, education or training (%)	59	71.2
Standard of living	100	11.1
Poverty headcount ratio (% population)	100	25.2
GDP per capita	147	14.8
<b>Health and environment</b>	116	52.2
Health	101	11.0
Universal health coverage	144	30
Healthy life expectancy (years)	100	21.7
Under-five mortality rate	143	25.0
Environmental performance	0	81.1
Renewable energy consumption (%)	4	80.0
Household footprint per capita	28	80.0
Natural hazard exposure	65	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# LITHUANIA

**GKI RANK** 36/154

**GKI SCORE** 59.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Lithuania is a strong performer in terms of its knowledge infrastructure. It ranks 36th out of 154 countries in the Global Knowledge Index 2021 and 35th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Educational attainment rate, bachelor's or equivalent
- + Completion rate in upper secondary education, wealth parity
- + International Internet bandwidth per user
- + Adult literacy rate
- + Product concentration

### AREAS OF IMPROVEMENT

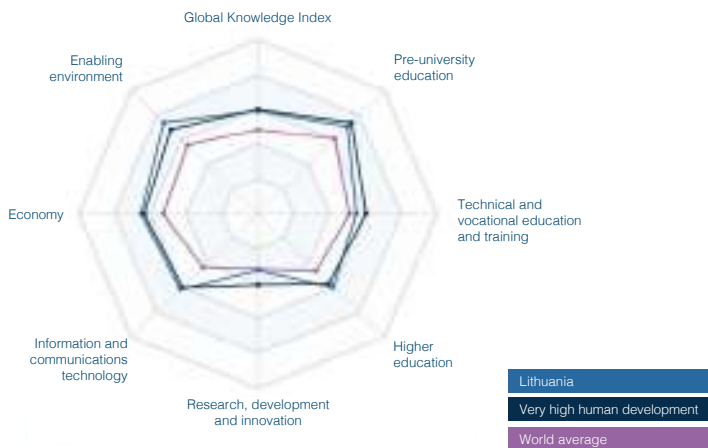
- Government expenditure on primary education (% of GDP)
- Investment in telecommunication services (% GDP)
- Firms that spend on R&D (%)
- Ratio of high-skill TVET occupations earnings to average wage
- Ecological footprint per capita

### KEY INDICATORS

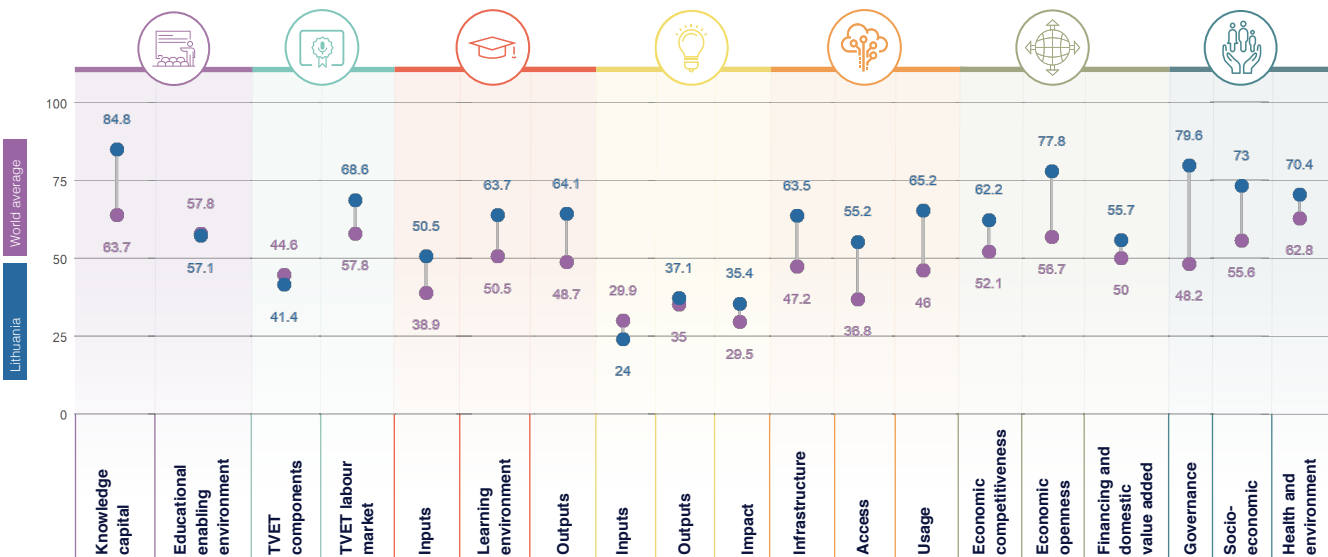
GDP US\$ billions	102.655
Population	2,722,291
HDI	0.882

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	58	70.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	55	55
HIGHER EDUCATION	27	59.4
RESEARCH, DEVELOPMENT AND INNOVATION	61	32.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	25	61.3
ECONOMY	28	65.2
ENABLING ENVIRONMENT	22	74.3



## GKI PILLARS







# LITHUANIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	17	88.8
Enrolment	11	92.0
Net enrolment rate in primary education	102	90.7
Net enrolment rate in lower secondary education	8	99.6
Net enrolment rate in upper secondary education	19	96.0
Completion	10	92.0
Years of compulsory education in primary and secondary	12	76.0
Completion rate in upper secondary education	22	83.1
Success rate rate in the last grade of lower secondary education	27	84
Completion	21	71.1
Assessment of 15-year-old students in math, science and reading	30	68.4
Learning-adjusted years of schooling	23	82.7
<b>Educational enabling environment</b>		
Enrolment	60	25.0
Government expenditure on primary education (% GDP)	119	16.0
Government expenditure on secondary education (% GDP)	75	26.4
Government funding per primary student (% GDP per capita)	54	38.7
Government funding per secondary student (% GDP per capita)	79	23.6
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	11	50.7
Class attendance rate in early childhood education	91	80.7
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	11	91
Completion rate in upper secondary education, gender parity	30	84.0
Completion rate in upper secondary education, wealth parity	5	85.2
Completion rate in upper secondary education, location parity	34	81.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	10	10.4
Firms offering formal training (%)	75	33.1
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	25	37.7
TVET enrolment	10	10.1
Government expenditure on vocational education (%)	17	30.7
Share of students enrolled in secondary vocational programmes	81	13.7
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	116	116
Extent of staff training	29	81
Quality of vocational training	50	54.2
Ratio of high-skill TVET occupations earnings to average wage	108	10.0
Ratio of medium-skill TVET occupations earnings to average wage	80	25.7
<b>TVET labour market</b>		
Efficiency of the labour market	10	10.7
Firms considered with inappropriately educated workforce (%)	70	57.0
Employment educational mismatch (%)	14	87.2
Proportion of skilled production workers	86	68.0
Unemployment rate with vocational education	85	30.0
Real TVET unemployment	11	91
Share of TVET occupations	10	83
Manufacturing employment (%)	34	65.1
Quality and infrastructure	10	76.0
Enrolment in vocational education, gender parity	67	63.0
Useable employment rate	26	80.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrolment	10	19.1
Government expenditure per tertiary student	43	24.8
Teaching staff compensation (% tertiary expenditure)	81	33.7
Enrolment	11	31
Enrolment in bachelor's or equivalent level (%)	11	43.0
Enrolment in master's, doctoral or equivalent (%)	21	62.1
Resources	10	19.1
Rap teacher ratio in tertiary education	18	68.1
Researchers in higher education (%)	40	50.7
<b>Learning environment</b>		
Timely and academic freedom	41	61.7
Teachers in tertiary education, gender parity	44	76.0
Labour mobility rate	44	27.1
Academic freedom	23	60.0
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Retention	11	63.1
Educational attainment rate, bachelor's or equivalent	1	909
Educational attainment rate, master's or equivalent	14	55.5
Educational attainment rate, doctoral or equivalent	22	49.0
Employment	10	66.6
Labour force participation rate with advanced education	21	83.1
Unemployment rate with advanced education	23	88.0
Impact	11	41.7
University tertiary enrollment in R&D	34	63.8
OECD indicators per 100 persons in higher education	68	39
<b>Government's contribution to innovation and economic growth</b>		
Impact	11	34
Quality and infrastructure	116	116
GDP (% GDP)	36	18.0
GERD per researcher	10	6.7
Researchers per thousand labour force	30	32.1
Tertiary graduates from STEM programmes (%)	91	37.0
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	41	18.0
GERD financed by business enterprises (%)	50	43.0
Researchers in business enterprises (%)	38	36.4
Firms that spend on R&D (%)	111	0.8
Quality and infrastructure	116	116
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	10	4.9
State of cluster development	18	43.0
<b>Outputs</b>		
Quality and infrastructure	116	116
Average documents per researcher	67	64.0
Citations per document	45	21.7
Patent applications (per 100 billion GDP)	54	65.7
Quality and infrastructure	116	116
Intellectual property receipts (% total trade)	10	5.8
Research design applications (per 100 billion GDP)	44	19
PCT applications (per 100 billion GDP)	41	64.4
Firms producing new goods and services (%)	78	36





# LITHUANIA

	Rank	Value
<b>Business environment</b>	31	82.2
Treatment applications (per 100 million GDP)	30	82.7
Cultural goods exports (% exports)	56	18.4
Printing and publishing output (% manufactured output)	80	22.9
<b>Energy</b>	44	60.5
<b>Finance</b>	35	81.1
Access to venture capital	39	15.9
Depth of innovative companies	24	82.1
ISO 9001 quality certificates (% GDP)	26	49.5
ISO 14001 environmental certificates (% GDP)	11	84.0
<b>Industry</b>	33	81.9
CERD forecast from abroad (%)	13	46.5
Joint ventures per strategic industry deals (% GDP)	54	12.6
Computer software spending (% GDP)	83	6.7
<b>International trade</b>	30	82.0
New business density per thousand population	44	60.5
Firms with new products/services (%)	84	53.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>23</b>	<b>81.3</b>
<b>Infrastructure</b>	22	80.8
<b>Coverage</b>	11	100
30MHz mobile network coverage (% population)	11	100
Secure Internet servers per 1 million population	17	41.1
Investment in telecommunication services (% GDP)	104	11.1
<b>Speed</b>	29	82.2
Mobile upload and download speeds	19	66.3
Fixed broadband upload and download speeds	12	40
Fixed broadband subscriptions (by speed) per hundred people	32	81.3
<b>Availability</b>	27	81.8
Fixed broadband latency (% QM per capita)	22	88.3
Mobile broadband basket (% QM per capita)	37	73.0
Internet and telephony competition	1	100
<b>Access</b>	27	80.2
<b>Subscribers</b>	16	80.3
Active mobile broadband subscriptions per hundred inhabitants	23	51.6
International Internet bandwidth per user	8	86.8
Households with Internet access at home (%)	82	82.8
<b>Skills and employment</b>	15	83.5
Individuals with standard ICT skills (%)	26	56.3
Tertiary graduates from ICT programmes (%)	85	26.9
ICT employment (%)	21	47.6
<b>Usage</b>	24	80.2
<b>Services</b>	10	73.5
Government online services	24	85.0
Fixed broadband Internet traffic per subscriber	104	7.8
Mobile broadband Internet traffic per subscriber	8	80.0
Internet users (%)	45	80.1
<b>Commerce</b>	10	81.7
ICT/FIT patent applications (per 100,000 GDP)	39	52.9
E-participation	83	73.0
Internet activities by individuals (%)	17	80.4
Trade in digitally deliverable services (% total trade)	113	23.0
<b>ECONOMY</b>	<b>28</b>	<b>80.2</b>
<b>Economic complexity/structure</b>	33	82.2
<b>Investment in innovation</b>	32	76.1
Overhead capital formation (% GDP)	82	46.7
Logistics performance	59	50.4
Transport productive capacity	85	32.0
Building quality control	22	86.7

	Rank	Value
<b>Business agility</b>	31	82.2
Ease of starting a business	31	83.5
Recovery recovery rate	85	43.8
Entrepreneurial employee activity rate	25	43.0
Growth of corporate transactions	1	100
<b>Corporate openness</b>	9	71.3
<b>Trade and investment</b>	13	70.1
Trade (% GDP)	16	89.7
High-technology trade (% total trade)	45	52.0
Market concentration	8	82.3
Market concentration	9	85.0
Product diversity	19	80.5
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	72	47.0
Data dynamics	1	100
<b>Financing and domestic value added</b>	<b>32</b>	<b>80.7</b>
<b>Financing and loans</b>	16	81.0
Domestic credit to private sector (% GDP)	86	13.7
MSME financing gap (% GDP)	104	7.8
Tax and contribution rate (% profit)	100	84.8
Bank nonperforming loans (%)	9	80.3
<b>Unmet needs index</b>	10	81
Medium- and high-tech activities value added	55	32.3
Industry and services value added (% GDP)	51	85.4
Labour underutilization rate	28	83.7
Output per worker	30	80.0
<b>ENABLING ENVIRONMENT</b>	<b>29</b>	<b>74.3</b>
<b>Governance</b>	<b>22</b>	<b>79.8</b>
<b>Political environment</b>	22	77.0
Peace and stability	25	73.5
View and accountability	28	83.0
Quality of institutions	27	81.4
Rule of law	29	81.7
Control of corruption	30	79.0
Government effectiveness	27	82.7
<b>Socio-economic</b>	<b>22</b>	<b>73</b>
<b>Gender equity</b>	41	73.6
Female-to-male ratio in parliament	62	36.2
Female-to-male labour force participation	44	83.2
Female-to-male ratio in internal wage	1	100
<b>Gender balance</b>	14	82.0
Social protection coverage (% population)	24	82.5
Adult literacy rate	4	89.8
Youth not in employment, education or training (%)	28	85.0
<b>Standard of living</b>	81	52.2
Poverty headcount ratio (% population)	57	71.5
GDP per capita	34	27.9
<b>Health and environment</b>	<b>23</b>	<b>70.4</b>
<b>Health</b>	40	81.0
Universal health coverage	65	75
Healthy life expectancy (years)	88	75.2
Under-five mortality rate	21	85.5
<b>Environmental performance</b>	58	83.0
Renewable energy consumption (%)	56	34.0
Household footprint per capita	100	88.0
Natural hazard exposure	0	84

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 12/154

**GKI SCORE** 67.3

**WORLD AVERAGE** 48.4

# LUXEMBOURG

## COUNTRY PERFORMANCE SUMMARY

Luxembourg is a leading performer in terms of its knowledge infrastructure. It ranks 12th out of 154 countries in the Global Knowledge Index 2021 and 12th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 69.715  
**Population** 625,976  
**HDI** 0.916

### AREAS OF STRENGTH

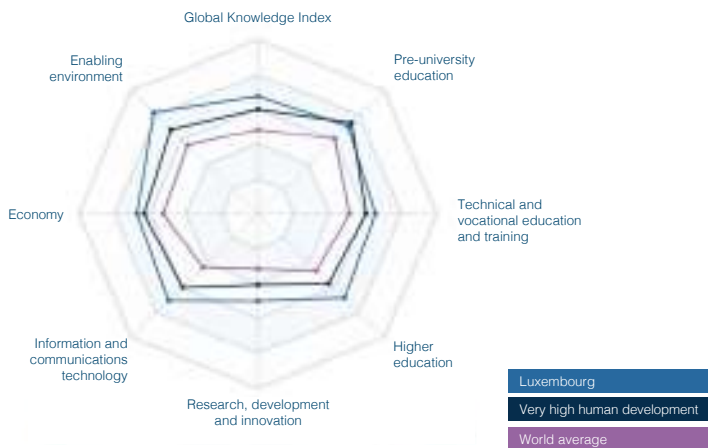
- + Gross intake ratio to the last grade of lower secondary education
- + Mobile broadband basket (% GNI per capita)
- + GDP per capita
- + Output per worker
- + Trade in digitally deliverable services (% total trade)

### AREAS OF IMPROVEMENT

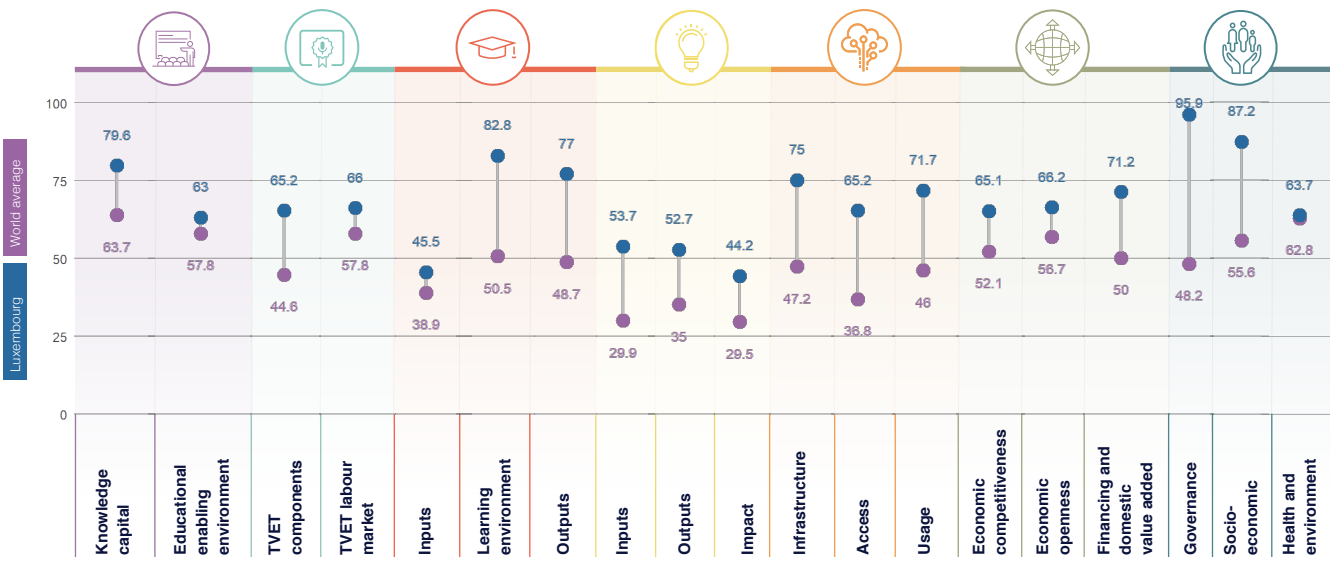
- Ratio of high-skill TVET occupations earnings to average wage
- Manufacturing employment (%)
- Investment in telecommunication services (% GDP)
- Foreign direct investment, net inflows (% GDP)
- Ecological footprint per capita

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	55	71.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	21	65.6
HIGHER EDUCATION	7	68.4
RESEARCH, DEVELOPMENT AND INNOVATION	10	50.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	7	70.6
ECONOMY	24	67.5
ENABLING ENVIRONMENT	7	82.3



## GKI PILLARS





# LUXEMBOURG

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	81	76.4
Enrollment	17	80.0
Net enrolment rate in primary education	23	90.1
Net enrolment rate in lower secondary education	49	86.8
Net enrolment rate in upper secondary education	71	70
Completion	27	82.0
Years of compulsory education in primary and secondary	42	76.0
Completion rate in upper secondary education	80	71.7
Success rate rate in the last grade of lower secondary education	1	100
Completion	40	84.0
Assessment of PISA/PIAAC students in math, science and reading	33	88.2
Learning-adjusted years of schooling	41	71.5
<b>Educational enabling environment</b>	73	83
Enrollment	71	11.0
Government expenditure on primary education (% GDP)	80	20
Government expenditure on secondary education (% GDP)	52	29.0
Government funding per primary student (% GDP per capita)	52	41
Government funding per secondary student (% GDP per capita)	69	33.0
Resources	100	100
Pupil-based teacher ratio in primary education	100	100
Pupil-based teacher ratio in secondary education	100	100
Schools with access to computers in primary education (%)	100	100
Schools with access to computers in secondary education (%)	100	100
Early learning	31	33.0
Class attendance rate in early childhood education	74	23.8
Proportion of children who are developmentally on track	100	100
Proportion of children with stimulating home learning environments	100	100
Pupil-based teacher ratio in preprimary education	100	100
Quality and infrastructure	61	63.0
Completion rate in upper secondary education, gender parity	21	81.0
Completion rate in upper secondary education, wealth parity	30	80.0
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	14	88.0
Commence training apprenticeship	10	10.1
Firms offering formal training (%)	4	85.1
Labour force with short-cycle tertiary education (%)	40	74.1
Participation rate in formal and non-formal education and training	18	81.1
TVET resources	10	10.1
Government expenditure on vocational education (%)	6	89.0
Share of students enrolled in secondary vocational programmes	18	52.0
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	37	41.0
Extent of staff training	8	75.1
Quality of vocational training	9	70.0
Ratio of high-skill TVET occupations earnings to average wage	100	10.0
Ratio of median-skill TVET occupations earnings to average wage	104	21.0
<b>TVET labour market</b>	64	80
Efficiency of the labour market	44	71.4
Firms considered with inequality educated workforce (%)	81	43.0
Employment educational mismatch (%)	6	80.0
Proportion of skilled production workers	30	85.0
Unemployment rate with vocational education	43	62.0
High TVET unemployment	100	11.0
Share of TVET occupations	60	51.7
Manufacturing employment (%)	143	10.4
Quality and infrastructure	7	84.0
Enrollment in vocational education, gender parity	12	80.0
Useful employment rate	12	84.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	28	41.0
Enrollment	15	84.0
Government expenditure per tertiary student	1	100
Teaching staff compensation (% tertiary expenditure)	81	8.7
Enrollment	80	10.0
Enrollment in bachelor's or equivalent level (%)	113	8.4
Enrollment in masters, doctoral or equivalent (%)	25	20
Resources	100	87.1
Pupil-teacher ratio in tertiary education	2	88.1
Research in higher education (%)	72	35
<b>Learning environment</b>	6	82.8
Timely and academic freedom	8	82.0
Teachers in tertiary education, gender parity	60	50.0
Labour mobility rate	1	100
Academic freedom	13	84.0
Quality and infrastructure	100	100
Class attendance rate in tertiary education, gender parity	100	100
Class attendance rate in tertiary education, wealth parity	100	100
Class attendance rate in tertiary education, location parity	100	100
<b>Outputs</b>	5	77
Efficiency	100	100
Educational attainment rate, bachelor's or equivalent	100	100
Educational attainment rate, master's or equivalent	100	100
Educational attainment rate, doctoral or equivalent	100	100
Employment	23	83.0
Labour force participation rate with advanced education	42	78.0
Unemployment rate with advanced education	42	87.0
Impact	9	33.0
University tertiary enrollment in FTE	6	88.8
OECD students per FTE personnel in higher education	12	71.0
<b>INNOVATION, RESEARCH AND DEVELOPMENT</b>		
Inputs	14	33.0
Government R&D expenditure	10	10.0
GDP (% GDP)	20	24.0
GERD per researcher	22	43.1
Researchers per thousand labour force	14	64
Tertiary graduates from STEM programmes (%)	62	35
Quality and infrastructure	100	10.0
GERD performed by business enterprises (%)	31	18.0
GERD financed by business enterprises (%)	24	81.0
Researchers in business enterprises (%)	28	83.4
Firms that spend on R&D (%)	14	85.0
Quality and infrastructure	8	84.0
High-skill employment (%)	100	100
Intellectual property payments (% total trade)	1	100
State of cluster development	18	88.0
<b>Outputs</b>	10	52.7
Government R&D expenditure	10	10.0
Average documents per researcher	31	85.0
Citations per document	18	41.0
Patent applications (per 100 billion GDP)	14	73.0
Quality and infrastructure	100	10.0
Intellectual property receipts (% total trade)	17	47.7
Research design applications (per 100 billion GDP)	12	38.0
PCT applications (per 100 billion GDP)	9	81.0
Firms producing new goods and services (%)	18	71.7





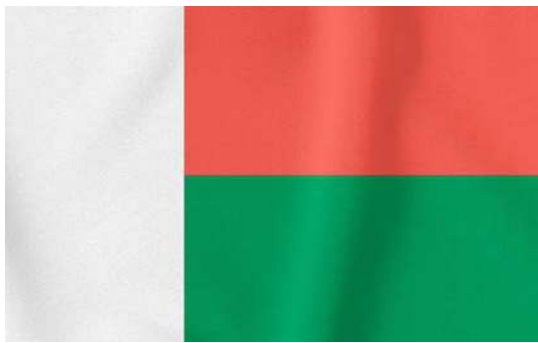
# LUXEMBOURG

	Rank	Value
<b>Business environment</b>		
Treatment applications (per 100 million GDP)	30	32.7
Cultural goods exports (% exports)	56	18.4
Printing and publishing output (% manufactured output)	88	22.9
<b>Energy</b>	44	65.9
<b>Finance</b>	35	61.1
Ratio of institutions' provisions	59	15.6
Depth of innovative companies	24	62.1
ISO 9001 quality certificates (% GDP)	26	49.5
ISO 14001 environmental certificates (% GDP)	11	64.0
<b>Industry</b>	33	61.0
CERD forecast from abroad (%)	13	46.5
Joint ventures per strategic industry deals (% GDP)	54	12.6
Computer software spending (% GDP)	83	6.7
<b>Internationalization</b>	39	60.0
New business density per thousand population	44	60.5
Firms with new products/services (%)	84	53.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>23</b>	<b>61.3</b>
<b>Infrastructure</b>	22	60.8
<b>Coverage</b>	11	100
3G/4G mobile network coverage (% population)	11	100
Secure Internet servers per 1 million population	17	41.1
Investment in telecommunication services (% GDP)	138	11.1
<b>Speed</b>	29	62.2
Mobile upload and download speeds	18	66.3
Fixed broadband upload and download speeds	12	40
Fixed broadband subscriptions (by speed) per hundred people	32	61.3
<b>Availability</b>	27	61.6
Fixed broadband latency (% QM per capita)	22	66.3
Mobile broadband basket (% QM per capita)	37	73.0
Internet and telephony competition	1	100
<b>Access</b>	27	60.2
<b>Subscribers</b>	16	60.3
Active mobile broadband subscriptions per hundred inhabitants	23	51.6
International Internet bandwidth per user	8	66.8
Households with Internet access at home (%)	82	62.8
<b>Skills and employment</b>	16	63.5
Individuals with standard ICT skills (%)	26	56.9
Tertiary graduates from ICT programmes (%)	85	26.9
ICT employment (%)	21	47.6
<b>Usage</b>	24	65.2
<b>Services</b>	10	71.5
Government online services	24	65.0
Fixed broadband Internet traffic per subscriber	194	7.8
Mobile broadband Internet traffic per subscriber	8	60.0
Internet users (%)	45	60.1
<b>Commerce</b>	10	61.7
ICT/FIT patent applications (per 100 million GDP)	39	52.0
E-participation	63	73.0
Internet activities by individuals (%)	17	60.4
Trade in digitally deliverable services (% total trade)	113	23.0
<b>ECONOMY</b>	<b>28</b>	<b>60.2</b>
<b>Economic complexity indexes</b>	33	52.2
<b>International investment</b>	32	54.1
Overhead capital formation (% GDP)	82	46.7
Logistics performance	59	50.4
Transport productive capacity	85	32.0
Building quality control	22	66.7

	Rank	Value
<b>Business agility</b>	31	62.2
Ease of starting a business	31	63.5
Recovery recovery time	85	43.0
Entrepreneurial employee activity rate	29	43.0
Growth of corporate transactions	1	100
<b>Corporate openness</b>	9	71.3
<b>Trade and investment</b>	13	70.1
Trade (% GDP)	16	69.7
High-technology trade (% total trade)	45	52.0
Market concentration	8	62.3
Market concentration	9	63.0
Product diversity	19	60.5
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	72	47.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	<b>32</b>	<b>61.7</b>
<b>Financing and costs</b>	16	61.2
Domestic credit to private sector (% GDP)	86	13.7
MSME financing gap (% GDP)	194	7.8
Tax and contribution rate (% profit)	100	64.8
Bank nonperforming loans (%)	9	60.3
<b>Unmet needs index</b>	10	61
Medium- and high-tech activities value added	55	32.3
Industry and services value added (% GDP)	31	65.4
Labour underutilization rate	28	63.7
Output per worker	30	65.0
<b>ENABLING ENVIRONMENT</b>	<b>29</b>	<b>74.3</b>
<b>Governance</b>	<b>22</b>	<b>79.8</b>
Political environment	22	77.0
Peace and stability	25	73.5
View and accountability	26	69.0
Quality of institutions	27	61.4
Rule of law	29	61.7
Control of corruption	30	79.0
Government effectiveness	27	62.7
<b>Socio-economic</b>	<b>22</b>	<b>73</b>
Gender equity	41	23.6
Female-to-male ratio in parliament	62	36.2
Female-to-male labour force participation	44	63.2
Female-to-male ratio in internal wage	1	100
<b>Social inclusion</b>	14	62.0
Social protection coverage (% population)	24	62.5
Adult literacy rate	4	69.0
Youth not in employment, education or training (%)	28	65.0
<b>Standard of living</b>	31	52.2
Poverty headcount ratio (% population)	57	71.5
GDP per capita	34	27.0
<b>Health and environment</b>	<b>23</b>	<b>70.4</b>
<b>Health</b>	40	62.0
Universal health coverage	65	75
Healthy life expectancy (years)	98	75.2
Under-five mortality rate	21	65.5
<b>Environmental performance</b>	58	63.0
Renewable energy consumption (%)	56	34.0
Household footprint per capita	188	66.0
Natural hazard exposure	0	84

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 140/154

**GKI SCORE** 32.2

**WORLD AVERAGE** 48.4

# MADAGASCAR

## KEY INDICATORS

GDP US\$ billions ..... 41.817  
 Population ..... 27,691,019  
 HDI ..... 0.528

## COUNTRY PERFORMANCE SUMMARY

Madagascar is a weak performer in terms of its knowledge infrastructure. It ranks 140th out of 154 countries in the Global Knowledge Index 2021 and 14th out of the 27 countries with low human development.

### AREAS OF STRENGTH

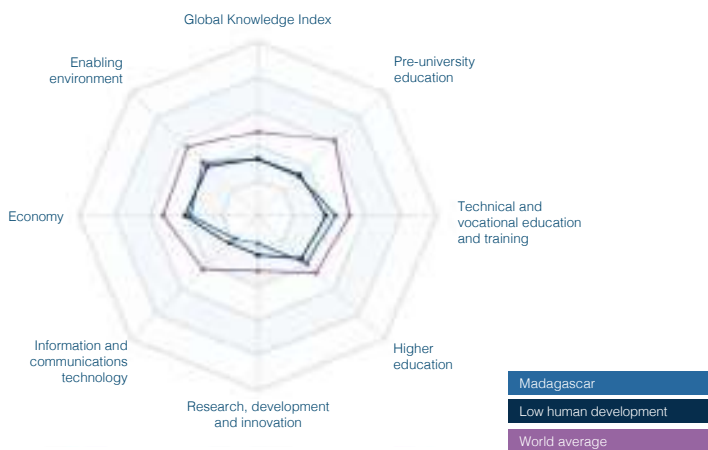
- + Gross attendance ratio for tertiary education, gender parity
- + Renewable energy consumption (%)
- + Female-to-male labour force participation
- + Youth not in employment, education or training (%)
- + Ecological footprint per capita

### AREAS OF IMPROVEMENT

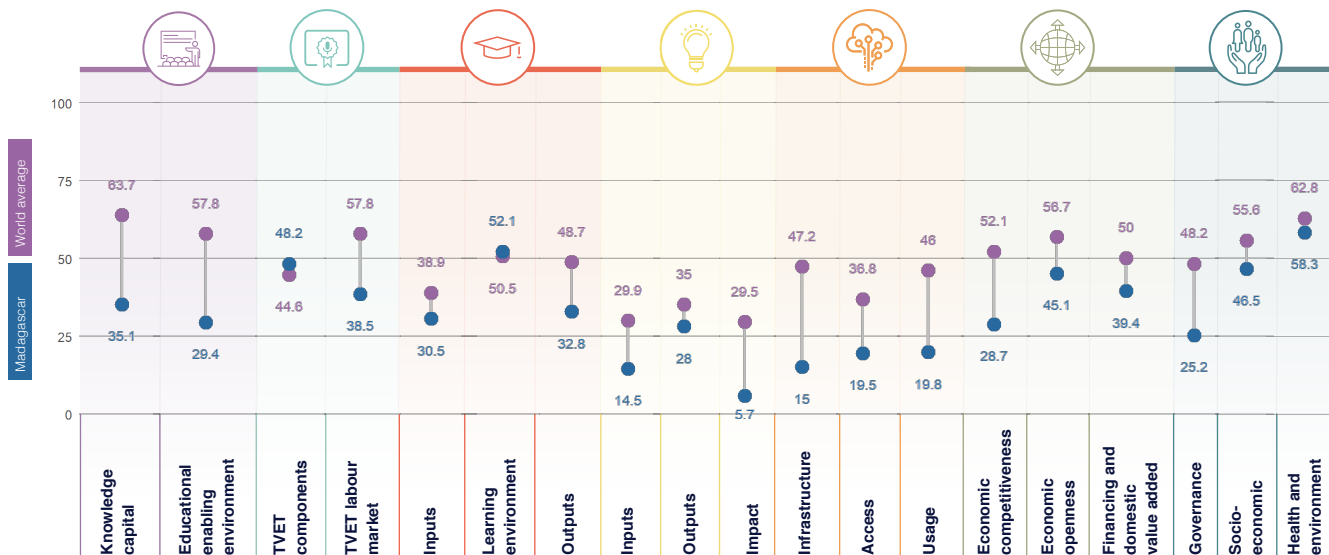
- Pupil-trained teacher ratio in secondary education
- GERD (% GDP)
- Extent of corporate transparency
- Poverty headcount ratio (% population)
- Universal health coverage

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	144	32.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	115	43.4
HIGHER EDUCATION	112	38.5
RESEARCH, DEVELOPMENT AND INNOVATION	149	16.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	149	18.1
ECONOMY	139	37.7
ENABLING ENVIRONMENT	119	43.3



## GKI PILLARS





# MADAGASCAR

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	128	23.1
Enrollment	119	39
Net enrolment rate in primary education	69	82.9
Net enrolment rate in lower secondary education	113	85.2
Net enrolment rate in upper secondary education	109	36
Completion	143	22.7
Years of compulsory education in primary and secondary	148	38.5
Completion rate in upper secondary education	127	9.7
Success rate rate in the last grade of lower secondary education	121	20.1
Completion	131	23.0
Assessment of 15-year-old students in math, science and reading	194	194
Learning-adjusted years of schooling	138	23.8
<b>Educational enabling environment</b>	<b>144</b>	<b>26.4</b>
Expenditure	139	11.9
Government expenditure on primary education (% GDP)	89	24.9
Government expenditure on secondary education (% GDP)	129	4.4
Government funding per primary student (% GDP per capita)	108	12.1
Government funding per secondary student (% GDP per capita)	118	4.1
Resources	123	3.1
Pupil-based teacher ratio in primary education	95	9
Pupil-based teacher ratio in secondary education	83	9
Schools with access to computers in primary education (%)	62	0.8
Schools with access to computers in secondary education (%)	89	17
Early learning	122	30.4
Class attendance rate in early childhood education	81	31.7
Proportion of children who see developmentally on track	49	49.7
Proportion of children with stimulating home learning environments	69	71
Pupil-based teacher ratio in preprimary education	72	56.5
Quality and infrastructure	91	61.5
Completion rate in upper secondary education, gender parity	23	84.7
Completion rate in upper secondary education, wealth parity	194	194
Completion rate in upper secondary education, location parity	86	32.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>97</b>	<b>40.3</b>
Companies training apprentices	11	42.9
Firms offering formal training (%)	119	14
Labour force with short-cycle tertiary education (%)	53	71.8
Participation rate in formal and non-formal education and training	164	164
TVET resources	131	10.1
Government expenditure on vocational education (%)	164	164
Share of students enrolled in secondary vocational programmes	114	4.2
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	61	49.7
Extent of staff training	129	41.3
Quality of vocational training	109	43.8
Ratio of high-skill TVET occupations earnings to average wage	74	70.6
Ratio of medium-skill TVET occupations earnings to average wage	59	42.4
<b>TVET labour market</b>	<b>121</b>	<b>38.8</b>
Efficiency of the labour market	71	61.4
Firms considered with inappropriately educated workforce (%)	29	81.8
Employment educational mismatch (%)	84	43.5
Proportion of skilled production workers	76	64.0
Unemployment rate with vocational education	33	86.2
Real TVET unemployment	108	74.9
Share of TVET occupations	109	14.4
Manufacturing employment (%)	127	15.4
Quality and infrastructure	106	31.0
Enrollment in vocational education, gender parity	89	83.0
Useable employment rate	145	11.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>108</b>	<b>30.8</b>
Expenditure	97	33.3
Government expenditure per tertiary student	103	5.1
Teaching staff compensation (% tertiary expenditure)	78	88.8
Enrollment	124	2.6
Enrollment in bachelor's or equivalent level (%)	124	2.2
Enrollment in masters, doctoral or equivalent (%)	112	3
Resources	99	69.9
Ratios/teacher ratio in tertiary education	114	52
Researchers in higher education (%)	36	81.1
<b>Learning environment</b>	<b>48</b>	<b>52.1</b>
<b>Quality and academic freedom</b>	<b>99</b>	<b>44</b>
Teachers in tertiary education, gender parity	84	21.7
Labour mobility rate	67	6.7
Academic freedom	79	12.5
<b>Quality and infrastructure</b>	<b>11</b>	<b>65.5</b>
Class attendance rate in tertiary education, gender parity	9	89.9
Class attendance rate in tertiary education, wealth parity	69	27.8
Class attendance rate in tertiary education, location parity	64	194
<b>Outputs</b>	<b>139</b>	<b>32.8</b>
<b>Attainment</b>	<b>91</b>	<b>3.3</b>
Educational attainment rate, bachelor's or equivalent	90	9
Educational attainment rate, master's or equivalent	68	0.4
Educational attainment rate, doctoral or equivalent	43	13.0
<b>Employment</b>	<b>91</b>	<b>35</b>
Labour force participation rate with advanced education	91	84.3
Unemployment rate with advanced education	83	75.0
<b>Impact</b>	<b>137</b>	<b>18.8</b>
University tertiary enrollment in R&D	108	32.9
CRIDE students per 100 personnel in higher education	87	7.3
<b>INNOVATION, SCIENCE AND TECHNOLOGY</b>		
<b>Inputs</b>	<b>108</b>	<b>14.3</b>
<b>Government R&amp;D expenditure</b>	<b>119</b>	<b>10.9</b>
GDP (% GDP)	122	9
GERD per researcher	106	9
Researchers per thousand labour force	102	0.2
Tertiary graduates from STEM programmes (%)	28	83.7
<b>Quality of innovation environment</b>	<b>109</b>	<b>10</b>
GERD performed by business enterprises (%)	164	164
GERD financed by business enterprises (%)	164	164
Researchers in business enterprises (%)	164	164
Firms that spend on R&D (%)	164	164
<b>Quality of business environment</b>	<b>109</b>	<b>10.2</b>
High-skilled employment (%)	85	3
Intellectual property payments (% total trade)	84	6.1
State of cluster development	106	28.1
<b>Outputs</b>	<b>102</b>	<b>35</b>
<b>Government R&amp;D expenditure</b>	<b>114</b>	<b>10.9</b>
Average documents per researcher	72	52
Citations per document	126	0.6
Patent applications (per 100 billion GDP)	108	10.9
<b>Quality of business environment</b>	<b>109</b>	<b>10.2</b>
Intellectual property receipts (% total trade)	82	1.7
Research design applications (per 100 billion GDP)	23	30.1
PCT applications (per 100 billion GDP)	114	34.5
Firms producing new goods and services (%)	64	194



# MADAGASCAR

	Rank	Value
<b>Business environment</b>	85	69.9
Trademark applications per 100 million GDP	35	46.1
Cultural goods exports (% exports)	85	7.4
Printing and publishing output (% manufactured output)	196	196
<b>Energy</b>	153	1.7
<b>Trade</b>	175	1.1
Access to investors' protection	107	4.8
Depth of innovative companies	115	42.0
ISO 9001 quality certificates (% GDP)	94	0.8
ISO 14001 environmental certificates (% GDP)	115	1
<b>Logistics</b>	170	1.5
CERD forecast from abroad (%)	106	196
Cost of letters per storage distance dealt (% GDP)	119	0.1
Computer software spending (% GDP)	112	1.8
<b>Government efficiency</b>	107	0.1
New business density per thousand population	104	0.5
Firms with one or more employees (%)	196	196
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	146	16.1
<b>Infrastructure</b>	132	16
<b>Coverage</b>	130	21.1
30MHz mobile network coverage (% population)	142	27.0
Secure Internet servers per 1 million population	143	0.4
Investment in telecommunication services (% GDP)	62	40.0
<b>Quality</b>	111	0.8
Mobile speed and download speeds	165	4.5
Fixed broadband upload and download speeds	47	16.2
Fixed broadband subscriptions (y speed) per hundred people	128	0.1
<b>Availability</b>	100	11.0
Fixed broadband bandwidth (% Gbps per capita)	148	27.0
Mobile broadband basket (% Gbps per capita)	149	12.1
Internet and telephone competition	100	0
<b>Access</b>	121	16.5
<b>Subscribers</b>	111	0.0
Active mobile-broadband subscriptions per fixed-line inhabitants	146	5.7
International Internet bandwidth per user	144	16.7
Households with Internet access at home (%)	102	11.1
<b>Skills and employment</b>	75	25.0
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	30	57.4
ICT employment (%)	122	1.1
<b>Usage</b>	149	10.0
<b>Services</b>	136	10.0
Government online services	144	25.0
Fixed broadband Internet traffic per subscriber	39	26.1
Mobile broadband Internet traffic per subscriber	119	7.2
Internet users (%)	142	10.0
<b>Commerce</b>	140	10
ICT/FIT patent applications (per 100,000 GDP)	196	19
E-participation	106	25.0
Internet activities by individuals (%)	196	19
Trade in digitally deliverable services (% total trade)	129	16.0
<b>ECONOMY</b>	134	37.7
<b>Economic complexity/structure</b>	104	23.7
<b>REGISTRATION</b>	141	11
Overhead capital formation (% GDP)	91	40.1
Logistics performance	129	34.7
Transport productive capacity	100	4.3
Building quality control	140	40

	Rank	Value
<b>Business agility</b>	146	16.1
Ease of starting a business	72	86.6
Recovery recovery rate	136	11.5
Entrepreneurial employee activity rate	77	0.8
Growth of corporate transactions	118	0
<b>Employee openness</b>	121	40.1
<b>Trust and development</b>	111	11.0
Trade (% GDP)	110	20.0
High-technology trade (% total trade)	120	20.0
Market concentration	89	7.1
Market concentration	80	60.0
Product diversity	110	11.0
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	45	40.0
Cost dynamics	89	45.0
<b>Financing and domestic value added</b>	122	26.4
<b>Financing and costs</b>	122	47.0
Domestic credit to private sector (% GDP)	102	4.9
IMRS financing gap (% GDP)	90	40.4
Tax and contribution rate (% profit)	87	83.2
Bank nonperforming loans (%)	80	67.0
Unmet loan demand	114	10.0
Medium- and high-tech activities value added	128	0.8
Industry and services value added (% GDP)	128	44.0
Labour underutilization rate	57	74.0
Output per worker	140	0.8
<b>ENABLING ENVIRONMENT</b>	119	40.3
<b>Governance</b>	121	25.2
Political environment	97	11.0
Peace and stability	100	25.2
Value and accountability	84	17.7
Quality of institutions	100	17
Rule of law	102	16.7
Control of corruption	101	17.0
Government effectiveness	128	13.0
<b>Socio-economic</b>	106	46.0
Gender equity	100	17.0
Female-to-male ratio in parliament	100	21.0
Female-to-male labour force participation	11	83.0
Female-to-male ratio in internal wage	119	19
Gender inequality	44	87.0
Social protection coverage (% population)	119	19
Adult literacy rate	86	70
Youth not in employment, education or training (%)	13	80.1
<b>Standard of living</b>	101	11.1
Poverty headcount ratio (% population)	128	0
GDP per capita	199	11.7
<b>Health and environment</b>	118	26.3
Health	101	11.0
Universal health coverage	101	20
Healthy life expectancy (years)	129	42.0
Under-five mortality rate	120	57.0
Environmental performance	80	11.1
Renewable energy consumption (%)	10	84.0
Household footprint per capita	13	87.0
Natural hazard exposure	108	30

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 117/154

**GKI SCORE** 39

**WORLD AVERAGE** 48.4

# MALAWI

## COUNTRY PERFORMANCE SUMMARY

Malawi is a modest performer in terms of its knowledge infrastructure. It ranks 117th out of 154 countries in the Global Knowledge Index 2021 and 3rd out of the 27 countries with low human development.

**KEY INDICATORS**

GDP US\$ billions	20.401
Population	19,129,955
HDI	0.483

### AREAS OF STRENGTH

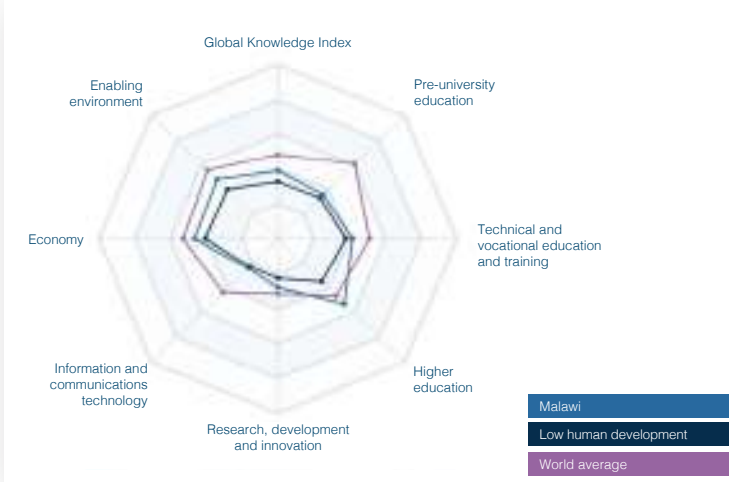
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Unemployment rate with advanced education
- + Unemployment rate with vocational education
- + Ecological footprint per capita
- + Female-to-male labour force participation

### AREAS OF IMPROVEMENT

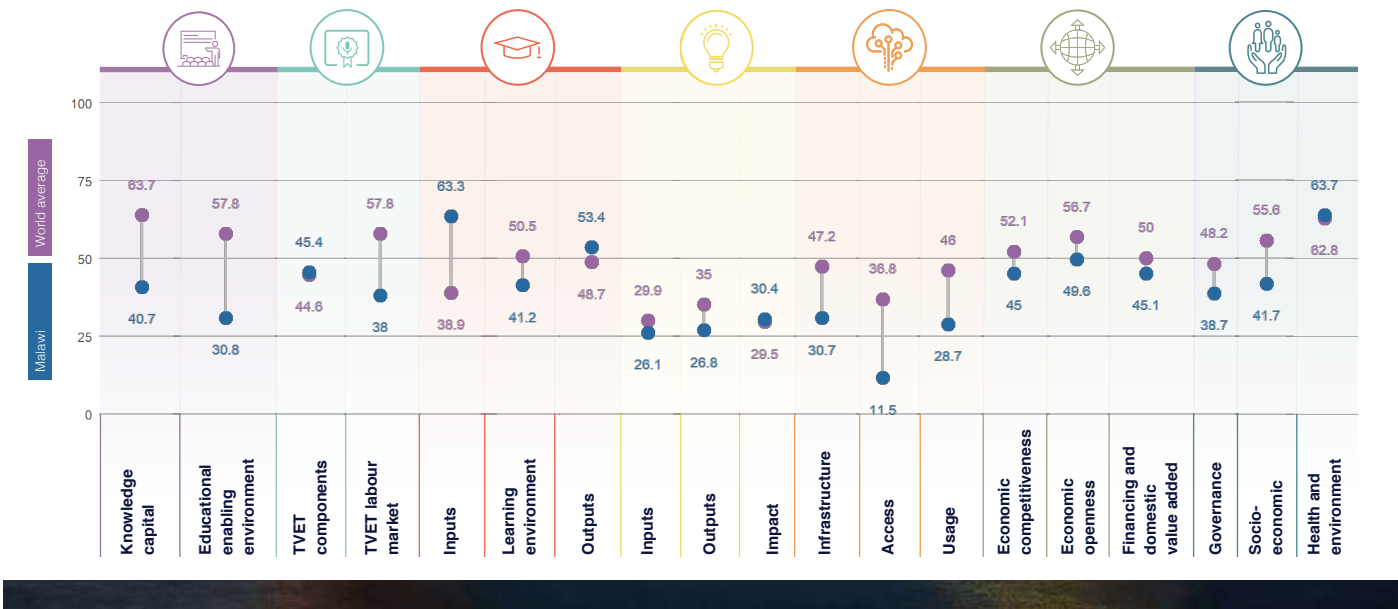
- Mobile broadband basket (% GNI per capita)
- GDP per capita
- Output per worker
- Fixed-broadband subscriptions by speed per hundred people
- Pupil-trained teacher ratio in secondary education

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	138	35.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	125	41.7
HIGHER EDUCATION	43	52.6
RESEARCH, DEVELOPMENT AND INNOVATION	92	27.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	134	23.6
ECONOMY	104	46.6
ENABLING ENVIRONMENT	104	48



## GKI PILLARS







# MALAWI

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	121	80.7
Enrolment	114	82.0
Net enrolment rate in primary education	63	84.3
Net enrolment rate in lower secondary education	100	74.1
Net enrolment rate in upper secondary education	109	30
Completion	141	25.1
Years of compulsory education in primary and secondary	119	81.5
Completion rate in upper secondary education	121	34
Success rate rate in the last grade of lower secondary education	149	88
Completion	111	31.1
Assessment of Grade 6 students in math, science and reading	106	104
Learning-adjusted years of schooling	118	21.1
<b>Educational enabling environment</b>		
Expenditure	62	23.0
Government expenditure on primary education (% GDP)	20	52
Government expenditure on secondary education (% GDP)	77	24.3
Government funding per primary student (% GDP per capita)	107	19.9
Government funding per secondary student (% GDP per capita)	33	39.0
Resources	102	10.1
Pupil-based teacher ratio in primary education	82	22.0
Pupil-based teacher ratio in secondary education	83	9
Schools with access to computers in primary education (%)	84	8.8
Schools with access to computers in secondary education (%)	106	104
Early learning	111	20.4
Class attendance rate in early childhood education	29	86.6
Proportion of children who are developmentally on track	50	35.1
Proportion of children with stimulating home learning environments	81	16.4
Pupil-based teacher ratio in preprimary education	106	104
Quality and infrastructure	100	23.7
Completion rate in upper secondary education, gender parity	83	84.0
Completion rate in upper secondary education, wealth parity	101	8.3
Completion rate in upper secondary education, location parity	100	27.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	101	34.0
Firms offering formal training (%)	57	40.1
Labour force with short-cycle tertiary education (%)	71	81.7
Participation rate in formal and non-formal education and training	86	0.8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	73	2.3
Share of students enrolled in secondary vocational programmes	108	104
Share of students enrolled in postsecondary vocational programmes	1	109
<b>TVET quality and infrastructure</b>		
Extent of staff training	110	42.6
Quality of vocational training	112	41.0
Ratio of high-skil TVET occupations earnings to average wage	89	18.1
Ratio of medium-skil TVET occupations earnings to average wage	1	109
<b>TVET labour market</b>		
Efficiency of the labour market	67	11.4
Firms considered with inappropriately educated workforce (%)	85	76.1
Employment educational mismatch (%)	108	104
Proportion of skilled production workers	100	21.6
Unemployment rate with vocational education	9	81.0
Real TVET unemployment	100	10.0
Share of TVET occupations	144	12.2
Manufacturing employment (%)	143	9.8
<b>Quality and infrastructure</b>		
Enrolment in vocational education, gender parity	106	104
Useable employment rate	116	26.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	20	49.0
Government expenditure per tertiary student	22	45.0
Teaching staff compensation (% tertiary expenditure)	106	104
<b>Enrolment</b>		
Enrolment in bachelor's or equivalent level (%)	106	104
Enrolment in masters, doctoral or equivalent (%)	106	104
<b>Resources</b>		
Rapit teacher ratio in tertiary education	45	89.0
Researchers in higher education (%)	106	104
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	100	24.0
Labour mobility rate	106	104
Academic freedom	71	37.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	68	31.1
Class attendance rate in tertiary education, wealth parity	81	6.1
Class attendance rate in tertiary education, location parity	70	1.1
<b>Outputs</b>		
<b>Enrolment</b>		
Educational attainment rate, bachelor's or equivalent	106	104
Educational attainment rate, master's or equivalent	106	104
Educational attainment rate, doctoral or equivalent	106	104
<b>Employment</b>		
Labour force participation rate with advanced education	100	58.7
Unemployment rate with advanced education	13	84.0
<b>Impact</b>		
University tertiary enrollment in R&D	113	38
CRIDE students per 1000 personnel in higher education	106	104
<b>Government's contribution to economic growth</b>		
<b>Inputs</b>		
Government expenditure	102	24.7
<b>Resources</b>		
GDP (% GDP)	106	104
GERD per researcher	106	104
Researchers per thousand labour force	106	104
Tertiary graduates from STEM programmes (%)	106	104
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	106	104
GERD financed by business enterprises (%)	106	104
Researchers in business enterprises (%)	106	104
Firms that spend on R&D (%)	38	27.8
<b>Quality and infrastructure</b>		
High-skilled employment (%)	87	6.1
Intellectual property payments (% total trade)	101	6.1
State of cluster development	117	35.0
<b>Outputs</b>		
<b>Government's contribution to economic growth</b>		
Average documents per researcher	106	104
Citations per document	118	14.6
Patent applications (per 100 billion GDP)	106	104
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	106	104
Research and development expenditure (per 100 billion GDP)	106	104
PCT applications (per 100 billion GDP)	85	43.0
Firms producing new goods and services (%)	27	88.0



# MALAWI

	Rank	Value
<b>Consumer Innovation Adoption</b>	81	22.2
Treatment applications per 100 million GDP	116	116
Cultural goods exports (% exports)	125	11.8
Printing and publishing output (% manufactured output)	25	43.0
<b>Finance</b>	75	36.3
<b>Banking</b>	111	11
Access to institutions' provisions	85	5.3
Depth of innovative companies	85	45.3
ISO 9001 quality certificates (% GDP)	108	4.4
ISO 14001 environmental certificates (% GDP)	131	1.1
<b>Insurance</b>	91	10.5
CERD received from abroad (%)	116	116
Joint ventures per strategic industry deals (% GDP)	32	34.5
Computer software spending (% GDP)	100	2.3
<b>Government Innovation</b>	91	10.5
New business density per thousand population	116	116
Firms with new products/services (%)	82	58.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	104	23.9
<b>Infrastructure</b>	128	20.2
<b>Coverage</b>	111	32.1
30MHz mobile network coverage (% population)	87	83.2
Secure Internet servers per 1 million population	158	0.8
Investment in telecommunication services (% GDP)	59	32
<b>Quality</b>	111	1.1
Mobile upload and download speeds	85	10
Fixed broadband upload and download speeds	100	2.8
Fixed broadband subscriptions (y speed) per hundred people	133	9
<b>Availability</b>	108	41.0
Fixed broadband basket (% GNI per capita)	111	29.1
Mobile broadband basket (% GNI per capita)	105	0.2
Internet and telephony competition	1	100
<b>Access</b>	124	11.0
<b>Subscriptions</b>	111	11.0
Active mobile-broadband subscriptions per hundred inhabitants	121	16.8
International Internet bandwidth per user	148	0.4
Households with Internet access at home (%)	138	10.2
<b>Skills and employment</b>	116	11.0
Individuals with standard ICT skills (%)	116	11.0
Tertiary graduates from ICT programmes (%)	116	11.0
ICT employment (%)	106	11.0
<b>Usage</b>	127	26.2
<b>Services</b>	106	11
Government online services	127	42.4
Fixed broadband internet traffic per subscription	85	1.4
Mobile broadband internet traffic per subscription	118	1.4
Internet users (%)	145	50.0
<b>Commerce</b>	91	11.0
eTPU/T purchase applications (per 100,000 GDP)	53	47.3
e-participation	118	47.3
Internet activities by individuals (%)	116	11.0
Trade in digitally deliverable services (% total trade)	70	40.0
<b>ECONOMY</b>	104	46.3
<b>Economic Competitiveness</b>	103	40
<b>Infrastructure Investment</b>	120	22.2
Overhead capital formation (% GDP)	116	116
Logistics performance	95	38.6
Transport productive capacity	138	14.0
Building quality control	112	82.0

	Rank	Value
<b>Business Agility</b>	95	50.7
Time of starting a business	139	37.0
Recovery recovery time	133	18.0
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	79	57.1
<b>Business operations</b>	88	46.8
Trade and investment	31	61.1
Trade (% GDP)	116	116
High-technology trade (% total trade)	27	56.0
Market concentration	100	48.7
Market concentration	41	82.1
Product diversity	107	31.1
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	124	33
Data dynamics	89	59
<b>Financing and domestic value added</b>	144	45.1
<b>Financing and credit</b>	91	60
Domestic credit to private sector (% GDP)	142	2.8
MSME financing gap (% GDP)	11	80.0
Tax and contribution rate (% profit)	82	75
Bank nonperforming loans (%)	80	37.0
Unmet loan demand	100	31.2
Medium- and high-tech activities value added	101	15.1
Industry and services value added (% GDP)	100	47.7
Labour underutilization rate	88	26.7
Output per worker	102	0.3
<b>ENABLING ENVIRONMENT</b>	104	81
<b>Governance</b>	82	30.2
<b>Political environment</b>	75	43.0
Peace and stability	84	45.1
View and accountability	79	45.4
Quality of institutions	97	34.0
Rule of law	89	44.7
Control of corruption	81	32.4
Government effectiveness	100	16.7
<b>Socio-economic</b>	122	41.7
<b>Gender equity</b>	100	24.0
Female-to-male ratio in parliament	82	20.7
Female-to-male labour force participation	15	89.3
Female-to-male ratio in internal wage	116	11.0
Gender inequality	112	21.0
Social protection coverage (% population)	104	10
Adult literacy rate	100	61.0
Youth not in employment, education or training (%)	31	84.0
<b>Standard of living</b>	138	12.8
Poverty headcount ratio (% population)	112	27.4
GDP per capita	101	0.2
<b>Health and environment</b>	75	60.2
<b>Health</b>	102	61.0
Universal health coverage	100	40
Healthy life expectancy (years)	139	42.0
Under-five mortality rate	115	85.0
<b>Environmental performance</b>	91	25.0
Renewable energy consumption (%)	21	70
Household footprint per capita	12	81.0
Natural hazard exposure	92	54

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# MALAYSIA

## KEY INDICATORS

GDP US\$ billions	855.601
Population	32,365,998
HDI	0.81

**GKI RANK** 51/154

**GKI SCORE** 53.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Malaysia is a strong performer in terms of its knowledge infrastructure. It ranks 51st out of 154 countries in the Global Knowledge Index 2021 and 48th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

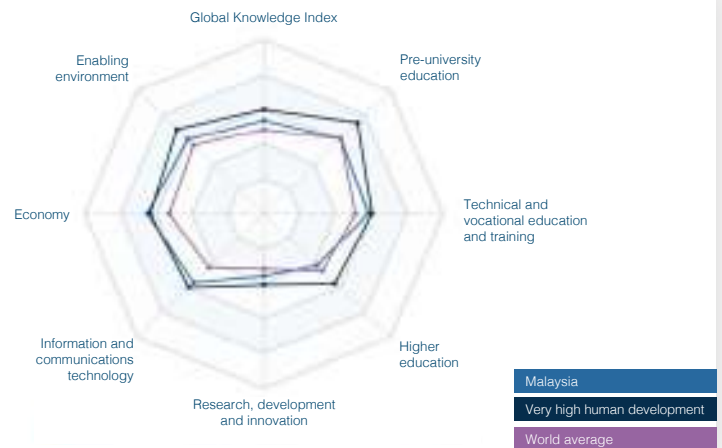
- + Tertiary graduates from STEM programmes (%)
- + High-technology trade (% total trade)
- + Growth of innovative companies
- + State of cluster development
- + Extent of staff training

### AREAS OF IMPROVEMENT

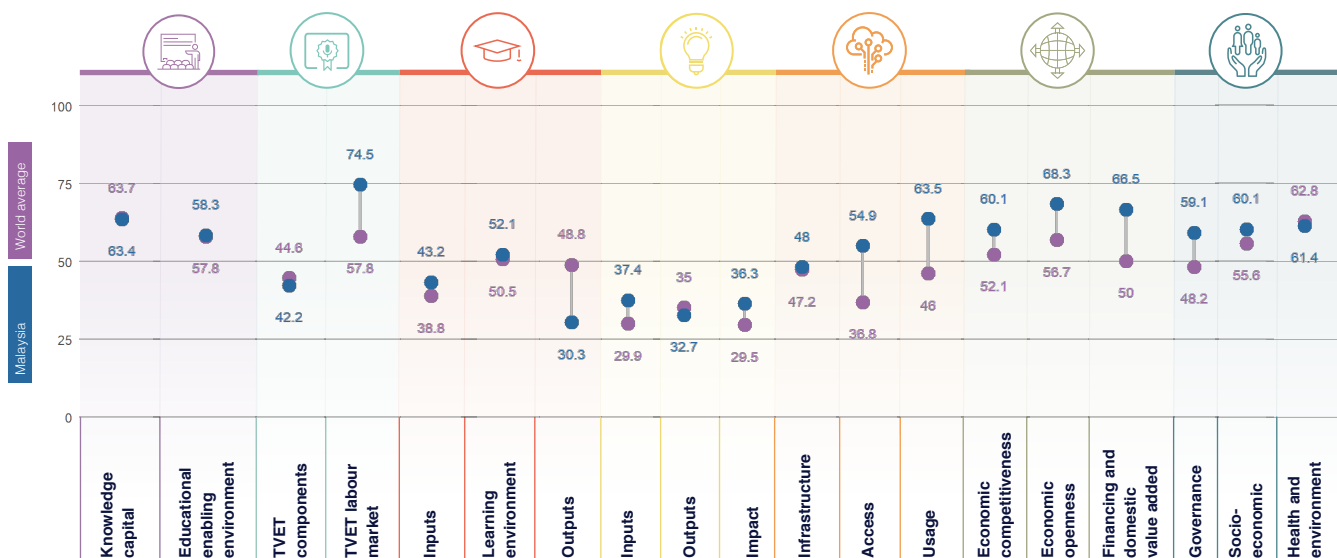
- Share of students enrolled in post-secondary vocational programmes
- Years of compulsory education in primary and secondary
- Ratio of medium-skill TVET occupations earnings to average wage
- Proportion of children with stimulating home learning environment
- Firms producing new goods and services (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	91	60.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	44	58.3
HIGHER EDUCATION	93	41.9
RESEARCH, DEVELOPMENT AND INNOVATION	50	35.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	42	55.5
ECONOMY	29	65
ENABLING ENVIRONMENT	52	60.2



## GKI PILLARS







# MALAYSIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	63.4
Enrolment	50	75.1
Net enrolment rate in primary education	93	95.7
Net enrolment rate in lower secondary education	87	85.2
Net enrolment rate in upper secondary education	100	98.2
Completion	100	90
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	69	85.2
Success rate rate in the last grade of lower secondary education	79	88.7
Completion	91	91.3
Assessment of TIMSS/PIAAC students in math, science and reading	46	28.6
Learning-adjusted years of schooling	55	83
<b>Educational enabling environment</b>		
Expenditure	61	91
Government expenditure on primary education (% GDP)	62	34.5
Government expenditure on secondary education (% GDP)	45	23.0
Government funding per primary student (% GDP per capita)	82	17.9
Government funding per secondary student (% GDP per capita)	62	20.6
Resources	17	61.3
Pupil-based teacher ratio in primary education	11	85.0
Pupil-based teacher ratio in secondary education	20	82
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	60	25.1
Early learning	75	51.1
Class attendance rate in early childhood education	9	78.0
Proportion of children who are developmentally on track	100	100
Proportion of children with stimulating home learning environments	89	10.9
Pupil-based teacher ratio in preprimary education	32	88.7
Quality and infrastructure	100	100
Completion rate in upper secondary education, gender parity	100	100
Completion rate in upper secondary education, wealth parity	100	100
Completion rate in upper secondary education, location parity	100	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	99	71.4
Firms offering formal training (%)	100	21.5
Labour force with short-cycle tertiary education (%)	25	81.0
Participation rate in formal and non-formal education and training	100	100
TVET enrolment	100	23.0
Government expenditure on vocational education (%)	71	4.2
Share of students enrolled in secondary vocational programmes	71	16.4
Share of students enrolled in postsecondary vocational programmes	79	81.8
TVET quality and infrastructure	99	49.0
Extent of staff training	8	71
Quality of vocational training	12	85.1
Ratio of high-skill TVET occupations earnings to average wage	84	23.0
Ratio of medium-skill TVET occupations earnings to average wage	119	24.0
<b>TVET labour market</b>		
Efficiency of the labour market	61	81
Firms considered with inappropriately educated workforce (%)	89	78.6
Employment educational mismatch (%)	100	100
Proportion of skilled production workers	91	82
Unemployment rate with vocational education	22	86.4
Real TVET unemployment	99	91.2
Share of TVET occupations	39	80
Manufacturing employment (%)	29	85.4
Quality and infrastructure	99	76.4
Enrolment in vocational education, gender parity	85	81.0
Useable employment rate	87	74.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	87	33.7
Government expenditure per tertiary student	41	25.0
Teaching staff compensation (% tertiary expenditure)	88	41.8
Enrolment	74	11.0
Enrolment in bachelor's or equivalent level (%)	89	17.0
Enrolment in masters, doctoral or equivalent (%)	59	17.0
Resources	27	78.9
Rat teacher ratio in tertiary education	63	75.8
Researchers in higher education (%)	15	81.1
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	33	80.0
Labour mobility rate	39	23.7
Academic freedom	106	49.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	100	100
Class attendance rate in tertiary education, wealth parity	100	100
Class attendance rate in tertiary education, location parity	100	100
<b>Outputs</b>		
Attainment	76	16.0
Educational attainment rate, bachelor's or equivalent	87	30.0
Educational attainment rate, master's or equivalent	65	6
Educational attainment rate, doctoral or equivalent	90	12.7
Employment	100	100
Labour force participation rate with advanced education	100	100
Unemployment rate with advanced education	100	100
Innovation	57	41.1
University tertiary collaboration in R&D	14	88.8
CRISIP documents per 100 personnel in higher education	78	19.0
<b>Government's contribution to economic growth</b>		
Growth	99	17.4
Green GDP contribution	99	21.2
GDP (% GDP)	34	20.0
GERD per researcher	47	27.6
Researchers per thousand labour force	36	28.0
Tertiary graduate from STEM programmes (%)	9	72.8
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	55	12.6
GERD financed by business enterprises (%)	49	47.3
Researchers in business enterprises (%)	98	19
Firms that spend on R&D (%)	88	20.4
Quality of research innovation	99	89.0
High-skill employment (%)	100	100
Intellectual property payments (% total trade)	54	30
State of cluster development	7	89.0
<b>Science</b>		
Government R&D expenditure	99	91.1
Average documents per researcher	69	86.0
Citations per document	126	12.0
Patent applications (per 100 billion GDP)	80	83.0
<b>Government's contribution to services</b>		
Intellectual property receipts (% total trade)	54	11.2
Research design applications (per 100 billion GDP)	78	4
PCT applications (per 100 billion GDP)	40	81.2
Firms producing new goods and services (%)	129	2.6





# MALAYSIA

	Rank	Value
<b>Business environment</b>	41	80.0
Treatment applications (per 100 million GDP)	89	14.4
Cultural goods exports (% exports)	18	52.5
Printing and publishing output (% manufactured output)	73	10.0
<b>Energy</b>	44	76.0
<b>Finance</b>	35	82.0
Access to investors' protection	38	80.3
Depth of innovative companies	6	83.0
ISO 9001 quality certificates (% GDP)	38	45.1
ISO 14001 environmental certificates (% GDP)	32	24
<b>Infrastructure</b>	37	77
CERD freedom from abuse (%)	67	10.4
Cost of contracts per strategic contract deals (% GDP)	25	30.6
Computer software spending (% GDP)	32	27.0
<b>Internationalization</b>	35	82.0
New business density per thousand population	37	11.7
Firms with new products/services (%)	23	35.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>42</b>	<b>83.5</b>
<b>Infrastructure</b>	88	40
<b>Coverage</b>	88	41.0
30MHz mobile network coverage (% population)	70	61.0
Secure Internet servers per 1 million population	48	16.3
Investment in telecommunication services (% GDP)	72	30
<b>Quality</b>	87	24
Mobile upload and download speeds	81	20.6
Fixed broadband upload and download speeds	24	31.2
Fixed broadband subscriptions (by speed) per hundred people	74	20.9
<b>Accessibility</b>	87	73.0
Fixed broadband bandwidth (% Gbps per capita)	67	76.2
Mobile broadband basket (% Gbps per capita)	60	80.0
Internet and telephony competition	116	116
<b>Access</b>	33	84.0
<b>Subscribers</b>	87	87
Active mobile-broadband subscriptions per fixed-line inhabitants	92	52.9
International Internet bandwidth per user	17	86.4
Households with Internet access at home (%)	23	81.0
<b>Skills and employment</b>	41	82.0
Individuals with standard ICT skills (%)	23	56.9
Tertiary graduates from ICT programmes (%)	21	49.7
ICT employment (%)	80	10.4
<b>Usage</b>	27	85.0
<b>Services</b>	88	10.4
Government online services	24	85.0
Fixed broadband Internet traffic per subscriber	21	21.7
Mobile broadband Internet traffic per subscriber	9	47.6
Internet users (%)	27	80
<b>Commerce</b>	34	83.7
ICT/FIT patent applications (per 100,000 GDP)	30	55.1
E-participation	25	85.7
Internet activities by individuals (%)	86	84.0
Trade in digitally deliverable services (% total trade)	52	40.4
<b>ECONOMY</b>	<b>31</b>	<b>80</b>
<b>Economic complexity/structure</b>	48	80.0
<b>Infrastructure investment</b>	33	82.0
Overhead capital formation (% GDP)	81	48.0
Logistics performance	38	55.0
Transport productive capacity	75	20
Building quality control	22	86.7

	Rank	Value
<b>Business agility</b>	41	80.0
Cost of starting a business	100	83.0
Recovery recovery rate	16	87.0
Entrepreneurial employee activity rate	84	10.7
Growth of corporate transactions	13	85.7
<b>Corporate openness</b>	23	88.0
<b>Trade and investment</b>	11	77.0
Trade (% GDP)	25	49.0
High-technology trade (% total trade)	5	80.0
Market concentration	88	76.6
Market concentration	66	81.0
<b>Product openness</b>	10	81.0
China's financial openness	84	41.7
Foreign direct investment, net inflows (% GDP)	75	40.0
Cost dynamics	20	100
<b>Financing and domestic value added</b>	<b>15</b>	<b>85.0</b>
<b>Financing and costs</b>	12	77.0
Domestic credit to private sector (% GDP)	10	81.0
IMRS financing gap (% GDP)	12	86.7
Tax and contribution rate (% profit)	88	88.0
Bank nonperforming loans (%)	80	84.0
<b>Unmet needs index</b>	84	81.1
Medium- and high-tech activities value added	26	51.0
Industry and services value added (% GDP)	23	70.0
Labour underutilization rate	22	84.4
Output per worker	40	34
<b>ENABLING ENVIRONMENT</b>	<b>52</b>	<b>80.0</b>
<b>Governance</b>	53	80.1
<b>Political environment</b>	71	43.0
Peace and stability	65	50.0
View and accountability	80	40.1
Quality of institutions	59	72.0
Rule of law	38	70.1
Control of corruption	52	62.0
Government effectiveness	28	80.0
<b>Socio-economic</b>	<b>83</b>	<b>80.1</b>
<b>Gender equity</b>	100	50.0
Female-to-male ratio in parliament	102	17.0
Female-to-male labour force participation	111	80.0
Female-to-male ratio in internal wage	85	80.1
<b>Gender equality</b>	76	80.0
Social protection coverage (% population)	95	25.0
Adult literacy rate	98	80.0
Youth not in employment, education or training (%)	48	70.0
<b>Standard of living</b>	21	80.0
Poverty headcount ratio (% population)	12	80.0
GDP per capita	44	23.0
<b>Health and environment</b>	<b>98</b>	<b>81.4</b>
<b>Health</b>	81	76.7
Universal health coverage	65	75
Healthy life expectancy (years)	73	71.0
Under-five mortality rate	58	84.0
<b>Environmental performance</b>	100	80.0
Renewable energy consumption (%)	101	50
Household footprint per capita	100	70.0
Natural hazard exposure	100	51

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 149/154

**GKI SCORE** 28.7

**WORLD AVERAGE** 48.4

# MALI

## COUNTRY PERFORMANCE SUMMARY

Mali is a weak performer in terms of its knowledge infrastructure. It ranks 149th out of 154 countries in the Global Knowledge Index 2021 and 22nd out of the 27 countries with low human development.

### KEY INDICATORS

**GDP** US\$ billions ..... 44.892  
**Population** ..... 20,250,834  
**HDI** ..... 0.434

### AREAS OF STRENGTH

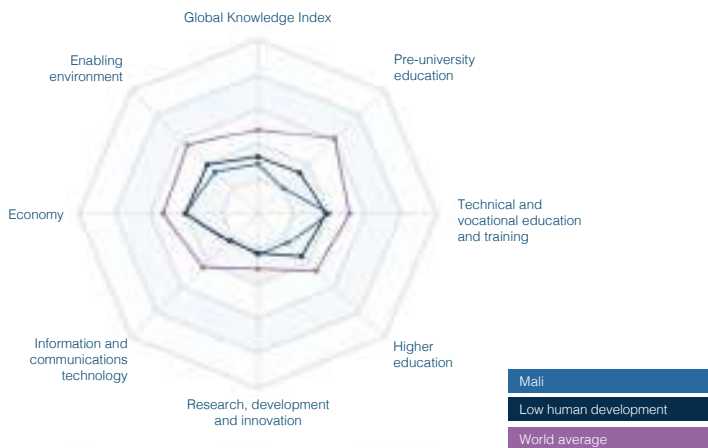
- + MSME financing gap (% GDP)
- + GERD financed from abroad (%)
- + Citable documents per R&D personnel in higher education
- + Firms with new product/service (%)
- + Investment in telecommunication services (% GDP)

### AREAS OF IMPROVEMENT

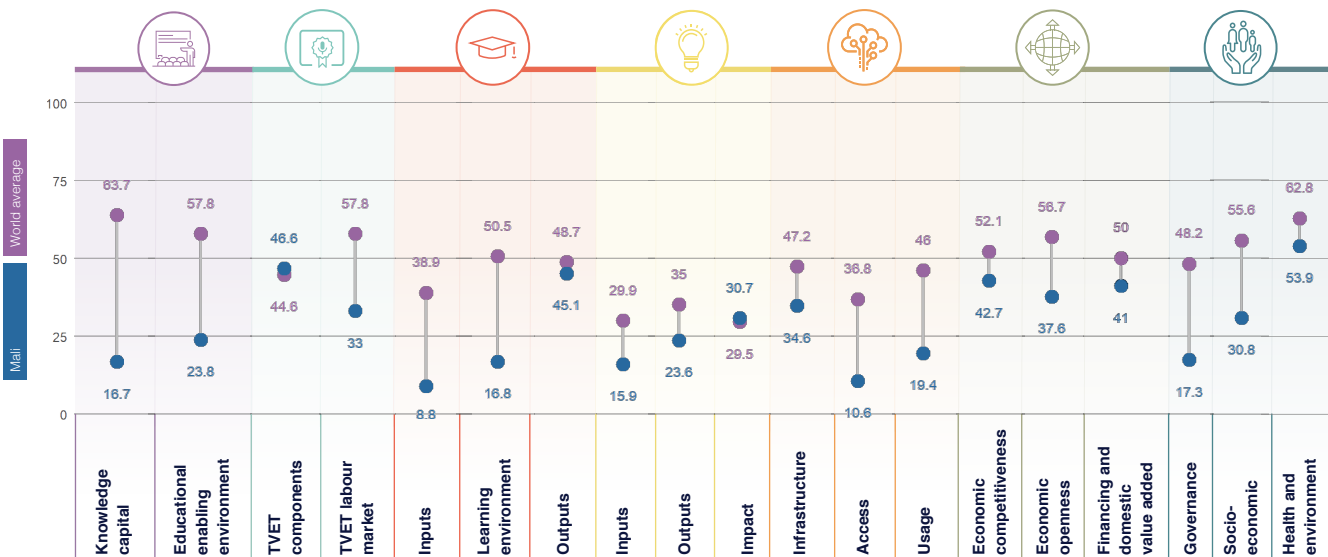
- Net enrolment rate in primary education
- Researchers in higher education (%)
- High-skilled employment (%)
- Intellectual property receipts (% total trade)
- Fixed broadband Internet traffic per subscription

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	152	20.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	129	39.8
HIGHER EDUCATION	152	23.6
RESEARCH, DEVELOPMENT AND INNOVATION	115	23.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	144	21.5
ECONOMY	132	40.4
ENABLING ENVIRONMENT	148	34



## GKI PILLARS



	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	182	16.7
Enrollment	144	15.1
Net enrolment rate in primary education	144	8
Net enrolment rate in lower secondary education	128	25.5
Net enrolment rate in upper secondary education	101	12.8
Completion	134	11.4
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	117	10.7
Success rate rate in the last grade of lower secondary education	128	14.4
Completion	147	5.8
Assessment of 15-year-old students in math, science and reading	194	194
Learning-adjusted years of schooling	147	5.8
<b>Educational enabling environment</b>		
Expenditure	77	32.1
Government expenditure on primary education (% GDP)	87	34.6
Government expenditure on secondary education (% GDP)	87	22
Government funding per primary student (% GDP per capita)	85	26
Government funding per secondary student (% GDP per capita)	26	42.7
Resources	133	3.1
Pupil-based teacher ratio in primary education	95	4.1
Pupil-based teacher ratio in secondary education	194	194
Schools with access to computers in primary education (%)	194	194
Schools with access to computers in secondary education (%)	194	194
Early learning	103	30.0
Class attendance rate in early childhood education	129	6.1
Proportion of children who are developmentally on track	52	39.2
Proportion of children with stimulating home learning environments	41	49.4
Pupil-based teacher ratio in preprimary education	75	31.9
Quality and infrastructure	101	25.5
Completion rate in upper secondary education, gender parity	118	60.0
Completion rate in upper secondary education, wealth parity	114	3.8
Completion rate in upper secondary education, location parity	109	21.9
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	119	31.5
Firms offering formal training (%)	198	20.4
Labour force with short-cycle tertiary education (%)	37	73.1
Participation rate in formal and non-formal education and training	87	0.8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	12	55.9
Share of students enrolled in secondary vocational programmes	65	19.4
Share of students enrolled in postsecondary vocational programmes	1	109
<b>TVET quality and infrastructure</b>		
Extent of staff training	119	42.6
Quality of vocational training	92	45.8
Ratio of high-skill TVET occupations earnings to average wage	29	69.2
Ratio of medium-skill TVET occupations earnings to average wage	27	55.0
<b>TVET labour market</b>		
Efficiency of the labour market	126	41.3
Firms considered well-integrated into workforce (%)	102	15.2
Employment educational mismatch (%)	119	3.8
Proportion of skilled production workers	81	71
Unemployment rate with vocational education	83	71.5
Real TVET unemployment	141	15.9
Share of TVET occupations	137	37
Manufacturing employment (%)	141	11.4
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	79	20.1
Useable employment rate	142	15.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	71	23.9
Government expenditure per tertiary student	66	12
Teaching staff compensation (% tertiary expenditure)	83	32.9
Enrollment	115	3.9
Enrollment in bachelor's or equivalent level (%)	128	1.8
Enrollment in master's, doctoral or equivalent (%)	97	5.4
Resources	142	9
Ratios/teacher ratio in tertiary education	194	194
Researchers in higher education (%)	106	9
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	194	194
Labour mobility rate	94	3
Academic freedom	194	194
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	72	66.0
Class attendance rate in tertiary education, wealth parity	92	22.4
Class attendance rate in tertiary education, location parity	81	2.8
<b>Outputs</b>		
Retention	107	2.8
Educational attainment rate, bachelor's or equivalent	104	1.8
Educational attainment rate, master's or equivalent	78	3.3
Educational attainment rate, doctoral or equivalent	76	2.5
Employment	194	62.4
Labour force participation rate with advanced education	25	62
Unemployment rate with advanced education	126	42.9
Impact	11	10.1
University tertiary enrollment in FTE	75	49.0
UNITE documents per FTE personnel in higher education	1	99
<b>Government's contribution to the economy</b>		
<b>Inputs</b>		
Government expenditure	126	16.2
Government expenditure	111	11.1
GDP (% GDP)	66	3.7
GERD per researcher	31	38.3
Researchers per thousand labour force	97	0.4
Tertiary graduates from STEM programmes (%)	194	194
<b>Government's contribution to the economy</b>		
GERD performed by business enterprises (%)	194	194
GERD financed by business enterprises (%)	97	1
Researchers in business enterprises (%)	35	38.1
Firms that spend on R&D (%)	57	22.4
<b>Quality of research environment</b>		
High-skill employment (%)	88	9
Intellectual property payments (% total trade)	134	9
State of cluster development	85	48.5
<b>Outputs</b>		
<b>Government's contribution to the economy</b>		
Average documents per researcher	87	57.0
Citations per document	45	21.7
Patent applications (per 100 billion GDP)	113	25.5
<b>Government's contribution to the economy</b>		
Intellectual property receipts (% total trade)	117	9
Research and development expenditure (per 100 billion GDP)	66	1.6
PCT applications (per 100 billion GDP)	194	194
Firms producing new goods and services (%)	53	48.5



	Rank	Value		Rank	Value
<b>Consumer electronics</b>	100	1.1	<b>Business agility</b>	90	47.0
Treatment applications per 100 billion GDP	119	2.2	Ease of starting a business	107	84.5
Cultural goods exports (% exports)	135	0.3	Recovery recovery rate	100	30.7
Printing and publishing output (% manufactured output)	196	196	Entrepreneurial employee activity rate	196	196
<b>Energy</b>	86	35.2	Growth of corporate transactions	86	20.0
Energy	100	100	<b>Executive openness</b>	143	37.0
Access to investors' proximity	115	2	Trust and dissemination	100	26.7
Depth of innovative companies	108	42.7	Trust (% GDP)	85	23.1
ISO 9001 quality certificates (% GDP)	100	1.4	High-technology trade (% total trade)	100	10.4
ISO 14001 environmental certificates (% GDP)	114	1	Market concentration	149	21.8
<b>Environment</b>	95	39.0	Market concentration	107	30.0
CERO forecast from abroad (%)	5	85.0	Product diversity	11	39.0
Cost savings per strategic alliance deals (% GDP)	76	7.3	Charitable financial openness	86	16.4
Computer software spending (% GDP)	115	1.8	Foreign direct investment, net inflows (% GDP)	85	43.0
<b>Government services</b>	95	39.0	Cost dynamics	87	45.0
New business density per thousand population	115	1.5	<b>Financing and domestic value added</b>	121	44
Firms with new products/services (%)	6	80.1	Financing and costs	107	22.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	144	21.3	Domestic credit to private sector (% GDP)	105	8
<b>Infrastructure</b>	117	20.9	IMR financing gap (% GDP)	2	85.1
Coverage	104	22.2	Tax and contribution rate (% profit)	102	82.7
30MHz mobile network coverage (% population)	129	48.0	Bank nonperforming loans (%)	194	194
Secure Internet servers per 1 million population	142	0.4	Unmet basic needs	107	23.0
Investment in telecommunication services (% GDP)	14	68.0	Medium- and high-tech activities value added	194	194
<b>Quality</b>	100	3.0	Industry and services value added (% GDP)	100	25.0
Mobile speed and download speeds	194	194	Labour underutilization rate	80	81.0
Fixed-broadband upload and download speeds	82	4.8	Output per worker	100	2.1
Fixed-broadband subscriptions (by speed) per hundred people	119	1.3	<b>ENABLING ENVIRONMENT</b>	148	34
<b>Availability</b>	107	31.0	<b>Governance</b>	148	37.3
Fixed broadband bandwidth (% Gbps per capita)	134	47.0	Political environment	104	10.1
Mobile broadband basket (% Gbps per capita)	107	37.1	Peace and stability	105	5.8
Internet and telephony competition	1	100	View and accountability	101	26.0
<b>Access</b>	143	10.6	Quality of institutions	100	16.4
<b>Subscriptions</b>	120	10.0	Rule of law	109	18.0
Active mobile-broadband subscriptions per fixed-line inhabitants	118	19.0	Control of corruption	119	24
International Internet bandwidth per user	107	30.7	Government effectiveness	142	12.0
Households with Internet access at home (%)	119	21.0	<b>Socio-economic</b>	148	30.0
<b>Skills and employment</b>	109	2	Gender equity	115	53.1
Individuals with standard ICT skills (%)	194	194	Female-to-male ratio in parliament	85	37.0
Tertiary graduates from ICT programmes (%)	194	194	Female-to-male labour force participation	87	88.7
ICT employment (%)	118	2	Female-to-male ratio in internal wage	194	194
<b>Usage</b>	147	10.4	Gender inequality	102	30
<b>Services</b>	145	14.0	Social protection coverage (% population)	101	6.7
Government online services	102	34.7	Adult literacy rate	104	10.0
Fixed broadband Internet traffic per subscription	106	8	Youth not in employment, education or training (%)	100	35.4
Mobile broadband Internet traffic per subscription	108	0.8	Standard of living	100	21.2
Internet users (%)	105	21.0	Poverty headcount ratio (% population)	107	41.1
<b>Statistics</b>	141	10.4	GDP per capita	107	1.4
ICT FDI patent applications (per 100 billion GDP)	194	194	<b>Health and environment</b>	138	53.9
E-participation	104	32.1	Health	147	31
Internet activities by individuals (%)	194	194	Universal health coverage	147	30
Trade in digitally deliverable services (% total trade)	109	30.7	Healthy life expectancy (years)	109	24.0
<b>ECONOMY</b>	132	60.4	Under-five mortality rate	148	20.1
<b>Economic complexity</b>	118	42.7	Government performance	10	30.0
Manufacture innovation	100	11.0	Renewable energy consumption (%)	16	70.0
Overhead capital formation (% GDP)	89	43.4	Household budget per capita	87	88.0
Logistics performance	85	39.6	Natural hazard exposure	70	50
Transport productive capacity	149	10.1			
Building quality control	109	50.7			





**GKI RANK** 26/154

**GKI SCORE** 61.9

**WORLD AVERAGE** 48.4

# MALTA

## COUNTRY PERFORMANCE SUMMARY

Malta is a leading performer in terms of its knowledge infrastructure. It ranks 26th out of 154 countries in the Global Knowledge Index 2021 and 26th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **20.487**  
**Population** ..... **441,539**  
**HDI** ..... **0.895**

### AREAS OF STRENGTH

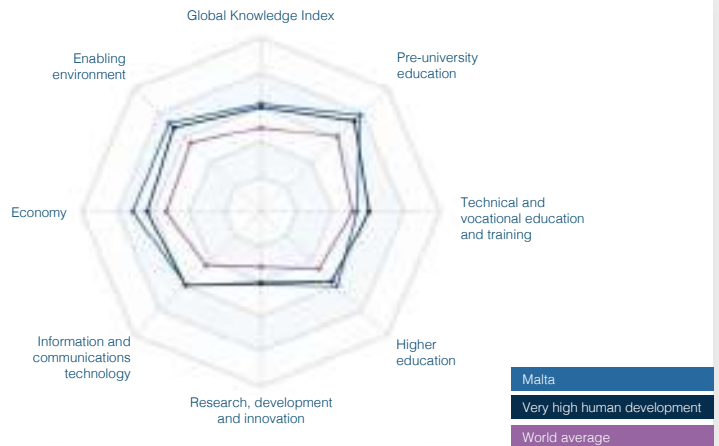
- + Joint ventures per strategic alliance deals (% GDP)
- + Gross enrolment ratio in early childhood education
- + Trade (% GDP)
- + Intellectual property payments (% total trade)
- + Intellectual property receipts (% total trade)

### AREAS OF IMPROVEMENT

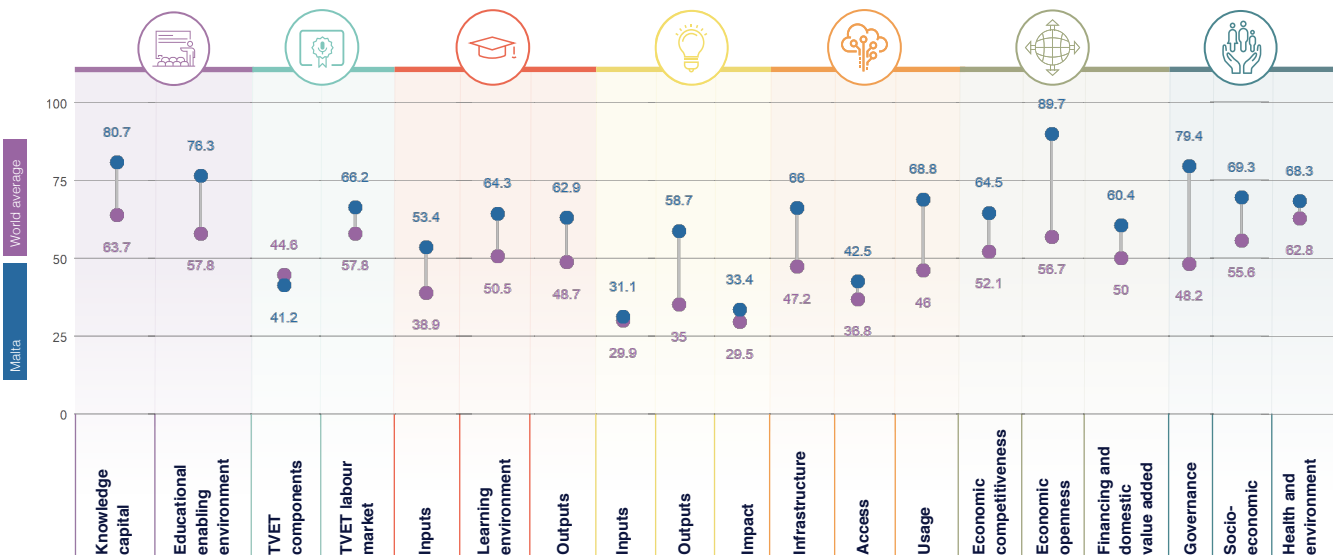
- Proportion of skilled production workers
- GERD per researcher
- Tertiary graduates from STEM programmes (%)
- Growth of innovative companies
- Share of students enrolled in post-secondary vocational programmes

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	24	78.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	64	53.7
HIGHER EDUCATION	25	60.2
RESEARCH, DEVELOPMENT AND INNOVATION	29	41.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	32	59.1
ECONOMY	8	71.5
ENABLING ENVIRONMENT	25	72.3



## GKI PILLARS





# MALTA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	24	78.5
Enrolment	33	83.0
Net enrolment rate in primary education	25	88.0
Net enrolment rate in lower secondary education	34	87.0
Net enrolment rate in upper secondary education	41	80.0
Completion	20	81.4
Years of compulsory education in primary and secondary	28	88.0
Completion rate in upper secondary education	51	76.1
Success rate rate in the last grade of lower secondary education	9	87.0
Completion	44	81.1
Assessment of 15-year-old students in math, science and reading	40	80.0
Learning-adjusted years of schooling	37	75.3
<b>Educational enabling environment</b>	18	76.3
Expenditure	33	37
Government expenditure on primary education (% GDP)	100	22.0
Government expenditure on secondary education (% GDP)	34	37
Government funding per primary student (% GDP per capita)	81	28.0
Government funding per secondary student (% GDP per capita)	14	49.0
Resources	17	80.0
Pupil-based teacher ratio in primary education	90	81.0
Pupil-based teacher ratio in secondary education	7	88.7
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	0	80.1
Class attendance rate in early childhood education	0	80
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	90	84.2
Quality and infrastructure	61	81
Completion rate in upper secondary education, gender parity	25	80
Completion rate in upper secondary education, wealth parity	34	70
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	65	81.0
Companies training apprentices	70	81.0
Firms offering formal training (%)	25	82.1
Labour force with short-cycle tertiary education (%)	11	80.0
Participation rate in formal and non-formal education and training	21	46.1
TVET enrolment	100	81.4
Government expenditure on vocational education (%)	81	23
Share of students enrolled in secondary vocational programmes	53	26.2
Share of students enrolling in postsecondary vocational programmes	47	8
TVET quality and infrastructure	100	81.4
Extent of staff training	81	80.8
Quality of vocational training	44	57.0
Ratio of high-skill TVET occupations earnings to average wage	80	79.8
Ratio of medium-skill TVET occupations earnings to average wage	80	57.0
<b>TVET labour market</b>	80	80.0
Efficiency of the labour market	80	81.0
Firms considered with inequality educated workforce (%)	100	57.4
Employment educational mismatch (%)	24	80.0
Proportion of skilled production workers	108	80.0
Unemployment rate with vocational education	12	80.0
High TVET unemployment	81	81.0
Share of TVET occupations	30	80
Manufacturing employment (%)	80	27.7
Quality and infrastructure	10	81.0
Enrolment in vocational education, gender parity	50	81.7
Useable employment rate	38	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	24	83.4
Expenditure	27	47.0
Government expenditure per tertiary student	13	65.0
Teaching staff compensation (% tertiary expenditure)	80	34.1
Enrolment	28	41.4
Enrolment in bachelor's or equivalent level (%)	68	28.0
Enrolment in masters, doctoral or equivalent (%)	24	60.8
Resources	34	81.1
Pupil-teacher ratio in tertiary education	10	80.0
Research in higher education (%)	55	43.0
<b>Learning environment</b>	28	84.3
Directly paid academic freedom	47	80.0
Teachers in tertiary education, gender parity	70	80.0
Labour mobility rate	13	43.0
Academic freedom	29	82.7
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	28	81.0
Attainment	41	41
Educational attainment rate, bachelor's or equivalent	38	88.0
Educational attainment rate, master's or equivalent	25	33.0
Educational attainment rate, doctoral or equivalent	30	30.0
Employment	0	81.1
Labour force participation rate with advanced education	9	88.0
Unemployment rate with advanced education	20	80.0
Impact	20	80.0
University tertiary enrolment in R&D	84	84.1
OECD students per 100 personnel in higher education	10	60
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	24	81.1
Access to credit resources	116	116
GDP (% GDP)	80	11.4
GERD per researcher	94	7.8
Researchers per thousand labour force	40	25.7
Tertiary graduates from STEM programmes (%)	113	20.0
Quality and infrastructure	10	81.1
GERD performed by business enterprises (%)	45	9.8
GERD financed by business enterprises (%)	71	20.2
Researchers in business enterprises (%)	50	18.1
Firms that spend on R&D (%)	80	11.0
Quality and infrastructure	0	80.0
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	1	108
State of cluster development	40	53.1
<b>Outputs</b>	0	80.0
Access to credit resources	0	80.0
Average documents per researcher	14	73.0
Citations per document	8	88.0
Patent applications (per 100 billion GDP)	116	116
Quality and infrastructure	11	81.1
Intellectual property receipts (% total trade)	0	80.0
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	21	81.0
Firms producing new goods and services (%)	80	21.1



# MALTA

	Rank	Value
<b>Business environment</b>	19	81.1
Treatment applications per 100 million GDP	116	116
Cultural goods exports (% exports)	50	15.9
Printing and publishing output (% manufactured output)	23	44.3
<b>Energy</b>	35	65.9
<b>Finance</b>	37	65.2
Access to venture capital	86	5.1
Depth of innovative companies	107	21.2
ISO 9001 quality certificates (% GDP)	43	56.9
ISO 14001 environmental certificates (% GDP)	47	15.4
<b>Infrastructure</b>	5	99.3
CERD freedom from abuse (%)	61	11
Cost of storage per storage volume (€) (% GDP)	1	100
Computer software spending (% GDP)	53	26.5
<b>Government services</b>	55	62.2
New business density per thousand population	50	12.5
Firms with one or more employees (%)	89	58.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>22</b>	<b>68.5</b>
<b>Infrastructure</b>	23	68
<b>Coverage</b>	30	41.5
3G/4G mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	54	13.1
Investment in telecommunication services (% GDP)	53	34.3
<b>Speed</b>	17	81.9
Mobile upload and download speeds	116	116
Fixed broadband upload and download speeds	116	116
Fixed broadband subscriptions (by speed) per hundred people	33	61.9
<b>Availability</b>	37	65.2
Fixed broadband bandwidth (% Gbps per capita)	30	68.2
Mobile broadband basket (% Gbps per capita)	40	72.0
Internet and telephony competition	1	100
<b>Access</b>	62	42.5
<b>Subscribers</b>	100	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	100	10.4
International Internet bandwidth per user	13	89.1
Households with Internet access at home (%)	100	51.0
<b>Skills and employment</b>	25	61.8
Individuals with standard ICT skills (%)	21	61.8
Tertiary graduates from ICT programmes (%)	30	43.0
ICT employment (%)	27	50.1
<b>Usage</b>	18	68.8
<b>Services</b>	39	61.7
Government online services	39	61.2
Fixed broadband internet traffic per subscription	8	51.7
Mobile broadband internet traffic per subscription	42	18.8
Internet users (%)	23	66.1
<b>Commerce</b>	36	71.0
ICT FDI patent applications (per 100 million GDP)	96	30.5
E-participation	37	63.0
Internet activities by individuals (%)	61	65.9
Trade in digitally deliverable services (% total trade)	90	72.7
<b>ECONOMY</b>	<b>8</b>	<b>71.3</b>
<b>Economic complexity indexes</b>	77	54.3
<b>International investment</b>	11	60.0
Overhead capital formation (% GDP)	76	47.7
Logistics performance	66	45.3
Transport productive capacity	30	41.1
Building quality control	8	60.0

	Rank	Value
<b>Business agility</b>	26	71.0
Cost of starting a business	75	66.2
Recovery recovery rate	71	42.6
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	13	65.7
<b>Employee experience</b>	6	66.2
<b>Trade and investment</b>	9	70.4
Trade (% GDP)	1	100
High-technology trade (% total trade)	50	50.5
Market concentration	86	71.0
Market concentration	8	65.0
Product diversity	1	100
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	1	100
Open dynamics	1	100
<b>Financing and domestic value added</b>	23	60.4
<b>Financing and costs</b>	37	60
Domestic credit to private sector (% GDP)	35	31.5
MSME financing gap (% GDP)	116	116
Tax and contribution rate (% profit)	100	63.4
Bank nonperforming loans (%)	69	65.0
Unsecured loans volume	11	60.0
Medium- and high-tech activities value added	45	41.8
Industry and services value added (% GDP)	30	65.0
Labour underutilization rate	30	68.0
Output per worker	30	42.0
<b>ENABLING ENVIRONMENT</b>	<b>24</b>	<b>72.3</b>
<b>Governance</b>	23	70.4
<b>Political environment</b>	13	63.5
Peace and stability	10	62.0
View and accountability	21	64.0
Quality of institutions	36	71.0
Rule of law	38	78.0
Control of corruption	40	64.0
Government effectiveness	28	61.7
<b>Socio-economic</b>	30	69.3
<b>Gender equity</b>	37	61.0
Female-to-male ratio in parliament	128	10.0
Female-to-male labour force participation	86	66.1
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	27	61.0
Social protection coverage (% population)	116	116
Adult literacy rate	68	62.0
Youth not in employment, education or training (%)	28	65.1
<b>Standard of living</b>	21	63.7
Poverty headcount ratio (% population)	42	30.0
GDP per capita	28	24.0
<b>Health and environment</b>	<b>13</b>	<b>68.5</b>
<b>Health</b>	22	60.0
Universal health coverage	17	62
Healthy life expectancy (years)	10	61.2
Under-five mortality rate	47	65.7
<b>Environmental performance</b>	110	49
Renewable energy consumption (%)	124	7.7
Household footprint per capita	107	68.8
Natural hazard exposure	25	70

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# MAURITANIA

**GKI RANK** 147/154

**GKI SCORE** 29  
**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**  
Mauritania is a weak performer in terms of its knowledge infrastructure. It ranks 147th out of 154 countries in the Global Knowledge Index 2021 and 21st out of the 27 countries with low human development.

- AREAS OF STRENGTH**
- + Gross fixed capital formation (% GDP)
  - + Tertiary graduates from STEM programmes (%)
  - + Firms producing new goods and services (%)
  - + Firms that spend on R&D (%)
  - + Firms offering formal training (%)

- AREAS OF IMPROVEMENT**
- Proportion of skilled production workers
  - GERD (% GDP)
  - Cultural goods exports (% exports)
  - Investment in telecommunication services (% GDP)
  - Transport productive capacity

**KEY INDICATORS**

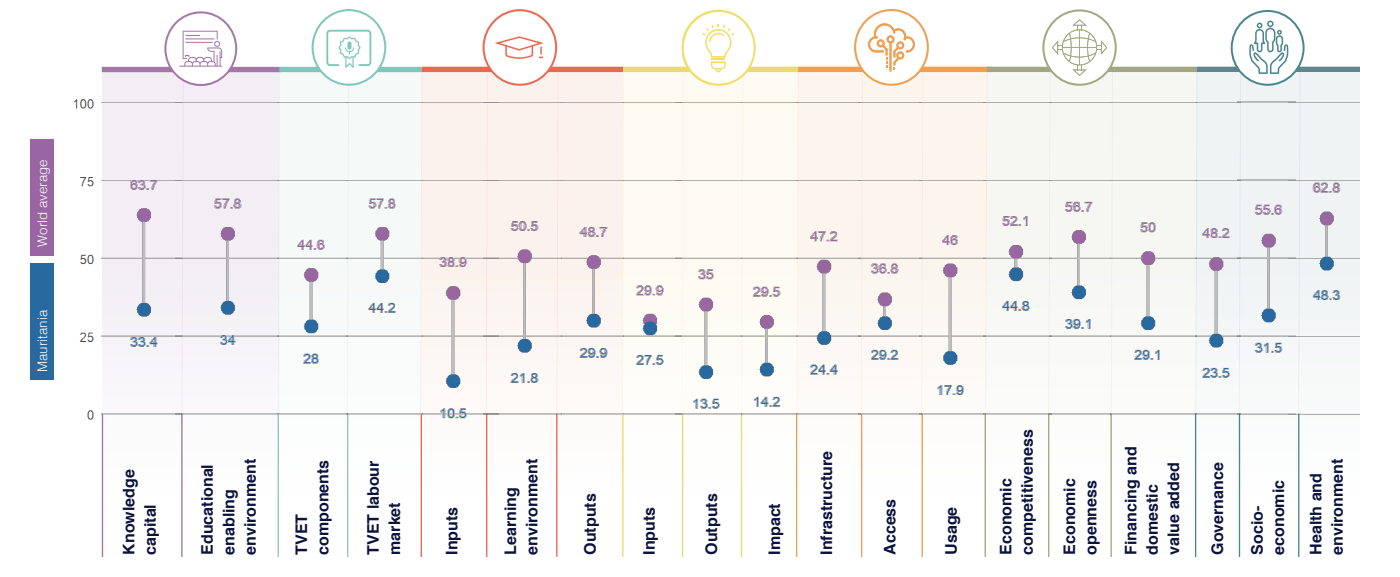
GDP US\$ billions	2317
Population	4,649,660
HDI	0.546

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	141	33.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	140	36.1
HIGHER EDUCATION	154	20.7
RESEARCH, DEVELOPMENT AND INNOVATION	141	18.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	133	23.9
ECONOMY	140	37.7
ENABLING ENVIRONMENT	145	34.4



## GKI PILLARS







# MAURITANIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	141	33.7
Enrollment	138	33.4
Enrollment rate in primary education	137	33.0
Enrollment rate in lower secondary education	126	20.6
Enrollment rate in upper secondary education	112	60.6
Enrollment rate in tertiary education	103	29.0
Completion	107	41.1
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	113	23.7
Completion rate in the last grade of lower secondary education	125	30.4
Completion	141	10.1
Assessment of 15-year-old students in math, science and reading	146	10.6
Learning-adjusted years of schooling	143	16.1
<b>Educational spending environment</b>	138	34
Expenditure	127	12.1
Government expenditure on primary education (% GDP)	169	3.2
Government expenditure on secondary education (% GDP)	128	4.8
Government funding per primary student (% GDP per capita)	113	16.8
Government funding per secondary student (% GDP per capita)	111	7.3
Resources	65	10.0
Pupil-based teacher ratio in primary education	70	81.5
Pupil-based teacher ratio in secondary education	65	66.7
Schools with access to computers in primary education (%)	81	16
Schools with access to computers in secondary education (%)	1	100
Early learning	133	24.0
Class attendance rate in early childhood education	107	3.8
Proportion of children who are developmentally on track	55	35.4
Proportion of children with stimulating home learning environments	10	34.6
Pupil-based teacher ratio in preprimary education	146	10.6
Quality and infrastructure	100	45.7
Completion rate in upper secondary education, gender parity	119	66.4
Completion rate in upper secondary education, wealth parity	82	14.4
Completion rate in upper secondary education, location parity	93	29.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	146	39
Companies training apprentices	10	10.0
Firms offering formal training (%)	25	65.7
Labour force with short-cycle tertiary education (%)	34	79.0
Participation rate in formal and non-formal education and training	69	5.7
<b>TVET resources</b>	146	1.1
Government expenditure on vocational education (%)	146	10.6
Share of students enrolled in secondary vocational programmes	131	7.2
Share of students enrolled in postsecondary vocational programmes	146	10.6
<b>TVET quality and infrastructure</b>	141	32.0
Extent of staff training	145	24.1
Quality of vocational training	116	41.1
Ratio of high-skil TVET occupations earnings to average wage	146	10.6
Ratio of medium-skil TVET occupations earnings to average wage	146	10.6
<b>TVET labour market</b>	138	44.0
Efficiency of the labour market	144	32.0
Firms considered well matched with educated workforce (%)	115	25.7
Employment educational mismatch (%)	106	10.6
Proportion of skilled production workers	123	8
Unemployment rate with vocational education	64	71
Real TVET unemployment	107	33.0
Share of TVET occupations	129	26.4
Manufacturing employment (%)	87	27.0
Quality and infrastructure	14	17.0
Enrollment in vocational education, gender parity	30	50.1
Useable employment rate	116	44.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	144	16.5
Expenditure	97	10
Government expenditure per tertiary student	67	12
Teaching staff compensation (% tertiary expenditure)	146	10.6
Enrollment	101	31
Enrollment in bachelor's or equivalent level (%)	127	2
Enrollment in masters, doctoral or equivalent (%)	146	4.2
<b>Resources</b>	108	14.4
Pupil-teacher ratio in tertiary education	136	15.6
Researcher in higher education (%)	146	10.6
<b>Learning environment</b>	131	21.8
<b>Quality and academic freedom</b>	100	5.5
Teachers in tertiary education, gender parity	122	4
Labour mobility rate	65	5.1
Academic freedom	146	10.6
<b>Equity and inclusiveness</b>	10	17.1
Class attendance rate in tertiary education, gender parity	62	54.0
Class attendance rate in tertiary education, wealth parity	32	40.1
Class attendance rate in tertiary education, location parity	28	18.0
<b>Outputs</b>	140	29.9
<b>Attainment</b>	67	3.3
Educational attainment rate, bachelor's or equivalent	68	4.4
Educational attainment rate, master's or equivalent	53	6.1
Educational attainment rate, doctoral or equivalent	44	13.4
<b>Employment</b>	106	64.0
Labour force participation rate with advanced education	64	73.0
Unemployment rate with advanced education	126	47.0
<b>Impact</b>	108	16.7
University tertiary enrollment in R&D	143	16.7
OECD students per 1000 personnel in higher education	146	10.6
<b>INNOVATION, INTELLECTUAL PROPERTY AND PATENTING</b>		
<b>Inputs</b>	116	17.2
Government R&D expenditure	10	10.0
GDP (% GDP)	123	0
GERD per researcher	146	10.6
Researchers per thousand labour force	146	10.6
Tertiary graduates from STEM programmes (%)	12	60.6
<b>Quality of innovation environment</b>	10	10.0
GERD performed by business enterprises (%)	146	10.6
GERD financed by business enterprises (%)	146	0
Researchers in business enterprises (%)	146	10.6
Firms that spend on R&D (%)	17	46.0
<b>Quality of innovation environment</b>	114	33
High-skilled employment (%)	146	10.6
Intellectual property payments (% total trade)	123	0.3
State of digital development	65	43.7
<b>Outputs</b>	147	10.0
<b>Quality of innovation environment</b>	10	10.0
Average documents per researcher	146	10.6
Citations per document	138	6.1
Patent applications (per 100 billion GDP)	146	10.6
<b>Quality of innovation environment</b>	10	10.0
Intellectual property receipts (% total trade)	117	0
Research design applications (per 100 billion GDP)	146	10.6
PCT applications (per 100 billion GDP)	146	10.6
Firms producing new goods and services (%)	14	75.0



# MAURITANIA

	Rank	Value
<b>Consumer credit</b>	100	0
Treatment applications per 100 million GDP	106	108
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	196	108
<b>Energy</b>	141	15.2
<b>Finance</b>	100	0
Access to venture capital	113	9
Depth of innovative companies	135	31.2
ISO 9001 quality certificates (% GDP)	149	0.4
ISO 14001 environmental certificates (% GDP)	155	1
<b>Infrastructure</b>	100	0
CERD forecast from abroad (%)	100	8
Cost of storage per storage volume (€) (% GDP)	104	108
Computer software spending (% GDP)	106	108
<b>International trade</b>	100	0
New business density per thousand population	112	1.8
Firms with new products/services (%)	60	87.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>132</b>	<b>23.9</b>
<b>Infrastructure</b>	149	26.4
<b>Coverage</b>	100	0
30MHz mobile network coverage (% population)	101	10.0
Secure Internet servers per 1 million population	141	0.5
Investment in telecommunication services (% GDP)	143	8
<b>Quality</b>	106	108
Mobile upload and download speeds	106	108
Fixed broadband upload and download speeds	106	108
Fixed broadband subscriptions (by speed) per hundred people	106	108
<b>Availability</b>	100	40.1
Fixed broadband bandwidth (% Gbps per capita)	108	47.0
Mobile broadband basket (% Gbps per capita)	121	40.0
Internet and telephony competition	135	47.1
<b>Access</b>	88	26.0
<b>Subscribers</b>	100	21.1
Active mobile-broadband subscriptions per fixed-line inhabitants	89	26.0
International Internet bandwidth per user	107	20.1
Households with Internet access at home (%)	108	14.1
<b>Skills and employment</b>	100	11.1
Individuals with standard ICT skills (%)	106	108
Tertiary graduates from ICT programmes (%)	42	37.1
ICT employment (%)	106	108
<b>Usage</b>	131	17.3
<b>Services</b>	100	0
Government online services	100	10
Fixed broadband Internet traffic per subscriber	106	108
Mobile broadband Internet traffic per subscriber	100	0.4
Internet users (%)	108	16.0
<b>Commerce</b>	100	25.0
ICT FDI parent applications (per 100 million GDP)	106	108
E-participation	100	5.8
Internet activities by individuals (%)	106	108
Trade in digitally deliverable services (% total trade)	82	42.4
<b>ECONOMY</b>	<b>140</b>	<b>37.7</b>
<b>Economic complexity</b>	104	48.0
<b>Infrastructure investment</b>	100	41.4
Overhead capital formation (% GDP)	9	80.0
Logistics performance	109	33.0
Transport productive capacity	104	8
Building quality control	124	80

	Rank	Value
<b>Business agility</b>	100	46.1
Cost of starting a business	45	82.2
Recovery recovery time	108	108
Entrepreneurial employee activity rate	106	108
Growth of corporate transactions	118	8
<b>Executive opinions</b>	140	26.1
<b>Trade and investment</b>	100	43.0
Trade (% GDP)	41	37.0
High-technology trade (% total trade)	145	1.1
Market concentration	121	88.0
Market concentration	87	80.0
<b>Product innovation</b>	100	27.0
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	75	47.0
Cost dynamics	110	40
<b>Financing and domestic value added</b>	148	20.1
<b>Financing and costs</b>	100	10
Domestic credit to private sector (% GDP)	102	8
MSME financing gap (% GDP)	106	108
Tax and contribution rate (% profit)	107	40
Bank nonperforming loans (%)	106	108
<b>Unmet needs index</b>	110	34.0
Medium- and high-tech activities value added	108	108
Industry and services value added (% GDP)	100	40.0
Labour underutilization rate	118	48.0
Output per worker	100	6.1
<b>ENABLING ENVIRONMENT</b>	<b>148</b>	<b>34.4</b>
<b>Governance</b>	128	23.0
<b>Political environment</b>	100	20.0
Peace and stability	100	19.0
View and accountability	117	24.0
Quality of institutions	104	24.0
Rule of law	108	30.0
Control of corruption	100	23.1
Government effectiveness	107	21.0
<b>Socio-economic</b>	146	31.0
<b>Gender equity</b>	100	32.0
Female-to-male ratio in parliament	88	26.4
Female-to-male labour force participation	107	38.6
Female-to-male ratio in internal wage	106	108
<b>Gender equality</b>	100	21.0
Social protection coverage (% population)	108	108
Adult literacy rate	113	80.1
Youth not in employment, education or training (%)	140	23.1
<b>Standard of living</b>	100	30.0
Poverty headcount ratio (% population)	80	50.0
GDP per capita	118	10
<b>Health and environment</b>	121	40.0
<b>Health</b>	100	40.0
Universal health coverage	100	41
Healthy life expectancy (years)	117	50
Under-five mortality rate	107	30.0
<b>Environmental performance</b>	79	60.0
Renewable energy consumption (%)	71	26.1
Household footprint per capita	81	80
Natural hazard exposure	113	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# MAURITIUS

## KEY INDICATORS

GDP US\$ billions	24.643
Population	1,271,767
HDI	0.804

**GKI RANK** 49/154

**GKI SCORE** 54.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Mauritius is a strong performer in terms of its knowledge infrastructure. It ranks 49th out of 154 countries in the Global Knowledge Index 2021 and 46th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

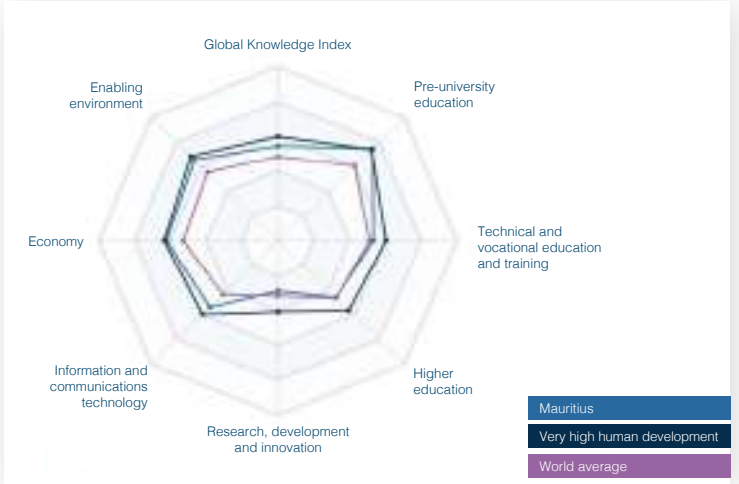
- + Government expenditure on secondary education (% of GDP)
- + Investment in telecommunication services (% GDP)
- + MSME financing gap (% GDP)
- + Tertiary graduates from ICT programmes (%)
- + Government funding per secondary student (% of GDP per capita)

### AREAS OF IMPROVEMENT

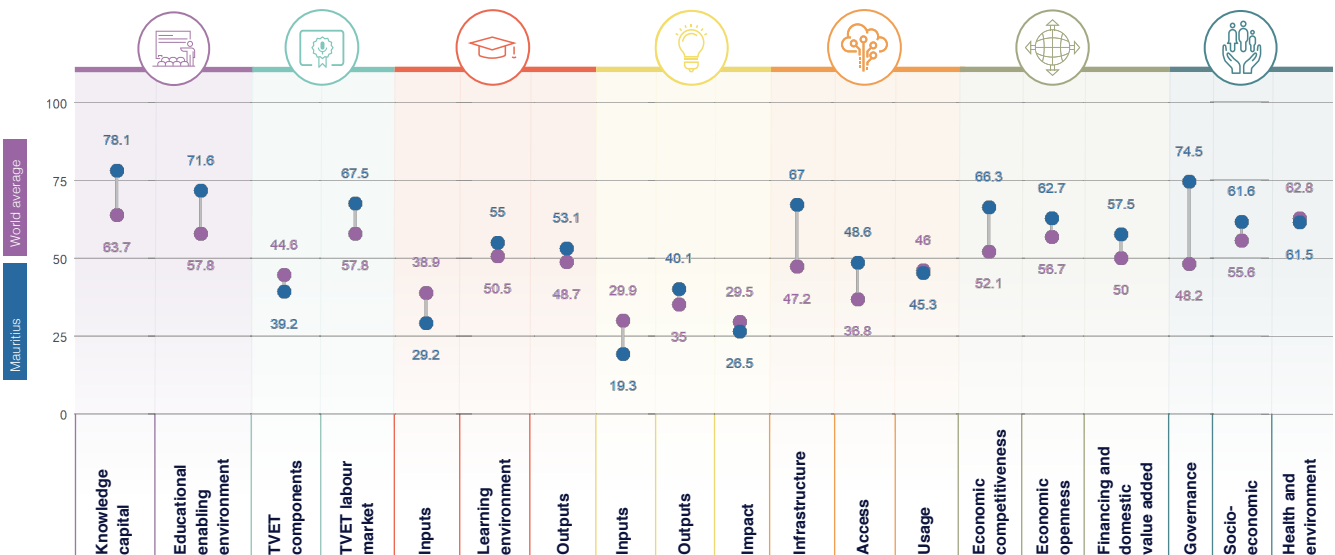
- Patent applications (per 100 billion GDP)
- Internet activities by individuals (%)
- Share of students enrolled in post-secondary vocational programmes
- Medium- and high-tech activities value added
- Mobile broadband Internet traffic per subscription

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	38	74.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	69	53.4
HIGHER EDUCATION	75	45.8
RESEARCH, DEVELOPMENT AND INNOVATION	86	28.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	48	53.6
ECONOMY	38	62.2
ENABLING ENVIRONMENT	36	65.9



## GKI PILLARS







# MAURITIUS

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	74.9
Enrollment	88	83.7
Net enrolment rate in primary education	98	90
Net enrolment rate in lower secondary education	89	85.5
Net enrolment rate in upper secondary education	81	74.8
Completion	57	73.0
Years of compulsory education in primary and secondary	28	84.8
Completion rate in upper secondary education	77	83.0
Success rate rate in the last grade of lower secondary education	17	86.1
Completion	31	87.0
Assessment of 15-year-old students in math, science and reading	106	106
Learning-adjusted years of schooling	40	87.0
<b>Educational enabling environment</b>	27	71.8
Expenditure	30	43.7
Government expenditure on primary education (% GDP)	101	24
Government expenditure on secondary education (% GDP)	4	50.7
Government funding per primary student (% GDP per capita)	83	37.8
Government funding per secondary student (% GDP per capita)	12	53.4
Resources	33	37
Pupil-based teacher ratio in primary education	17	83.0
Pupil-based teacher ratio in secondary education	38	78
Schools with access to computers in primary education (%)	42	86.2
Schools with access to computers in secondary education (%)	1	100
Early learning	21	75.1
Class attendance rate in early childhood education	83	83.2
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	11	85
Quality and infrastructure	106	106
Completion rate in upper secondary education, gender parity	106	106
Completion rate in upper secondary education, wealth parity	106	106
Completion rate in upper secondary education, location parity	106	106
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	168	101.2
Companies training apprentices	80	41.5
Firms offering formal training (%)	106	106
Labour force with short-cycle tertiary education (%)	30	80.5
Participation rate in formal and non-formal education and training	78	2.1
<b>TVET resources</b>	88	103.3
Government expenditure on vocational education (%)	64	54.7
Share of students enrolled in secondary vocational programmes	89	11.8
Share of students enrolled in postsecondary vocational programmes	81	51.8
<b>TVET quality and infrastructure</b>	80	47.0
Extent of staff training	41	84.8
Quality of vocational training	55	54.0
Ratio of high-skil TVET occupations earnings to average wage	28	41.7
Ratio of median-skil TVET occupations earnings to average wage	62	35.0
<b>TVET labour market</b>	44	67.8
<b>Efficiency of the labour market</b>	22	70.5
Firms considered with inequality educated workforce (%)	106	106
Employment educational mismatch (%)	45	71.0
Proportion of skilled production workers	106	106
Unemployment rate with vocational education	63	81.1
Real TVET unemployment	80	101.2
Share of TVET occupations	17	73.7
Manufacturing employment (%)	89	43.6
Quality and infrastructure	80	47.0
Enrollment in vocational education, gender parity	105	82.0
Useable employment rate	30	60.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	111	28.2
<b>Expenditure</b>	100	81
Government expenditure per tertiary student	88	82
Teaching staff compensation (% tertiary expenditure)	106	106
<b>Enrollment</b>	87	21.0
Enrollment in bachelor's or equivalent level (%)	64	28.8
Enrollment in masters, doctoral or equivalent (%)	88	17.2
<b>Resources</b>	97	58.2
Ratio teacher ratio in tertiary education	111	53.6
Researchers in higher education (%)	32	83.1
<b>Learning environment</b>		
<b>Quality and academic freedom</b>	88	81
Teachers in tertiary education, gender parity	58	68.4
Labour mobility rate	40	23.7
Academic freedom	81	32.0
<b>Quality and infrastructure</b>	106	106
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>	88	53.1
<b>Attainment</b>	106	106
Educational attainment rate, bachelor's or equivalent	106	106
Educational attainment rate, master's or equivalent	106	106
Educational attainment rate, doctoral or equivalent	106	106
<b>Employment</b>	32	81
Labour force participation rate with advanced education	77	73.0
Unemployment rate with advanced education	68	83.8
<b>Impact</b>	111	28.2
University tertiary enrollment in R&D	118	88.8
OECD indicators per 100 personnel in higher education	88	27.7
<b>Government expenditure and financing</b>		
<b>Inputs</b>	111	28.2
Share of GDP expenditure	80	101.2
GDP (% GDP)	75	8.8
OECD per researcher	40	82
Researchers per thousand labour force	78	82
Tertiary graduate from RTOA programmes (%)	64	88.0
<b>Quality and infrastructure</b>	106	106
GDP performed by business enterprises (%)	78	0.8
GDP financed by business enterprises (%)	85	5.1
Researchers in business enterprises (%)	69	8
Firms that spend on R&D (%)	106	106
<b>Quality and infrastructure</b>	80	47.0
High-skilled employment (%)	38	32.0
Intellectual property payments (% total trade)	88	8
State of cluster development	53	48.0
<b>Outputs</b>	106	106
<b>Quality and infrastructure</b>	80	47.0
Average documents per researcher	69	88
Citations per document	45	21.7
Patent applications (per 100 billion GDP)	108	30.4
<b>Quality and infrastructure</b>	80	47.0
Intellectual property receipts (% total trade)	88	5.3
Research design applications (per 100 billion GDP)	31	24.1
PCT applications (per 100 billion GDP)	30	68.7
Firms producing new goods and services (%)	106	106





# MAURITIUS

	Rank	Value
<b>Business environment</b>	10	87.9
Trademark applications per 100 million GDP	19	83.2
Cultural goods exports (% exports)	29	33.9
Printing and publishing output (% manufactured output)	21	46.5
<b>Energy</b>	55	25.5
<b>Trade</b>	70	12.1
Ratio of institutions' provisions	111	4.8
Depth of innovative companies	89	40.7
ISO 9001 quality certificates (% GDP)	41	29.2
ISO 14001 environmental certificates (% GDP)	70	0.7
<b>Finance</b>	11	71
CERD forecast from abroad (%)	93	2
Joint ventures per strategic industry deals (% GDP)	81	17.5
Computer software spending (% GDP)	70	15.4
<b>Government efficiency</b>	10	76
New business density per thousand population	93	40
Firms with one or more alternative (%)	116	116
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	41	52.5
<b>Infrastructure</b>	15	87
<b>Coverage</b>	4	100
3G/4G mobile network coverage (% population)	49	80.0
Secure Internet servers per 1 million population	71	5.5
Investment in telecommunication services (% GDP)	1	100
<b>Speed</b>	30	46.7
Mobile upload and download speeds	116	116
Fixed broadband upload and download speeds	116	116
Fixed broadband subscriptions (by speed) per hundred people	89	66.7
<b>Availability</b>	10	85.3
Fixed broadband latency (% QM per capita)	41	85.2
Mobile broadband basket (% QM per capita)	30	74.7
Internet and telephone competition	1	100
<b>Access</b>	65	46.8
<b>Subscriptions</b>	41	42.0
Active mobile broadband subscriptions per fixed-line inhabitants	41	42.0
International Internet bandwidth per user	29	81.8
Households with Internet access at home (%)	70	72.7
<b>Skills and employment</b>	41	47.5
Individuals with standard ICT skills (%)	59	29.1
Tertiary graduates from ICT programmes (%)	93	87.7
ICT employment (%)	43	22.0
<b>Usage</b>	31	45.3
<b>Services</b>	37	41.1
Government online services	69	70
Fixed broadband Internet traffic per subscription	31	21.1
Mobile broadband Internet traffic per subscription	104	0.4
Internet users (%)	89	83
<b>Commerce</b>	11	41.4
ICT FDI parent applications (per 100 million GDP)	29	60.4
E-participation	79	84.3
Internet activities by individuals (%)	86	20.1
Trade in digitally deliverable services (% total trade)	43	83
<b>ECONOMY</b>	34	62.2
<b>Economic competitiveness</b>	21	65.3
<b>Infrastructure investment</b>	10	12.0
Overhead capital formation (% GDP)	111	37.9
Logistics performance	79	43.5
Transport productive capacity	41	37.2
Building quality control	8	80.0

	Rank	Value
<b>Business agility</b>	11	36.7
Ease of starting a business	15	84.6
Recovery recovery rate	29	73.2
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	59	21.4
<b>Employee experience</b>	88	82.2
<b>Trust and development</b>	11	81.2
Tax (% GDP)	62	27.9
High-technology trade (% total trade)	102	28.4
Market concentration	96	78.5
Market concentration	27	84
<b>Product innovation</b>	10	84.5
Climate financial openness	80	76
Foreign direct investment, net inflows (% GDP)	82	43.9
Cost dynamics	59	78.0
<b>Financing and domestic value added</b>	41	57.3
<b>Financing and costs</b>	11	72.5
Domestic credit to private sector (% GDP)	31	36.4
MSME financing gap (% GDP)	8	80.4
Tax and contribution rate (% profit)	19	85.8
Bank nonperforming loans (%)	86	74.1
Unmet loan demand	10	42.7
Medium- and high-tech activities value added	122	5.9
Industry and services value added (% GDP)	69	83.0
Labour underutilization rate	29	81.7
Output per worker	69	20.0
<b>ENABLING ENVIRONMENT</b>	34	49.8
<b>Governance</b>	29	74.5
Political environment	29	74.8
Peace and stability	29	75.5
View and accountability	29	75.0
Quality of institutions	17	74.7
Rule of law	29	76.0
Control of corruption	45	67.0
Government effectiveness	27	76.8
<b>Socio-economic</b>	59	61.8
Gender equity	90	80.6
Female-to-male ratio in parliament	100	25
Female-to-male labour force participation	118	89.8
Female-to-male ratio in internal wage	81	80.0
Gender inequality	99	72.0
Social protection coverage (% population)	116	116
Adult literacy rate	89	88.0
Youth not in employment, education or training (%)	99	56.2
<b>Standard of living</b>	81	81.8
Poverty headcount ratio (% population)	95	86.2
GDP per capita	21	17.1
<b>Health and environment</b>	85	61.5
<b>Health</b>	86	72.8
Universal health coverage	100	83
Healthy life expectancy (years)	82	86
Under-five mortality rate	85	87.0
<b>Environmental performance</b>	86	83.0
Renewable energy consumption (%)	121	9.5
Household footprint per capita	84	78.9
Natural hazard exposure	55	83

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 74/154

**GKI SCORE** 48.7

**WORLD AVERAGE** 48.4

# MEXICO

## COUNTRY PERFORMANCE SUMMARY

Mexico is a moderate performer in terms of its knowledge infrastructure. It ranks 74th out of 154 countries in the Global Knowledge Index 2021 and 16th out of the 39 countries with high human development.

### KEY INDICATORS

**GDP US\$ billions** 2,306.317  
**Population** 128,932,753  
**HDI** 0.779

### AREAS OF STRENGTH

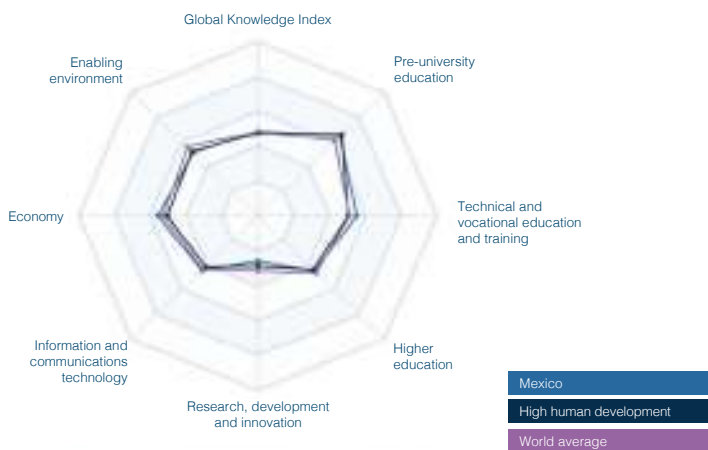
- + Female-to-male ratio in parliament
- + Enrolment in vocational education, gender parity
- + High-technology trade (% total trade)
- + Gross attendance ratio for tertiary education, gender parity
- + Research institutions prominence

### AREAS OF IMPROVEMENT

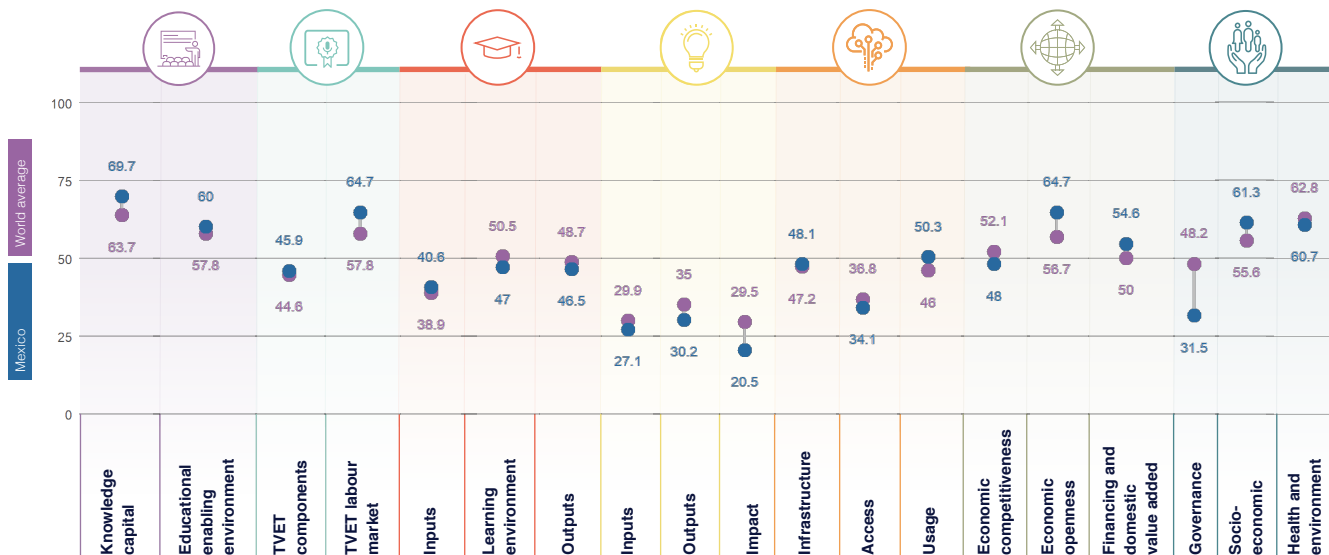
- Printing and publishing output (% manufactured output)
- Firms with new product/service (%)
- Natural hazard exposure
- Entrepreneurial employee activity rate
- Market concentration

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	83	64.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	52	55.3
HIGHER EDUCATION	80	44.7
RESEARCH, DEVELOPMENT AND INNOVATION	104	25.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	75	44.1
ECONOMY	58	55.8
ENABLING ENVIRONMENT	90	51.1



## GKI PILLARS





# MEXICO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	77	68.7
Enrollment	79	65.4
Net enrolment rate in primary education	49	87.6
Net enrolment rate in lower secondary education	79	69.4
Net enrolment rate in upper secondary education	81	69.0
Completion	70	75.7
Years of compulsory education in primary and secondary	5	82.0
Completion rate in upper secondary education	70	60.0
Success rate rate in the last grade of lower secondary education	62	74.4
Completion	71	47.0
Assessment of 15-year-old students in math, science and reading	66	23.5
Learning-adjusted years of schooling	52	82.4
<b>Educational enabling environment</b>	77	80
Expenditure	61	25.0
Government expenditure on primary education (% GDP)	86	22.0
Government expenditure on secondary education (% GDP)	88	27
Government funding per primary student (% GDP per capita)	88	30.2
Government funding per secondary student (% GDP per capita)	90	14.4
Resources	66	81.0
Pupil-based teacher ratio in primary education	51	60.4
Pupil-based teacher ratio in secondary education	38	82.6
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	70	63
Class attendance rate in early childhood education	69	29.6
Proportion of children who are developmentally on track	29	70.0
Proportion of children with stimulating home learning environments	30	69.9
Pupil-based teacher ratio in preprimary education	45	65.2
Quality and infrastructure	61	60.0
Completion rate in upper secondary education, gender parity	49	62.0
Completion rate in upper secondary education, wealth parity	50	46.6
Completion rate in upper secondary education, location parity	67	67.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	71	60.8
Companies training apprentices	10	60.0
Firms offering formal training (%)	29	65.3
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	34	41.1
<b>TVET resources</b>	60	23.0
Government expenditure on vocational education (%)	88	30.6
Share of students enrolled in secondary vocational programmes	26	44.7
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and infrastructure</b>	60	41.0
Extent of staff training	66	37
Quality of vocational training	60	53.0
Ratio of high-skill TVET occupations earnings to average wage	33	38.7
Ratio of medium-skill TVET occupations earnings to average wage	32	52
<b>TVET labour market</b>	64	64.7
Efficiency of the labour market	101	51.4
Firms considered with inappropriately educated workforce (%)	64	42.1
Employment educational mismatch (%)	48	70.5
Proportion of skilled production workers	66	41.8
Unemployment rate with vocational education	116	116
Real TVET unemployment	61	61.0
Share of TVET occupations	52	51.0
Manufacturing employment (%)	27	67.7
Quality and infrastructure	61	60.0
Enrollment in vocational education, gender parity	4	66.0
Useable employment rate	73	71.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	68	40.8
Expenditure	41	34.7
Government expenditure per tertiary student	53	16.0
Teaching staff compensation (% tertiary expenditure)	20	64.8
Enrollment	51	26.0
Enrollment in bachelor's or equivalent level (%)	61	28.0
Enrollment in masters, doctoral or equivalent (%)	69	12.7
Resources	71	64.0
Pupil-teacher ratio in tertiary education	28	65.5
Researchers in higher education (%)	59	43.0
<b>Learning environment</b>	67	47
<b>Quality and academic freedom</b>	67	44.4
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	66	2.5
Academic freedom	60	66.0
<b>Equity and inclusiveness</b>	51	43.7
Class attendance rate in tertiary education, gender parity	11	66.0
Class attendance rate in tertiary education, wealth parity	56	37.4
Class attendance rate in tertiary education, location parity	27	71.1
<b>Outputs</b>	68	46.3
<b>Attainment</b>	60	22.0
Educational attainment rate, bachelor's or equivalent	60	43.6
Educational attainment rate, master's or equivalent	44	9.3
Educational attainment rate, doctoral or equivalent	45	35
<b>Employment</b>	64	35
Labour force participation rate with advanced education	78	76.5
Unemployment rate with advanced education	44	67.0
<b>Impact</b>	60	32.7
University tertiary enrollment in R&D	86	42.1
OECD indicators per 100 personnel in higher education	54	33.0
<b>INNOVATION, SCIENCE AND TECHNOLOGY</b>		
<b>Inputs</b>	60	27.1
Share of R&D expenditure	76	60.0
GDP (% GDP)	78	6.1
GERD per researcher	26	45.1
Researchers per thousand labour force	72	4.4
Tertiary graduates from STEM programmes (%)	41	47.7
<b>Quality of innovation environment</b>	60	60.0
GERD performed by business enterprises (%)	62	1.8
GERD financed by business enterprises (%)	69	23
Researchers in business enterprises (%)	33	45.0
Firms that spend on R&D (%)	22	46.7
<b>Quality of innovation environment</b>	60	60.0
High-skilled employment (%)	41	33.0
Intellectual property payments (% total trade)	112	1.8
State of cluster development	34	64.7
<b>Outputs</b>	68	46.3
<b>Quality of innovation environment</b>	61	60.0
Average documents per researcher	48	60.2
Citations per document	112	15.3
Patent applications (per 100 billion GDP)	77	44.2
<b>Quality of innovation environment</b>	60	60.0
Intellectual property receipts (% total trade)	90	1.6
Research and development expenditure (per 100 billion GDP)	66	24
PCT applications (per 100 billion GDP)	75	47.2
Firms producing new goods and services (%)	66	40.7





# MEXICO

	Rank	Value
<b>Consumer Electronics</b>		
Trademark applications (per 100 million GDP)	45	30.1
Cultural goods exports (% exports)	79	7.7
Printing and publishing output (% manufactured output)	100	0
<b>Design</b>	114	25.5
<b>Trade</b>	31	10.1
Access to investors' protection	20	43.2
Depth of innovative companies	77	30
ISO 9001 quality certificates (% GDP)	79	12.1
ISO 14001 environmental certificates (% GDP)	75	0.8
<b>Software</b>	100	0.1
CERD licensed from abroad (%)	89	1.3
Joint ventures per strategic industry deals (% GDP)	100	4.4
Computer software spending (% GDP)	84	10.0
<b>Government Services</b>	100	0.0
New business density per thousand population	81	4.9
Firms with one or more patents (%)	111	40.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>71</b>	<b>46.1</b>
<b>Infrastructure</b>	89	40.3
<b>Coverage</b>	100	11.1
30MHz mobile network coverage (% population)	70	82.0
Secure Internet servers per 1 million population	81	3.2
Investment in telecommunication services (% GDP)	100	21.3
<b>Speed</b>	81	24.0
Mobile upload and download speeds	47	28.4
Fixed broadband upload and download speeds	69	11.0
Fixed broadband subscriptions (y-speed) per hundred people	67	34.3
<b>Availability</b>	100	70.0
Fixed broadband latency (% QM per capita)	80	77.7
Mobile broadband basket (% QM per capita)	75	81.0
Internet and telephone competition	1	100
<b>Access</b>	83	34.5
<b>Subscribers</b>	80	11.1
Active mobile-broadband subscriptions per hundred inhabitants	80	33.0
International Internet bandwidth per user	85	23.2
Households with Internet access at home (%)	85	80.0
<b>Skills and employment</b>	71	20
Individuals with standard ICT skills (%)	51	33
Tertiary graduates from ICT programmes (%)	80	35.0
ICT employment (%)	88	9.8
<b>Usage</b>	89	50.0
<b>Services</b>	40	10.0
Government online services	37	82.8
Fixed broadband Internet traffic per subscriber	104	7.8
Mobile broadband Internet traffic per subscriber	79	8.8
Internet users (%)	74	30.4
<b>Commerce</b>	70	10.7
ICT FDI patent applications (per 100 million GDP)	87	27.6
E-participation	40	83.1
Internet activities by individuals (%)	85	44.7
Trade in digitally deliverable services (% total trade)	87	32.1
<b>ECONOMY</b>	<b>34</b>	<b>55.9</b>
<b>Economic Competitiveness</b>	81	40
<b>Infrastructure Investment</b>	80	41.0
Overhead capital formation (% GDP)	111	29.0
Logistics performance	49	51.3
Transport productive capacity	118	17.1
Building quality control	70	70

	Rank	Value
<b>Business Agility</b>	80	40.0
Ease of starting a business	81	85.1
Recovery recovery rate	36	89.4
Entrepreneurial employee activity rate	85	0
Growth of corporate transactions	89	42.0
<b>Employee experience</b>	88	54.2
Trust and development	10	10.0
<b>Talent (% GDP)</b>	64	31.0
High-technology trade (% total trade)	13	32.1
Market concentration	95	86.2
Market concentration	148	43.7
Product diversity	41	10.0
Climate financial openness	60	70
Foreign direct investment, net inflows (% GDP)	70	47.7
Cost dynamics	34	80.7
<b>Financing and domestic value added</b>	<b>82</b>	<b>54.0</b>
<b>Financing and costs</b>	81	17.4
Domestic credit to private sector (% GDP)	85	13.0
MSME financing gap (% GDP)	41	73.2
Tax and contribution rate (% profit)	100	52.1
Bank nonperforming loans (%)	40	80.0
Unmet loan demand	41	81.7
Medium- and high-tech activities value added	36	52.7
Industry and services value added (% GDP)	29	85.0
Labour underutilization rate	80	89.0
Output per worker	62	15.1
<b>ENABLING ENVIRONMENT</b>	<b>84</b>	<b>81.5</b>
<b>Governance</b>	105	31.5
Political environment	100	37.4
Peace and stability	124	17.0
View and accountability	80	44.0
Quality of institutions	100	31.0
Rule of law	116	24.0
Control of corruption	103	21.0
Government effectiveness	88	46.2
<b>Socio-economic</b>	57	81.3
Gender equity	11	88
Female-to-male ratio in parliament	1	100
Female-to-male labour force participation	128	54.2
Female-to-male ratio in internal wage	52	85
Gender inequality	80	72.0
Social protection coverage (% population)	50	81.3
Adult literacy rate	88	89.0
Youth not in employment, education or training (%)	84	83.2
<b>Standard of living</b>	112	28.0
Poverty headcount ratio (% population)	102	36.2
GDP per capita	83	18.7
<b>Health and environment</b>	<b>103</b>	<b>80.7</b>
Health	80	79.0
Universal health coverage	40	70
Healthy life expectancy (years)	72	72.1
Under-five mortality rate	75	80.4
Environmental performance	100	43.0
Renewable energy consumption (%)	100	70
Household footprint per capita	71	80.0
Natural hazard exposure	137	35

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 63/154

**GKI SCORE** 50.7

**WORLD AVERAGE** 48.4

# MOLDOVA (REPUBLIC OF)

## KEY INDICATORS

GDP US\$ billions ..... 32.264  
 Population ..... 4,033,963  
 HDI ..... 0.75

## COUNTRY PERFORMANCE SUMMARY

Moldova (Republic of) is a moderate performer in terms of its knowledge infrastructure. It ranks 63rd out of 154 countries in the Global Knowledge Index 2021 and 6th out of the 39 countries with high human development.

### AREAS OF STRENGTH

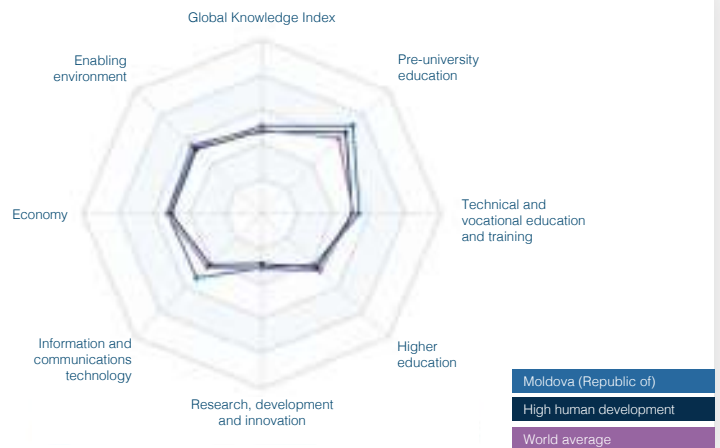
- + Citations per document
- + Gross intake ratio to the last grade of lower secondary education
- + Government funding per primary student (% of GDP per capita)
- + Trademark applications (per 100 billion GDP)
- + Unemployment rate with advanced education

### AREAS OF IMPROVEMENT

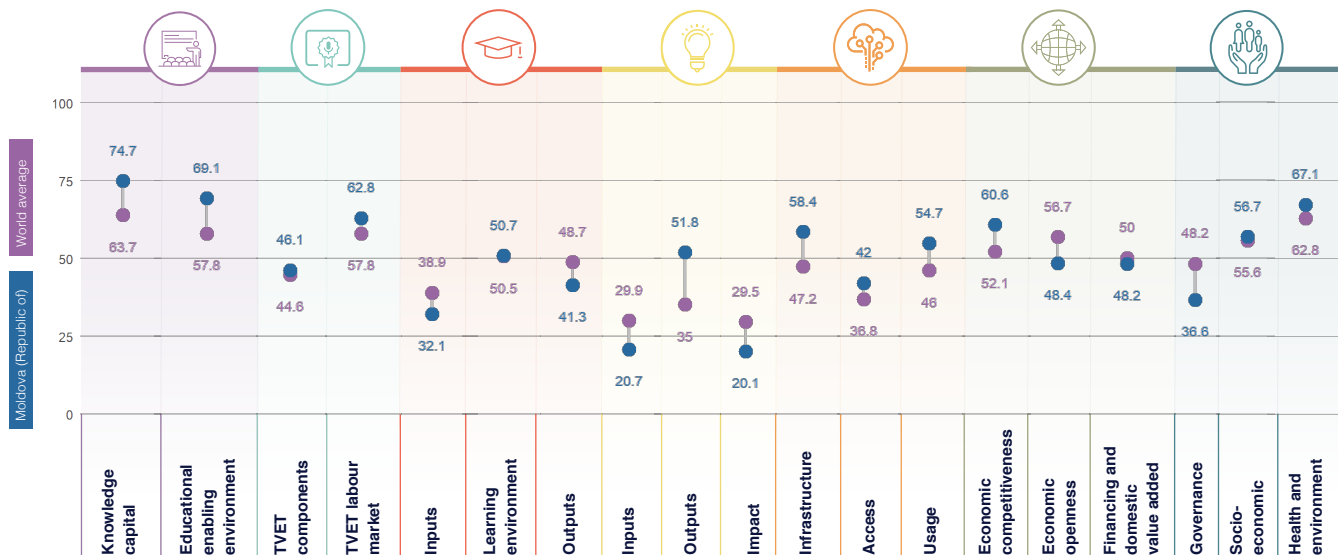
- Average documents per researcher
- Researchers in higher education (%)
- Chinn-Ito financial openness
- GERD per researcher
- State of cluster development

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	53	71.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	61	54.4
HIGHER EDUCATION	97	41.4
RESEARCH, DEVELOPMENT AND INNOVATION	72	30.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	53	51.7
ECONOMY	70	52.4
ENABLING ENVIRONMENT	77	53.4



## GKI PILLARS





# MOLDOVA (REPUBLIC OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	71.9
Enrollment	40	54.1
Net enrolment rate in primary education	29	87.6
Net enrolment rate in lower secondary education	27	85.0
Net enrolment rate in upper secondary education	60	83.0
Completion	20	82.0
Years of compulsory education in primary and secondary	28	86.6
Completion rate in upper secondary education	54	74.1
Success rate rate in the last grade of lower secondary education	9	90.1
Completion	70	47.1
Assessment of 15-year-old students in math, science and reading	69	36.6
Learning-adjusted years of schooling	74	87.3
<b>Educational enabling environment</b>	<b>48</b>	<b>86.5</b>
Expenditure	31	42.4
Government expenditure on primary education (% GDP)	61	29.1
Government expenditure on secondary education (% GDP)	29	33.6
Government funding per primary student (% GDP per capita)	6	81.8
Government funding per secondary student (% GDP per capita)	35	40.2
Resources	31	80.1
Pupil-based teacher ratio in primary education	27	89.5
Pupil-based teacher ratio in secondary education	10	86.1
Schools with access to computers in primary education (%)	25	82.3
Schools with access to computers in secondary education (%)	30	89.6
Early learning	11	80.0
Class attendance rate in early childhood education	42	87.9
Proportion of children who are developmentally on track	19	76.7
Proportion of children with stimulating home learning environments	11	91.0
Pupil-based teacher ratio in preprimary education	9	83.8
Quality and infrastructure	61	51.1
Completion rate in upper secondary education, gender parity	77	85.4
Completion rate in upper secondary education, wealth parity	77	85.0
Completion rate in upper secondary education, location parity	76	80.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Enrollment in training and learning	10	44.0
Firms offering formal training (%)	41	46.8
Labour force with short-cycle tertiary education (%)	116	119
Participation rate in formal and non-formal education and training	106	108
TVET resources	61	50.0
Government expenditure on vocational education (%)	84	32
Share of students enrolled in secondary vocational programmes	60	20.0
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	109	40.4
Extent of staff training	111	42.8
Quality of vocational training	113	41.0
Ratio of high-skill TVET occupations earnings to average wage	79	29.7
Ratio of medium-skill TVET occupations earnings to average wage	69	56.0
<b>TVET labour market</b>		
Efficiency of the labour market	61	51.1
Firms considered well matched with workforce (%)	100	37
Employment educational mismatch (%)	15	85
Proportion of skilled production workers	87	47.0
Unemployment rate with vocational education	17	80.0
Real TVET unemployment	75	59.0
Share of TVET occupations	62	53.0
Manufacturing employment (%)	67	28.0
Quality and infrastructure	61	51.1
Enrollment in vocational education, gender parity	47	85.0
Useable employment rate	80	87.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	60	29.0
Government expenditure per tertiary student	63	15
Teaching staff compensation (% tertiary expenditure)	88	43.0
Enrollment	76	11.1
Enrollment in bachelor's or equivalent level (%)	91	13.2
Enrollment in masters, doctoral or equivalent (%)	55	31
Resources	111	91
Pupil-teacher ratio in tertiary education	47	80.5
Researchers in higher education (%)	88	15.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	65	84.0
Labour mobility rate	42	20.4
Academic freedom	44	86.0
Quality and infrastructure	61	43.2
Class attendance rate in tertiary education, gender parity	61	76.7
Class attendance rate in tertiary education, wealth parity	24	49.0
Class attendance rate in tertiary education, location parity	57	64
<b>Outputs</b>		
Retention	66	21.7
Educational attainment rate, bachelor's or equivalent	48	84.0
Educational attainment rate, master's or equivalent	70	5.0
Educational attainment rate, doctoral or equivalent	64	9
Employment	61	71.4
Labour force participation rate with advanced education	100	53.7
Unemployment rate with advanced education	9	85.0
Impact	111	27.1
University tertiary enrollment in R&D	126	28.7
CRIDE indicators per 100 personnel in higher education	67	34.7
<b>International comparisons and performance</b>		
Quality	111	27.1
Quality of TVET	109	40.4
Quality of TVET	109	40.4
GERD (% GDP)	66	4.8
GERD per researcher	100	4.2
Researchers per thousand labour force	56	12.1
Tertiary graduates from STEM programmes (%)	43	47
Quality of TVET	109	40.4
GERD performed by business enterprises (%)	71	7.2
GERD financed by business enterprises (%)	32	18.2
Researchers in business enterprises (%)	86	7.2
Firms that spend on R&D (%)	70	20.2
Quality of TVET	109	40.4
High-skill employment (%)	8	60.3
Intellectual property payments (% total trade)	69	14.4
State of cluster development	100	26.1
Quality	111	27.1
Quality of TVET	109	40.4
Average documents per researcher	102	34.0
Citations per document	1	109
Patent applications (per 100 billion GDP)	27	62.0
Quality of TVET	109	40.4
Intellectual property receipts (% total trade)	79	7.6
Research design applications (per 100 billion GDP)	12	81.0
PCT applications (per 100 billion GDP)	62	54.7
Firms producing new goods and services (%)	58	48.0



# MOLDOVA (REPUBLIC OF)

	Rank	Value		Rank	Value
<b>Business environment</b>			<b>Business agility</b>		
Treatment applications (per 100 billion GDP)	7	85.0	Ease of starting a business	11	85.7
Cultural goods exports (% exports)	81	4.3	Recovery recovery time	80	34.0
Printing and publishing output (% manufactured output)	77	16.4	Entrepreneurial employee activity rate	116	11.9
<b>Finance</b>			Growth of corporate transactions	13	85.7
Banking	10	8	<b>Corporate openness</b>		
Access to institutions' provisions	81	6.8	Trust in institutions	91	11
Depth of innovative companies	128	35.7	Taxs (% GDP)	65	31.1
ISO 9001 quality certificates (% GDP)	62	10.0	High-technology trade (% total trade)	88	42.0
ISO 14001 environmental certificates (% GDP)	82	5.8	Market concentration	81	80.8
<b>Logistics</b>			Market concentration	75	83.0
CERD received from abroad (%)	83	9.4	Product diversity	114	31.0
Cost of letters per storage of data deals (% GDP)	39	17.8	Charitable financial openness	85	16.4
Computer software spending (% GDP)	87	6.4	Foreign direct investment, net inflows (% GDP)	85	41.7
<b>Government efficiency</b>			Cost dynamics	88	48.1
New business density per thousand population	85	9.2	<b>Financing and domestic value added</b>		
Firms with new products/services (%)	81	87.3	Financing and costs	91	22.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>			Domestic credit to private sector (% GDP)	112	9.7
<b>Infrastructure</b>			IMR financing gap (% GDP)	40	74.0
Coverage			Tax and contribution rate (% profit)	85	88.8
30MHz mobile network coverage (% population)	26	89.4	Bank nonperforming loans (%)	69	88
Secure Internet servers per 1 million population	53	14.1	Unmet basic needs	76	41
Investment in telecommunication services (% GDP)	40	28.2	Medium- and high-tech activities value added	87	30.6
<b>Quality</b>			Industry and services value added (% GDP)	100	85.8
Mobile speed and download speeds	116	11.9	Labour underutilization rate	41	78.0
Fixed-broadband upload and download speeds	116	11.9	Output per worker	54	10
Fixed-broadband subscriptions (by speed) per hundred people	86	38.2	<b>ENABLING ENVIRONMENT</b>		
<b>Availability</b>			<b>Governance</b>		
Fixed broadband bandwidth (% GIG per capita)	68	77.8	Political environment	88	38.0
Mobile broadband basket (% GIG per capita)	20	81.1	Peace and stability	85	32.0
Internet and telephony competition	1	100	View and accountability	81	44.4
<b>Access</b>			Quality of institutions	87	34.0
<b>Connectivity</b>			Rule of law	84	37.0
Active mobile-broadband subscriptions per fixed-line inhabitants	104	25.2	Control of corruption	100	30.0
International Internet bandwidth per user	43	47.2	Government effectiveness	100	36.1
Households with Internet access at home (%)	80	64.6	<b>Socio-economic</b>		
<b>Skills and employment</b>			Gender equity	38	16.4
Individuals with standard ICT skills (%)	116	11.9	Female-to-male ratio in parliament	27	85.0
Tertiary graduates from ICT programmes (%)	34	49.0	Female-to-male labour force participation	47	83.2
ICT employment (%)	28	35.0	Female-to-male ratio in internal wage	116	11.9
<b>Usage</b>			Government access	82	38
<b>Services</b>			Social protection coverage (% population)	85	40.0
Government online services	87	75.0	Adult literacy rate	117	89.0
Fixed broadband Internet traffic per subscription	116	11.9	Youth not in employment, education or training (%)	102	37.0
Mobile broadband Internet traffic per subscription	88	13.7	<b>Standard of living</b>		
Internet users (%)	64	74.0	Poverty headcount ratio (% population)	34	82.0
<b>Statistics</b>			GDP per capita	82	10.8
ICT FDI patent applications (per 100 billion GDP)	33	58.6	<b>Health and environment</b>		
E-participation	54	36.2	Health		
Internet activities by individuals (%)	116	11.9	Universal health coverage	79	69
Trade in digitally deliverable services (% total trade)	85	25.1	Healthy life expectancy (years)	86	86
<b>ECONOMY</b>			Unemployment rate	75	80.0
<b>Economic competitiveness</b>			Economic total performance	62	33.0
OECD average innovation	82	40.1	Renewable energy consumption (%)	88	26.7
Overhead capital formation (% GDP)	37	89.0	Household budget per capita	86	88.7
Logistics performance	112	36.4	Natural hazard exposure	65	80
Transport productive capacity	82	23.1			
Building quality control	47	80			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 69/154

**GKI SCORE** 49.4

**WORLD AVERAGE** 48.4

# MONGOLIA

## KEY INDICATORS

**GDP** US\$ billions ..... **37,604**  
**Population** ..... **3,278,292**  
**HDI** ..... **0.737**

## COUNTRY PERFORMANCE SUMMARY

Mongolia is a moderate performer in terms of its knowledge infrastructure. It ranks 69th out of 154 countries in the Global Knowledge Index 2021 and 12th out of the 39 countries with high human development.

### AREAS OF STRENGTH

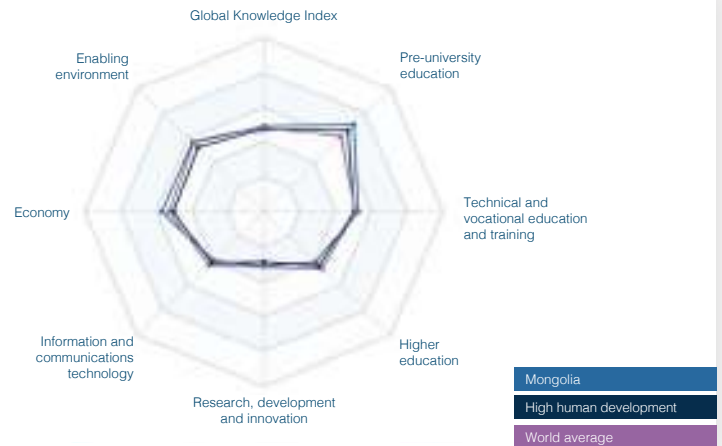
- + Firms offering formal training (%)
- + Firms with new product/service (%)
- + Trademark applications (per 100 billion GDP)
- + Industrial design applications (per 100 billion GDP)
- + Foreign direct investment, net inflows (% GDP)

### AREAS OF IMPROVEMENT

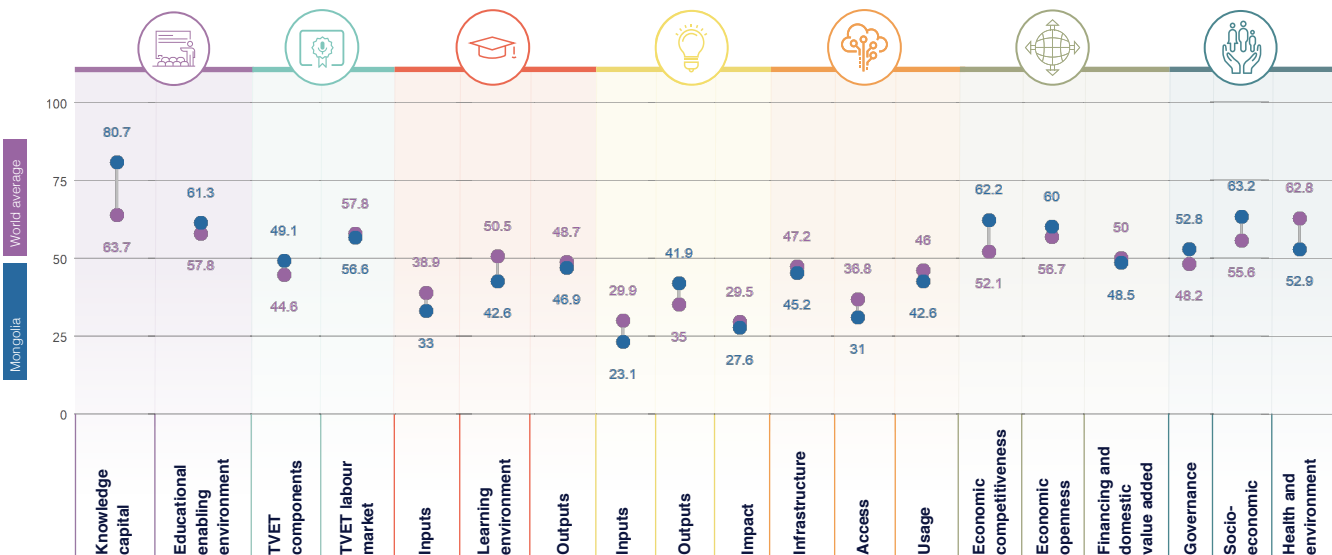
- Participation rate in formal and non-formal education and training
- Government expenditure per tertiary student
- Teaching staff compensation (% tertiary expenditure)
- Cultural goods exports (% exports)
- Market concentration

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	57	71
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	73	52.8
HIGHER EDUCATION	100	40.8
RESEARCH, DEVELOPMENT AND INNOVATION	73	30.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	88	39.6
ECONOMY	55	56.9
ENABLING ENVIRONMENT	66	56.3



## GKI PILLARS







# MONGOLIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	38	90.7
Enrollment	88	81.5
Net enrolment rate in primary education	32	90.1
Net enrolment rate in lower secondary education	79	89.9
Net enrolment rate in upper secondary education	53	86.4
Completion	58	85.2
Years of compulsory education in primary and secondary	5	82.9
Completion rate in upper secondary education	42	84.7
Success rate rate in the last grade of lower secondary education	46	79.4
Completion	40	80.0
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	81	85.0
<b>Educational enabling environment</b>		
Expenditure	88	23.1
Government expenditure on primary education (% GDP)	79	29.1
Government expenditure on secondary education (% GDP)	79	23.0
Government funding per primary student (% GDP per capita)	79	31.2
Government funding per secondary student (% GDP per capita)	116	116
Resources	88	81.0
Pupil-based teacher ratio in primary education	87	70.7
Pupil-based teacher ratio in secondary education	28	87.0
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	84	81.6
Early learning	88	81
Class attendance rate in early childhood education	22	88.8
Proportion of children who are developmentally on track	33	82.7
Proportion of children with stimulating home learning environments	42	82.1
Pupil-based teacher ratio in preprimary education	81	72.0
Quality and infrastructure	88	70
Completion rate in upper secondary education, gender parity	79	86.4
Completion rate in upper secondary education, wealth parity	50	85.1
Completion rate in upper secondary education, location parity	61	86.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	88	40.1
Firms offering formal training (%)	5	83.2
Labour force with short-cycle tertiary education (%)	77	84.0
Participation rate in formal and non-formal education and training	80	81.8
TVET enrolment	84	80.7
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	73	15.4
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	88	40.4
Extent of staff training	84	45.4
Quality of vocational training	80	44.4
Ratio of high-skill TVET occupations earnings to average wage	84	27.7
Ratio of medium-skill TVET occupations earnings to average wage	23	55.7
<b>TVET labour market</b>		
Efficiency of the labour market	81	81.0
Firms considered with inappropriately educated workforce (%)	33	80.0
Employment educational mismatch (%)	17	84.0
Proportion of skilled production workers	72	81.8
Unemployment rate with vocational education	72	36.0
Real TVET unemployment	100	11.0
Share of TVET occupations	113	36.0
Manufacturing employment (%)	112	20
Quality and infrastructure	116	10
Enrollment in vocational education, gender parity	88	83.0
Useable employment rate	104	50.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	128	1.1
Government expenditure per tertiary student	128	2.2
Teaching staff compensation (% tertiary expenditure)	88	9
Enrollment	28	26.0
Enrollment in bachelor's or equivalent level (%)	15	43.4
Enrollment in masters, doctoral or equivalent (%)	40	35.0
Resources	100	18.2
Pupil-teacher ratio in tertiary education	88	58.8
Researchers in higher education (%)	116	116
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	88	47.4
Labour mobility rate	87	6.1
Academic freedom	40	80
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	19	81.0
Class attendance rate in tertiary education, wealth parity	88	13.0
Class attendance rate in tertiary education, location parity	44	9.2
<b>Outputs</b>		
Skilled labour	44	32.0
Educational attainment rate, bachelor's or equivalent	13	85.2
Educational attainment rate, master's or equivalent	48	11.8
Educational attainment rate, doctoral or equivalent	88	0.8
Employment	88	14.7
Labour force participation rate with advanced education	80	85.0
Unemployment rate with advanced education	80	85.7
<b>Impact</b>		
University tertiary enrollment in R&D	118	32.4
OECD indicators per 100 personnel in higher education	116	116
<b>Government's contribution to economic growth</b>		
<b>Inputs</b>		
Government expenditure	88	12.7
GDP (% GDP)	100	1.0
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	88	42.8
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	84	0.2
GERD financed by business enterprises (%)	79	80
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	52	22.4
<b>Quality and infrastructure</b>		
High-skill employment (%)	7	80.0
Intellectual property payments (% total trade)	88	0.1
State of cluster development	128	33.7
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	116	116
Citations per document	108	15.0
Patent applications (per 100 billion GDP)	42	68.1
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	88	0.1
Research design applications (per 100 billion GDP)	1	398
PCT applications (per 100 billion GDP)	88	45.1
Firms producing new goods and services (%)	38	84.7



# MONGOLIA

	Rank	Value
<b>Consumer confidence</b>	97	55.4
Treatment applications per 100 million GDP	1	100
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	40	27.3
<b>Energy</b>	81	45.0
<b>Energy</b>	100	51.1
Risks of institutions' persistence	100	4.8
Depth of innovative companies	70	50.0
ISO 9001 quality certificates (% GDP)	97	0.4
ISO 14001 environmental certificates (% GDP)	100	2.4
<b>Finance</b>	110	5.5
CERD forecast from abroad (%)	79	0.7
Joint ventures per strategic industry deals (% GDP)	118	9
Computer software spending (% GDP)	80	12.3
<b>Government efficiency</b>	97	60.4
New business density per thousand population	25	27.5
Firms with one product/service (%)	3	81.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	88	56.0
<b>Infrastructure</b>	85	40.0
<b>Coverage</b>	79	41.0
30MHz mobile network coverage (% population)	24	84.3
Secure Internet servers per 1 million population	25	7.7
Investment in telecommunication services (% GDP)	20	40
<b>Quality</b>	97	70.0
Mobile upload and download speeds	99	21.0
Fixed broadband upload and download speeds	93	30
Fixed broadband subscriptions (y speed) per hundred people	81	14.0
<b>Availability</b>	97	50.0
Fixed broadband latency (% QM per capita)	99	80.1
Mobile broadband basket (% QM per capita)	92	54.1
Internet and telephony competition	100	84.8
<b>Access</b>	88	21
<b>Connectivity</b>	99	11
Active mobile-broadband subscriptions per hundred inhabitants	29	40
International Internet bandwidth per user	88	37.0
Households with Internet access at home (%)	97	44.7
<b>Skills and employment</b>	100	17.0
Individuals with standard ICT skills (%)	85	15.4
Tertiary graduates from ICT programmes (%)	100	17.0
ICT employment (%)	27	20.5
<b>Usage</b>	87	40.0
<b>Services</b>	88	37.0
Government online services	100	57.0
Fixed broadband Internet traffic per subscription	24	20.7
Mobile broadband Internet traffic per subscription	40	16.0
Internet users (%)	94	80.4
<b>Commerce</b>	70	17.7
ICT FDI parent applications (per 100 million GDP)	104	19
E-participation	89	80.7
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	84	34.0
<b>ECONOMY</b>	24	30.0
<b>Economic competitiveness</b>	27	50.0
<b>Infrastructure investment</b>	41	100
Overhead capital formation (% GDP)	25	84.1
Logistics performance	128	34.5
Transport productive capacity	97	30.4
Building quality control	8	80.0

	Rank	Value
<b>Business agility</b>	91	60.0
Ease of starting a business	86	80.7
Recovery recovery rate	128	18.0
Entrepreneurial employee activity rate	104	19
Growth of corporate transactions	1	100
<b>Customer experience</b>	87	80
<b>Trade and investment</b>	107	47.7
Trade (% GDP)	25	48.1
High-technology trade (% total trade)	113	34.4
Market concentration	128	84.4
Market concentration	148	43.7
Product diversification	91	70.0
China's financial openness	58	83.0
Foreign direct investment, net inflows (% GDP)	1	100
Cost dynamics	100	21.0
<b>Financing and domestic value added</b>	82	40.0
<b>Financing and costs</b>	70	20.0
Domestic credit to private sector (% GDP)	85	16.0
IMRS financing gap (% GDP)	27	70.0
Tax and contribution rate (% profit)	29	82
Bank nonperforming loans (%)	104	19
Unmet loan demand	99	27.0
Medium- and high-tech activities value added	109	3.3
Industry and services value added (% GDP)	100	54.0
Labour underutilization rate	28	80.4
Output per worker	80	11.7
<b>ENABLING ENVIRONMENT</b>	84	56.0
<b>Governance</b>	83	57.0
<b>Political environment</b>	40	63.0
Peace and stability	25	72.0
View and accountability	28	58.0
Quality of institutions	65	43.1
Rule of law	80	46.7
Control of corruption	86	34.0
Government effectiveness	88	28.0
<b>Socio-economic</b>	52	60.0
<b>Gender equity</b>	76	63.0
Female-to-male ratio in parliament	111	21
Female-to-male labour force participation	71	35.0
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	20	80.0
Social protection coverage (% population)	1	100
Adult literacy rate	18	88.0
Youth not in employment, education or training (%)	58	67.4
<b>Standard of living</b>	96	21.1
Poverty headcount ratio (% population)	87	80.0
GDP per capita	86	18
<b>Health and environment</b>	141	50.0
<b>Health</b>	101	66
Universal health coverage	100	82
Healthy life expectancy (years)	112	83.0
Under-five mortality rate	82	65.1
<b>Environmental performance</b>	100	27.0
Renewable energy consumption (%)	100	3.5
Household footprint per capita	145	86
Natural hazard exposure	55	71

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 41/154

**GKI SCORE** 56.4

**WORLD AVERAGE** 48.4

# MONTENEGRO

## COUNTRY PERFORMANCE SUMMARY

Montenegro is a strong performer in terms of its knowledge infrastructure. It ranks 41st out of 154 countries in the Global Knowledge Index 2021 and 40th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **11.364**  
**Population** ..... **628.062**  
**HDI** ..... **0.829**

### AREAS OF STRENGTH

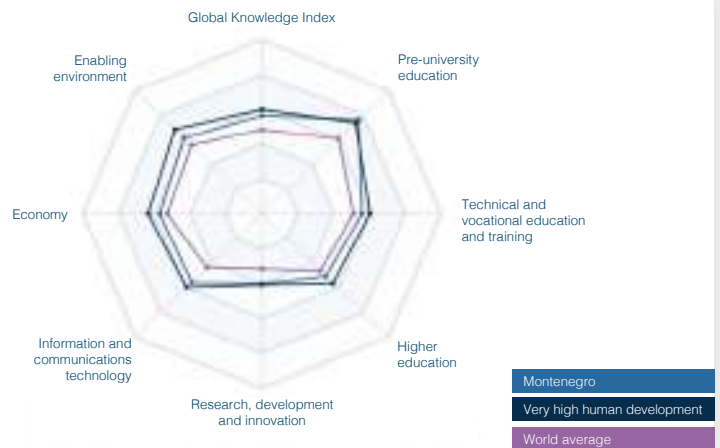
- + Citations per document
- + Employment educational mismatch (%)
- + Under-five mortality rate
- + ISO 14001 environmental certificates (% GDP)
- + Printing and publishing output (% manufactured output)

### AREAS OF IMPROVEMENT

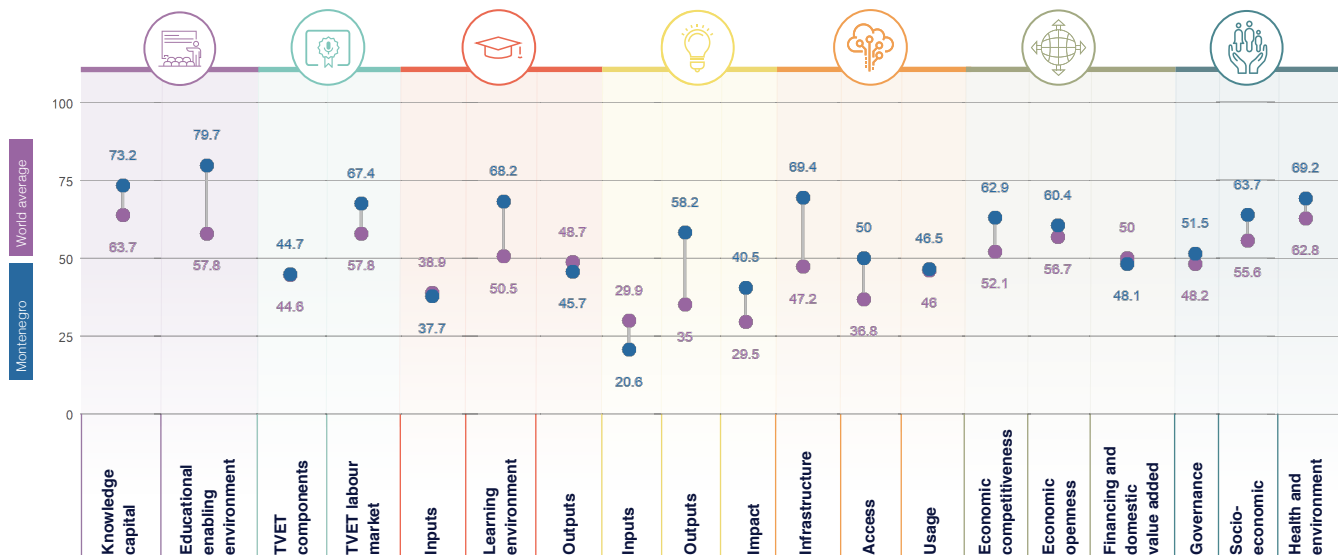
- Firms offering formal training (%)
- Unemployment rate with vocational education
- Labour force participation rate with advanced education
- Firms with new product/service (%)
- Firms that spend on R&D (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	32	76.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	50	56
HIGHER EDUCATION	45	50.5
RESEARCH, DEVELOPMENT AND INNOVATION	32	39.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	43	55.3
ECONOMY	53	57.1
ENABLING ENVIRONMENT	47	61.5



## GKI PILLARS







# MONTENEGRO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	76.5
Enrollment	81	82.5
Net enrolment rate in primary education	6	99.9
Net enrolment rate in lower secondary education	89	87.5
Net enrolment rate in upper secondary education	89	86.5
Completion	82	77.5
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	27	90
Success rate rate in the last grade of lower secondary education	86	73.4
Completion	80	49.5
Assessment of 15-year-old students in math, science and reading	33	33.9
Learning-adjusted years of schooling	57	83.2
<b>Educational enabling environment</b>		
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	88	81.2
Class attendance rate in early childhood education	88	80.1
Proportion of children who are developmentally on track	5	87.8
Proportion of children with stimulating home learning environments	9	85.8
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	81	81.1
Completion rate in upper secondary education, gender parity	88	81.8
Completion rate in upper secondary education, wealth parity	88	84.5
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	81	41.2
Firms offering formal training (%)	112	76
Labour force with short-cycle tertiary education (%)	87	84.5
Participation rate in formal and non-formal education and training	116	116
TVET resources	81	81.1
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	17	55.1
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	116	80.9
Extent of staff training	72	49.5
Quality of vocational training	72	49.5
Ratio of high-skil TVET occupations earnings to average wage	89	27.8
Ratio of medium-skill TVET occupations earnings to average wage	89	37.1
<b>TVET labour market</b>		
Efficiency of the labour market	88	71.2
Firms considered with inequality educated workforce (%)	83	39.6
Employment educational mismatch (%)	3	82.9
Proportion of skilled production workers	88	71
Unemployment rate with vocational education	106	82.3
Real TVET unemployment	88	81
Share of TVET occupations	84	82.9
Manufacturing employment (%)	129	81
Quality and infrastructure	81	81
Enrollment in vocational education, gender parity	38	89.9
Useable employment rate	45	80

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	80	33.8
Enrollment in bachelor's or equivalent level (%)	86	27.8
Enrollment in masters, doctoral or equivalent (%)	58	18.2
Resources	108	37.1
Ratio teacher ratio in tertiary education	88	78.8
Researchers in higher education (%)	81	25.2
<b>Learning environment</b>		
Directly paid academic freedom	17	13.8
Teachers in tertiary education, gender parity	5	98
Labour mobility rate	116	116
Academic freedom	106	80.9
Quality and infrastructure	5	81
Class attendance rate in tertiary education, gender parity	71	67.8
Class attendance rate in tertiary education, wealth parity	4	85.3
Class attendance rate in tertiary education, location parity	18	32.1
<b>Outputs</b>		
Attainment	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	108	81
Labour force participation rate with advanced education	128	18.2
Unemployment rate with advanced education	106	83.7
Impact	88	81.8
University tertiary enrollment in R&D	88	48.5
OECD indicators per 100 personnel in higher education	88	57.5
<b>Government's contribution to innovation and research</b>		
Inputs	111	10.8
Government R&D expenditure	108	11.1
GDP (% GDP)	72	7.2
GERD per researcher	88	18.1
Researchers per thousand labour force	88	18.5
Tertiary graduates from STEM programmes (%)	71	37.8
Quality and infrastructure	116	116
GERD performed by business enterprises (%)	86	7.4
GERD financed by business enterprises (%)	88	23.2
Researchers in business enterprises (%)	88	13.2
Firms that spend on R&D (%)	117	0.6
Quality and infrastructure	88	81.1
High-skilled employment (%)	11	68.9
Intellectual property payments (% total trade)	87	8.4
State of cluster development	78	48.9
<b>Outputs</b>		
Government R&D expenditure	8	11.1
Average documents per researcher	13	75.1
Citations per document	3	88
Patent applications (per 100 billion GDP)	116	116
Quality and infrastructure	116	116
Intellectual property receipts (% total trade)	88	5.8
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	88	45.8
Firms producing new goods and services (%)	88	27.4





# MONTENEGRO

	Rank	Value
<b>Business environment</b>		
Treatment applications (per 100 million GDP)	116	116
Cultural goods exports (% exports)	47	16.6
Printing and publishing output (% manufactured output)	4	25.0
<b>Energy</b>		
Renewable	10	100
Renewable or investment's proportion	100	2
Depth of innovative companies	75	50.1
ISO 9001 quality certificates (% GDP)	11	29.7
ISO 14001 environmental certificates (% GDP)	1	100
<b>Environment</b>		
CERD received from abroad (%)	44	19.6
Cost of waste per storage of waste deals (% GDP)	50	13.7
Computer software spending (% GDP)	27	21.7
<b>Government efficiency</b>		
New business density per thousand population	6	50.1
Firms with one or more employees (%)	112	26.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>41</b>	<b>52.3</b>
<b>Infrastructure</b>		
Coverage	6	12.2
30MHz mobile network coverage (% population)	62	67.6
Secure Internet servers per 1 million population	73	5.1
Investment in telecommunication services (% GDP)	1	100
<b>Quality</b>		
Mobile speed and download speeds	116	116
Fixed broadband upload and download speeds	116	116
Fixed broadband subscriptions (by speed) per hundred people	27	67.6
<b>Availability</b>		
Fixed broadband bandwidth (% Gbps per capita)	66	60.9
Mobile broadband basket (% Gbps per capita)	33	69.2
Internet and telephony competition	1	100
<b>Access</b>		
<b>Subscribers</b>		
Active mobile-broadband subscriptions per hundred inhabitants	67	27.0
International Internet bandwidth per user	1	81
Households with Internet access at home (%)	65	60.4
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	32	50.9
Tertiary graduates from ICT programmes (%)	65	22.7
ICT employment (%)	41	25.9
<b>Usage</b>		
<b>Services</b>		
Government online services	69	54.1
Fixed broadband Internet traffic per subscriber	44	24.1
Mobile broadband Internet traffic per subscriber	25	22
Internet users (%)	40	60.0
<b>Statistics</b>		
ICT/FDI patent applications (per 100 million GDP)	39	25
E-participation	60	54.0
Internet activities by individuals (%)	41	51.9
Trade in digitally deliverable services (% total trade)	54	21.4
<b>ECONOMY</b>	<b>23</b>	<b>57.1</b>
<b>Economic competitiveness</b>		
OECD innovation scoreboard	16	52.1
Overhead capital formation (% GDP)	25	61.7
Logistics performance	71	45.6
Transport productive capacity	67	25.0
Building quality control	60	66.7

	Rank	Value
<b>Business agility</b>		
Cost of starting a business	66	66.7
Recovery time	44	54.0
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	12	65.7
<b>Business openness</b>		
Trade and investment	22	61.0
Trade (% GDP)	43	33.4
High-technology trade (% total trade)	75	45.0
Market concentration	65	60.1
Market concentration	20	64.1
Product diversity	11	61
Domestic financial openness	116	116
Foreign direct investment, net inflows (% GDP)	11	24.1
Cost dynamics	110	40
<b>Financing and domestic value added</b>		
Financing and costs	41	12.1
Domestic credit to private sector (% GDP)	65	22.2
IMRS financing gap (% GDP)	40	20.0
Tax and contribution rate (% profit)	29	65.6
Bank nonperforming loans (%)	60	25.4
Unmet loan demand	110	22.0
Medium- and high-tech activities value added	65	17.2
Industry and services value added (% GDP)	110	50.4
Labour underutilization rate	127	41.0
Output per worker	61	52.1
<b>ENABLING ENVIRONMENT</b>	<b>47</b>	<b>61.5</b>
<b>Governance</b>		
Political environment	37	40
Peace and stability	71	47.2
View and accountability	74	48.6
Quality of institutions	55	35
Rule of law	60	55.0
Control of corruption	61	56.0
Government effectiveness	75	52.8
<b>Socio-economic</b>		
Gender equity	67	65
Female-to-male ratio in parliament	75	32.0
Female-to-male labour force participation	67	23.6
Female-to-male ratio in internal wage	44	50.0
Gender inequality	29	32
Social protection coverage (% population)	116	116
Adult literacy rate	23	66.6
Youth not in employment, education or training (%)	75	65.0
Standard of living	71	41
Poverty headcount ratio (% population)	75	65.0
GDP per capita	61	76
<b>Health and environment</b>		
Health	22	61.0
Universal health coverage	65	65
Healthy life expectancy (years)	34	25.1
Under-five mortality rate	4	60.7
Environmental performance	60	67.0
Renewable energy consumption (%)	47	42.1
Household footprint per capita	100	21.0
Natural hazard exposure	70	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 101/154

**GKI SCORE** 43.5

**WORLD AVERAGE** 48.4

# MOROCCO

## KEY INDICATORS

**GDP US\$ billions** 259,418  
**Population** 36,910,558  
**HDI** 0.686

## COUNTRY PERFORMANCE SUMMARY

Morocco is a modest performer in terms of its knowledge infrastructure. It ranks 101st out of 154 countries in the Global Knowledge Index 2021 and 6th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

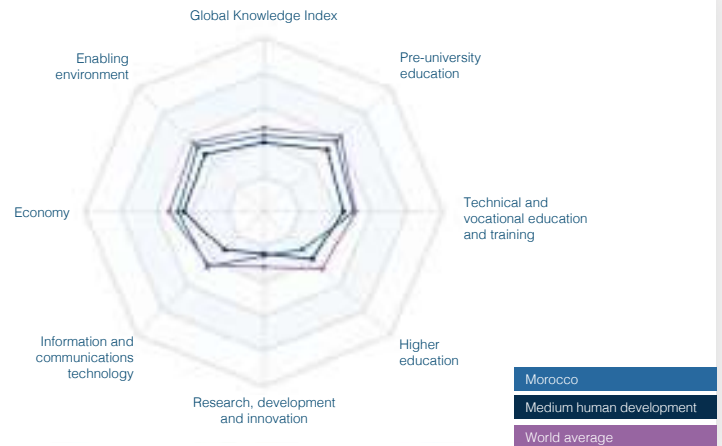
- + Government funding per secondary student (% of GDP per capita)
- + Poverty headcount ratio (% population)
- + Government expenditure on secondary education (% of GDP)
- + Researchers in higher education (%)
- + Industrial design applications (per 100 billion GDP)

### AREAS OF IMPROVEMENT

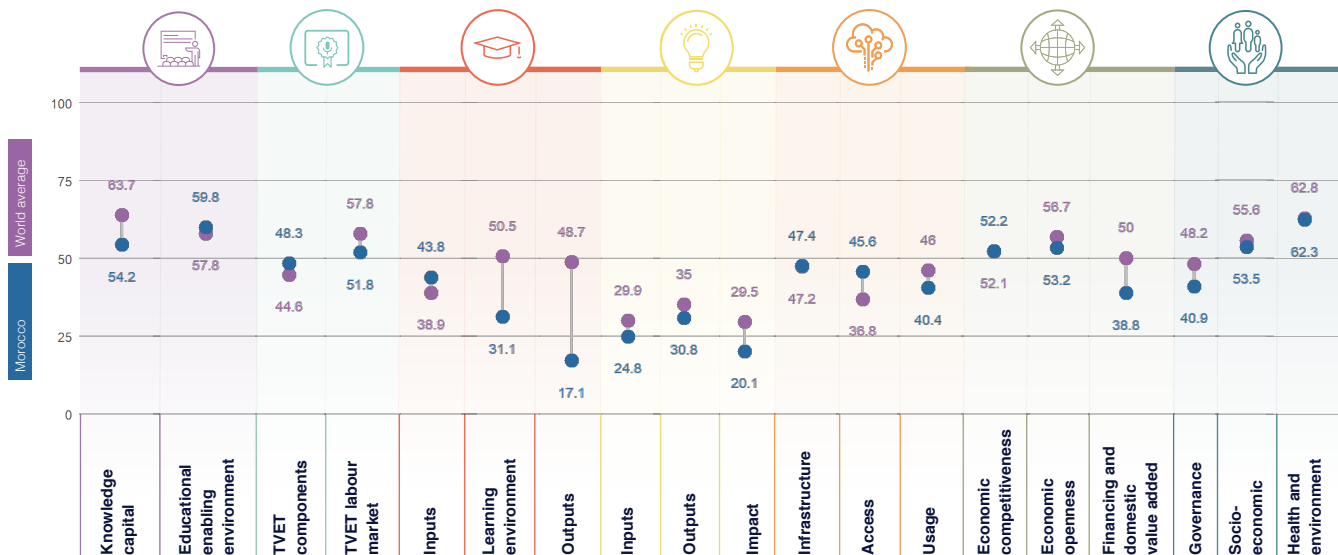
- Average documents per researcher
- Assessment of 15-year-old students in math, science and reading
- Firms with new product/service (%)
- Citable documents per R&D personnel in higher education
- Firms producing new goods and services (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	99	57
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	79	50.1
HIGHER EDUCATION	142	30.7
RESEARCH, DEVELOPMENT AND INNOVATION	109	25.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	74	44.5
ECONOMY	97	48
ENABLING ENVIRONMENT	84	52.3



## GKI PILLARS





# MOROCCO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	168	54.3
Enrollment	95	65.4
Net enrolment rate in primary education	23	99.6
Net enrolment rate in lower secondary education	74	90
Net enrolment rate in upper secondary education	89	70.6
Completion	115	49.9
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	104	25.4
Success rate rate in the last grade of lower secondary education	100	92
Completion	123	26.5
Assessment of 15-year-old students in math, science and reading	73	13.6
Learning-adjusted years of schooling	106	35.6
<b>Educational enabling environment</b>	78	66.8
Expenditure	9	61.1
Government expenditure on primary education (% GDP)	22	60.9
Government expenditure on secondary education (% GDP)	7	53.4
Government funding per primary student (% GDP per capita)	42	66.6
Government funding per secondary student (% GDP per capita)	4	66
Resources	99	60.3
Pupil-based teacher ratio in primary education	55	35.6
Pupil-based teacher ratio in secondary education	27	38.6
Schools with access to computers in primary education (%)	53	70.6
Schools with access to computers in secondary education (%)	67	67.7
Early learning	100	44.2
Class attendance rate in early childhood education	108	20.4
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	66	25.1
Pupil-based teacher ratio in preprimary education	30	69.5
Quality and infrastructure	106	106
Completion rate in upper secondary education, gender parity	104	106
Completion rate in upper secondary education, wealth parity	106	106
Completion rate in upper secondary education, location parity	104	106
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	88	66.3
Commence training, worldwide	99	41.1
Firms offering formal training (%)	59	43.7
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	106	106
TVET resources	97	50.3
Government expenditure on vocational education (%)	104	106
Share of students enrolled in secondary vocational programmes	65	12.9
Share of students enrolling in postsecondary vocational programmes	1	106
TVET quality and infrastructure	99	44.9
Extent of staff training	100	43.6
Quality of vocational training	94	40.2
Ratio of high-skil TVET occupations earnings to average wage	106	106
Ratio of median-skil TVET occupations earnings to average wage	106	106
<b>TVET labour market</b>	113	61.8
Efficiency of the labour market	106	41.5
Firms considered with inappropriately educated workforce (%)	62	43.5
Employment educational mismatch (%)	106	106
Proportion of skilled production workers	100	34.7
Unemployment rate with vocational education	106	106
High TVET unemployment	97	61.1
Share of TVET occupations	43	65
Manufacturing employment (%)	79	23.3
Quality and infrastructure	106	63.7
Enrollment in vocational education, gender parity	71	36.1
Useable employment rate	100	51.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	88	43.8
Expenditure	106	106
Government expenditure per tertiary student	106	106
Teaching staff compensation (% tertiary expenditure)	106	106
Enrollment	99	21.5
Enrollment in bachelor's or equivalent level (%)	77	28.5
Enrollment in masters, doctoral or equivalent (%)	53	22.7
Resources	99	66.1
Rpiti-teacher ratio in tertiary education	121	46.3
Researchers in higher education (%)	6	62
<b>Learning environment</b>	136	31.1
Directly and indirectly funded	121	61.1
Teachers in tertiary education, gender parity	100	34.9
Labour mobility rate	60	7.3
Academic freedom	100	47.9
Quality and infrastructure	106	106
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>	104	17.1
Efficiency	106	106
Educational attainment rate, bachelor's or equivalent	106	106
Educational attainment rate, master's or equivalent	106	106
Educational attainment rate, doctoral or equivalent	106	106
Employment	106	106
Labour force participation rate with advanced education	106	106
Unemployment rate with advanced education	106	106
Impact	116	17.1
University tertiary enrollment in R&D	127	28.2
OECD indicators per 100 personnel in higher education	100	5.1
<b>INNOVATION, KNOWLEDGE AND SKILLS</b>		
<b>Inputs</b>	99	66.3
Commence R&D worldwide	99	66.3
GDP (% GDP)	106	106
GERD per researcher	106	106
Researchers per thousand labour force	45	22.5
Tertiary graduates from STEM programmes (%)	72	37.7
Quality and infrastructure	106	66.3
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	64	5.2
Firms that spend on R&D (%)	66	21.6
Quality and infrastructure	106	66.3
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	63	6.1
State of cluster development	88	41.9
<b>Outputs</b>	99	66.3
Commence R&D worldwide	106	66.3
Average documents per researcher	100	21
Citations per document	100	16.6
Patent applications (per 100 billion GDP)	65	61.5
Quality and infrastructure	106	66.3
Intellectual property receipts (% total trade)	64	6.1
Research design applications (per 100 billion GDP)	4	47.2
PCT applications (per 100 billion GDP)	63	54.6
Firms producing new goods and services (%)	118	6





# MOROCCO

	Rank	Value
<b>Consumer electronics</b>		
Treatment applications per 100 million GDP	31	50.6
Cultural goods exports (% exports)	81	4.3
Printing and publishing output (% manufactured output)	80	15.7
<b>Energy</b>	139	25.1
<b>Finance</b>	51	37.5
Access to investors' protection	24	79.8
Depth of innovative companies	87	44.5
ISO 9001 quality certificates (% GDP)	99	10.9
ISO 14001 environmental certificates (% GDP)	80	5.4
<b>Industry</b>	91	31
CERD forecast from abroad (%)	106	17.8
Joint ventures per strategic industry deals (% GDP)	109	4.8
Computer software spending (% GDP)	90	21.5
<b>International trade</b>	109	10.1
New business density per thousand population	83	9.4
Firms with new products/services (%)	118	41.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	74	46.5
<b>Infrastructure</b>	79	47.4
<b>Coverage</b>	95	46.5
3G/4G mobile network coverage (% population)	49	88.7
Secure Internet servers per 1 million population	81	5.8
Investment in telecommunication services (% GDP)	47	36.9
<b>Speed</b>	95	36.9
Mobile spread and download speeds	39	23.9
Fixed broadband upload and download speeds	94	4.1
Fixed broadband subscriptions (y speed) per hundred people	95	7.7
<b>Availability</b>	115	80.7
Fixed broadband latency (% QM per capita)	88	70.7
Mobile broadband basket (% QM per capita)	47	71.5
Internet and telephony competition	1	100
<b>Access</b>	87	48.8
<b>Subscriptions</b>	91	51.5
Active mobile-broadband subscriptions per hundred inhabitants	83	32.9
International Internet bandwidth per user	97	45.4
Households with Internet access at home (%)	45	84.6
<b>Skills and employment</b>	91	37.5
Individuals with standard ICT skills (%)	49	39.5
Tertiary graduates from ICT programmes (%)	47	35.7
ICT employment (%)	104	19
<b>Usage</b>	81	40.4
<b>Services</b>	79	45.2
Government online services	100	57.8
Fixed broadband Internet traffic per subscriber	40	26.1
Mobile broadband Internet traffic per subscriber	81	38.9
Internet users (%)	41	83.0
<b>Commerce</b>	112	35.7
ICT FDI patent applications (per 100 million GDP)	96	41.6
E-participation	100	57.2
Internet activities by individuals (%)	87	38.6
Trade in digitally deliverable services (% total trade)	81	31.5
<b>ECONOMY</b>	87	39
<b>Economic complexity/structure</b>	76	52.2
<b>Infrastructure investment</b>	95	41
Overhead capital formation (% GDP)	95	85.1
Logistics performance	104	36.5
Transport productive capacity	107	11.7
Building quality control	23	86.7

	Rank	Value
<b>Business agility</b>	51	53.4
Ease of starting a business	55	93
Recovery recovery rate	100	31.2
Entrepreneurial employee activity rate	80	11.8
Growth of corporate transactions	13	85.7
<b>Corporate openness</b>	83	55.2
<b>Trade and investment</b>	91	61
Trade (% GDP)	65	27.9
High-technology trade (% total trade)	24	41.7
Market concentration	46	81.7
Market concentration	83	89.0
<b>Product openness</b>	91	41.5
China's financial openness	96	16.4
Foreign direct investment, net inflows (% GDP)	87	26.4
Cost dynamics	41	80
<b>Financing and domestic value added</b>	125	30.8
<b>Financing and costs</b>	121	40.1
Domestic credit to private sector (% GDP)	35	53.1
MSME financing gap (% GDP)	90	40.7
Tax and contribution rate (% profit)	100	87.8
Bank nonperforming loans (%)	104	10.8
Unsecured loans ratio	114	37.1
Medium- and high-tech activities value added	86	28.1
Industry and services value added (% GDP)	112	82.5
Labour underutilization rate	101	28.1
Output per worker	95	5.8
<b>ENABLING ENVIRONMENT</b>	84	52.3
<b>Governance</b>	85	40.5
Political environment	100	32.0
Peace and stability	90	30.4
View and accountability	100	30.4
Quality of institutions	75	48.0
Rule of law	71	51
Control of corruption	85	42.0
Government effectiveness	76	82.8
<b>Socio-economic</b>	88	55.5
Gender equity	102	48.6
Female-to-male ratio in parliament	84	29.5
Female-to-male labour force participation	143	24.5
Female-to-male ratio in internal wage	82	82.7
Gender inequality	81	81.0
Social protection coverage (% population)	109	17.8
Adult literacy rate	100	86.0
Youth not in employment, education or training (%)	87	57.7
<b>Standard of living</b>	88	66.6
Poverty headcount ratio (% population)	5	9.4
GDP per capita	100	3.8
<b>Health and environment</b>	88	62.5
<b>Health</b>	88	33.6
Universal health coverage	75	70
Healthy life expectancy (years)	84	83.2
Under-five mortality rate	95	85.1
<b>Environmental performance</b>	86	51.0
Renewable energy consumption (%)	111	11.2
Household footprint per capita	81	89.5
Natural hazard exposure	92	5.4

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# MOZAMBIQUE

## KEY INDICATORS

GDP US\$ billions	38.415
Population	31,255,435
HDI	0.456

**GKI RANK** 143/154

**GKI SCORE** 31.2

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Mozambique is a weak performer in terms of its knowledge infrastructure. It ranks 143rd out of 154 countries in the Global Knowledge Index 2021 and 17th out of the 27 countries with low human development.

### AREAS OF STRENGTH

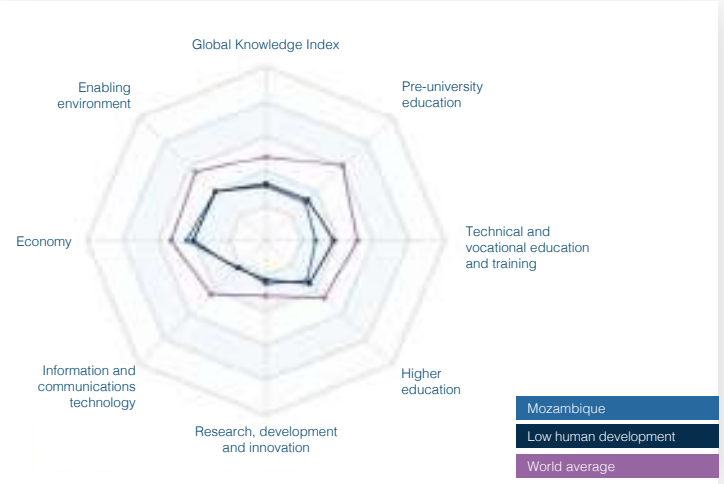
- + Government funding per secondary student (% of GDP per capita)
- + Female-to-male labour force participation
- + GERD financed from abroad (%)
- + Government expenditure on primary education (% of GDP)
- + Foreign direct investment, net inflows (% GDP)

### AREAS OF IMPROVEMENT

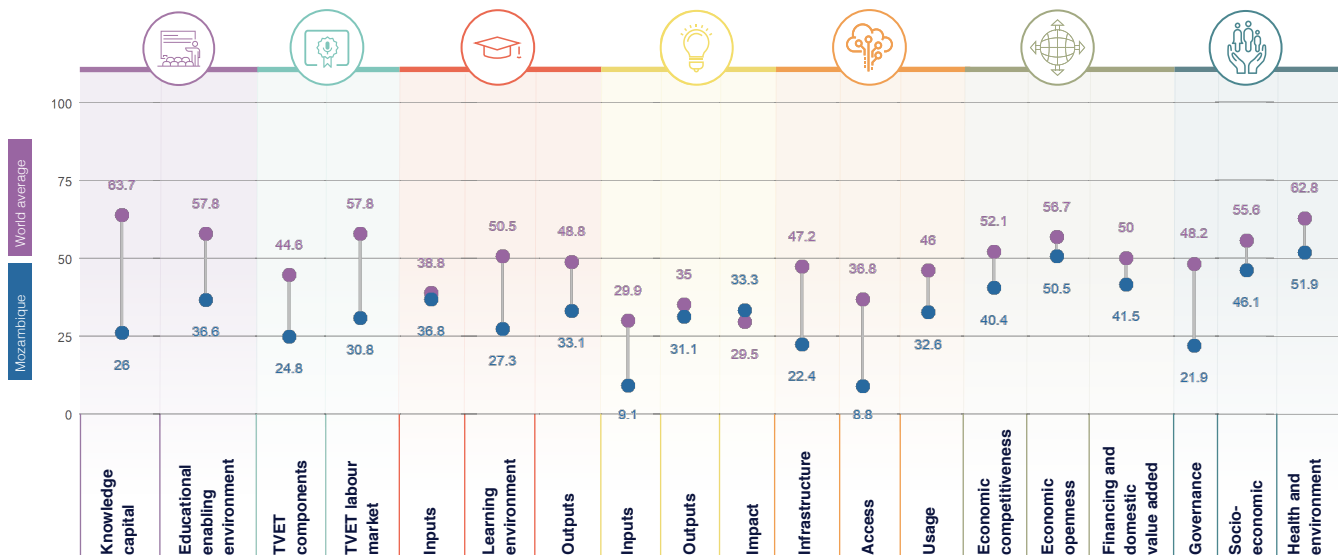
- Completion rate in upper secondary education, wealth parity
- Intellectual property payments (% total trade)
- Mobile broadband Internet traffic per subscription
- Extent of corporate transparency
- Debt dynamics

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	146	31.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	153	27.8
HIGHER EDUCATION	139	32.4
RESEARCH, DEVELOPMENT AND INNOVATION	112	24.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	146	21.2
ECONOMY	120	44.2
ENABLING ENVIRONMENT	137	40



## GKI PILLARS





# MOZAMBIQUE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	144	21.3
Enrollment	188	26
Enrollment rate in primary education	127	82.5
Net enrolment rate in primary education	43	87.4
Net enrolment rate in lower secondary education	133	90.0
Net enrolment rate in upper secondary education	128	90.1
Completion	197	2.2
Years of compulsory education in primary and secondary	148	8
Completion rate in upper secondary education	135	3.7
Success rate rate in the last grade of lower secondary education	128	8
Completion	133	21.4
Assessment of Grade 6 students in math, science and reading	194	194
Learning-adjusted years of schooling	135	21.4
<b>Educational enabling environment</b>		
Expenditure	81	60.0
Government expenditure on primary education (% GDP)	4	67.1
Government expenditure on secondary education (% GDP)	46	23.3
Government funding per primary student (% GDP per capita)	89	27.8
Government funding per secondary student (% GDP per capita)	2	74
Resources	102	38.5
Pupil-based teacher ratio in primary education	85	42.5
Pupil-based teacher ratio in secondary education	75	20.4
Schools with access to computers in primary education (%)	194	194
Schools with access to computers in secondary education (%)	194	194
Early learning	102	110
Class attendance rate in early childhood education	194	194
Proportion of children who are developmentally on track	194	194
Presence of children with stimulating home learning environments	194	194
Pupil-based teacher ratio in preprimary education	194	194
Quality and infrastructure	131	22.7
Completion rate in upper secondary education, gender parity	119	60.2
Completion rate in upper secondary education, wealth parity	122	8
Completion rate in upper secondary education, location parity	118	7.8
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	139	24.5
Firms offering formal training (%)	87	24.3
Labour force with short-cycle tertiary education (%)	194	194
Participation rate in formal and non-formal education and training	194	194
TVET resources	119	40.0
Government expenditure on vocational education (%)	88	16.1
Share of students enrolled in secondary vocational programmes	77	14.7
Share of students enrolled in postsecondary vocational programmes	194	194
TVET quality and infrastructure	141	22.0
Extent of staff training	143	32.9
Quality of vocational training	135	35.0
Ratio of high-skill TVET occupations earnings to average wage	194	194
Ratio of medium-skill TVET occupations earnings to average wage	194	194
<b>TVET labour market</b>		
Efficiency of the labour market	122	47.0
Firms considered well-integrated with workforce (%)	24	63.8
Employment educational mismatch (%)	199	12.5
Presence of skilled production workers	197	33.4
Unemployment rate with vocational education	190	57.3
Real TVET unemployment	197	10.1
Share of TVET occupations	143	12.2
Manufacturing employment (%)	138	74.0
Quality and infrastructure	137	31.0
Enrollment in vocational education, gender parity	100	89.2
Useable employment rate	144	12.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	97	29.0
Government expenditure per tertiary student	97	6.7
Teaching staff compensation (% tertiary expenditure)	24	84.2
Enrollment	133	2.6
Enrollment in bachelor's or equivalent level (%)	119	4.1
Enrollment in masters, doctoral or equivalent (%)	121	1.1
Resources	30	17.0
Ratios/teacher ratio in tertiary education	54	72.3
Researchers in higher education (%)	17	78.4
<b>Learning environment</b>		
Directly paid academic freedom	121	34.0
Teachers in tertiary education, gender parity	96	24.7
Labour mobility rate	111	1.5
Academic freedom	90	62.4
Quality and infrastructure	97	18.0
Class attendance rate in tertiary education, gender parity	80	68.8
Class attendance rate in tertiary education, wealth parity	87	1
Class attendance rate in tertiary education, location parity	74	6
<b>Outputs</b>		
Skilled labour	111	1.8
Educational attainment rate, bachelor's or equivalent	100	2.8
Educational attainment rate, master's or equivalent	85	0.8
Educational attainment rate, doctoral or equivalent	81	1.8
Employment	22	18.0
Labour force participation rate with advanced education	82	74.5
Unemployment rate with advanced education	79	78.0
Impact	102	20.0
University tertiary enrollment in FTE	100	34
OECD students per FTE personnel in higher education	85	7.8
<b>Entrepreneurship, innovation and services trade</b>		
Access	111	8.0
Access to FDI resources	100	10.0
GDP (% GDP)	77	6.1
GERD per researcher	79	17.5
Researchers per thousand labour force	90	0.5
Tertiary graduates from STEM programmes (%)	118	17.7
<b>Quality of innovation environment</b>		
GERD performed by business enterprises (%)	87	9
GERD financed by business enterprises (%)	100	0.8
Researchers in business enterprises (%)	85	9
Firms that spend on R&D (%)	80	14.0
Quality of innovation environment	97	10.0
High-skill employment (%)	86	0.2
Intellectual property payments (% total trade)	134	6
State of cluster development	121	35
<b>Support</b>		
Access to FDI resources	100	10.0
Average documents per researcher	89	44.8
Citations per document	24	38.0
Patent applications (per 100 billion GDP)	77	47.7
<b>Infrastructure and innovation ecosystem</b>		
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	88	6.1
PCT applications (per 100 billion GDP)	112	35.5
Firms producing new goods and services (%)	63	44.7



# MOZAMBIQUE

	Rank	Value
<b>Consumer electronics</b>	100	10.9
Treatment applications per 100 million GDP	54	31.3
Cultural goods exports (% exports)	103	0.4
Printing and publishing output (% manufactured output)	196	1.9
<b>Energy</b>	85	30.3
<b>Finance</b>	100	10.1
Access to investors' protection	80	2
Depth of innovative companies	113	41.3
ISO 9001 quality certificates (% GDP)	115	3.7
ISO 14001 environmental certificates (% GDP)	111	2.1
<b>Infrastructure</b>	97	10.9
CERD freedom from abuse (%)	4	25.0
Cost of storage per storage volume dealt (% GDP)	88	18.8
Computer software spending (% GDP)	111	1.8
<b>Government services</b>	97	10.9
New business density per thousand population	196	1.9
Firms with one or more employees (%)	84	53.9
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>146</b>	<b>21.2</b>
<b>Infrastructure</b>	149	23.4
<b>Coverage</b>	194	12.2
3G/4G mobile network coverage (% population)	121	23.7
Secure Internet servers per 1 million population	101	0.8
Investment in telecommunication services (% GDP)	141	1.1
<b>Speed</b>	100	0
Mobile upload and download speeds	88	15.3
Fixed broadband upload and download speeds	100	0.5
Fixed broadband subscriptions (y speed) per hundred people	103	0.3
<b>Availability</b>	140	41.0
Fixed broadband bandwidth (% Gbps per capita)	149	61.2
Mobile broadband basket (% Gbps per capita)	136	20.0
Internet and telephone competition	108	50.7
<b>Access</b>	144	8.8
<b>Subscriptions</b>	111	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	143	6.7
International Internet bandwidth per user	101	20.8
Households with Internet access at home (%)	101	1.8
<b>Skills and employment</b>	100	9.7
Individuals with standard ICT skills (%)	194	0.8
Tertiary graduates from ICT programmes (%)	113	0.7
ICT employment (%)	108	1.8
<b>Usage</b>	112	22.8
<b>Services</b>	100	10.1
Government online services	100	51.8
Fixed broadband Internet traffic per subscriber	88	2
Mobile broadband Internet traffic per subscriber	108	8
Internet users (%)	144	50.4
<b>Commerce</b>	90	10.1
ICT/FIT patent applications (per 100,000 GDP)	79	40
E-participation	89	51.4
Internet activities by individuals (%)	194	0.8
Trade in digitally deliverable services (% total trade)	37	80
<b>ECONOMY</b>	<b>109</b>	<b>41.0</b>
<b>Economic complexity indexes</b>	124	40.4
<b>Infrastructure Investment</b>	90	41.0
Overhead capital formation (% GDP)	85	33
Logistics performance	87	41.1
Transport productive capacity	115	30
Building quality control	25	73.3

	Rank	Value
<b>Business agility</b>	100	34.2
Cost of starting a business	140	83.5
Recovery recovery rate	94	13.4
Entrepreneurial employee activity rate	196	1.9
Growth of corporate transactions	118	8
<b>Corporate openness</b>	83	50.8
<b>Trade and investment</b>	97	10.9
Trade (% GDP)	25	49.5
High-technology trade (% total trade)	107	20.0
Market concentration	70	55.8
Market concentration	40	82.0
<b>Product openness</b>	107	18.0
China's financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	1	100
Cost dynamics	108	8
<b>Financing and domestic value added</b>	119	41.3
<b>Financing and costs</b>	97	10.9
Domestic credit to private sector (% GDP)	100	9.8
MSME financing gap (% GDP)	18	83
Tax and contribution rate (% profit)	72	71.4
Bank nonperforming loans (%)	100	50.0
<b>Unmet needs index</b>	100	10.1
Medium- and high-tech activities value added	100	12.5
Industry and services value added (% GDP)	143	34.7
Labour underutilization rate	86	84.0
Output per worker	101	0.8
<b>ENABLING ENVIRONMENT</b>	<b>137</b>	<b>40</b>
<b>Governance</b>	131	21.8
<b>Political environment</b>	101	21.1
Peace and stability	102	12.7
View and accountability	94	31.4
Quality of institutions	102	21.0
Rule of law	106	15.8
Control of corruption	115	26
Government effectiveness	100	23.8
<b>Socio-economic</b>	108	46.1
<b>Gender equity</b>	88	58.5
Female-to-male ratio in parliament	18	73.6
Female-to-male labour force participation	8	88.2
Female-to-male ratio in internal wage	104	83.7
<b>Gender equality</b>	100	10.1
Social protection coverage (% population)	116	10.0
Adult literacy rate	111	49.8
Youth not in employment, education or training (%)	73	80.2
<b>Standard of living</b>	101	11.0
Poverty headcount ratio (% population)	112	25.1
GDP per capita	148	0.8
<b>Health and environment</b>	144	51.8
<b>Health</b>	142	51.8
Universal health coverage	100	40
Healthy life expectancy (years)	100	21.0
Under-five mortality rate	108	37.3
<b>Environmental performance</b>	81	60.0
Renewable energy consumption (%)	26	80.4
Household footprint per capita	8	88.8
Natural hazard exposure	101	41

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# MYANMAR

**GKI RANK** 136/154

**GKI SCORE** 34

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Myanmar is a weak performer in terms of its knowledge infrastructure. It ranks 136th out of 154 countries in the Global Knowledge Index 2021 and 25th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Unemployment rate with advanced education
- + Unemployment rate with vocational education
- + Printing and publishing output (% manufactured output)
- + Labour underutilization rate
- + Tertiary graduates from STEM programmes (%)

### AREAS OF IMPROVEMENT

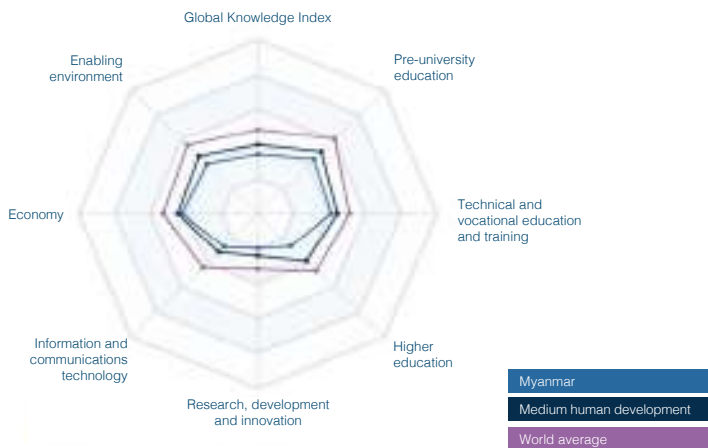
- Teachers in tertiary education, gender parity
- GERD financed by business enterprises (%)
- Fixed broadband Internet traffic per subscription
- Extent of corporate transparency
- Chinn-Ito financial openness

### KEY INDICATORS

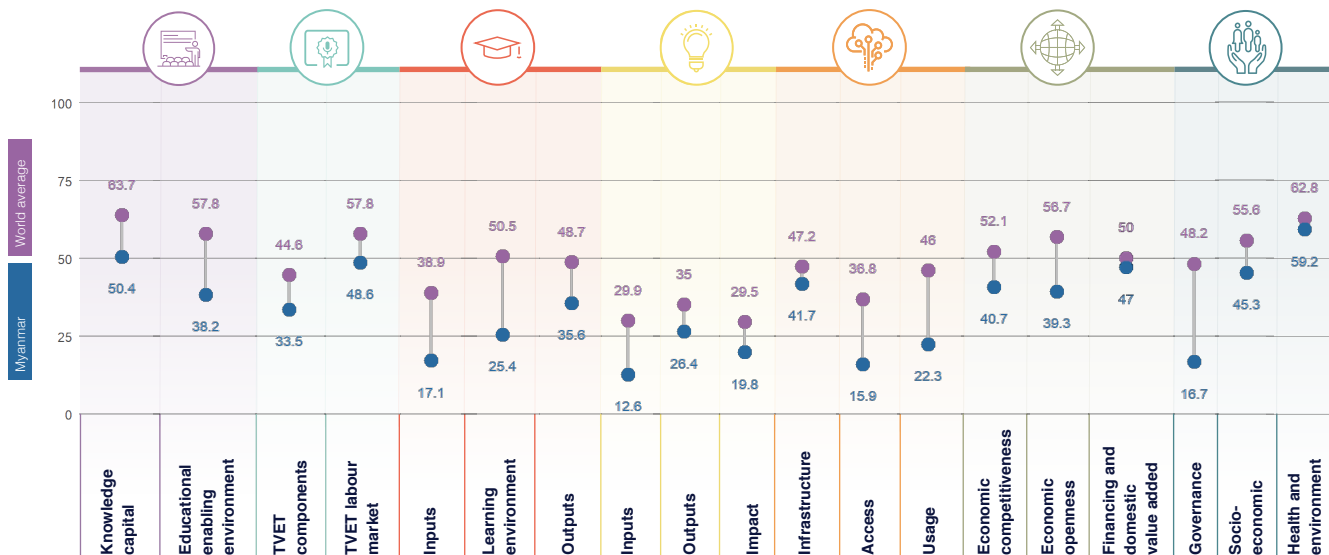
**GDP US\$ billions** 247.239  
**Population** 54,409,794  
**HDI** 0.583

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	120	44.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	126	41
HIGHER EDUCATION	150	26
RESEARCH, DEVELOPMENT AND INNOVATION	133	19.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	120	26.6
ECONOMY	127	42.4
ENABLING ENVIRONMENT	135	40.4



## GKI PILLARS







# MYANMAR

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	126	44.3
Enrollment	118	55.4
Enrollment rate in primary education	109	71.5
Enrollment rate in lower secondary education	80	84.1
Enrollment rate in upper secondary education	104	70.8
Completion	106	50.6
Completion rate in primary and secondary	104	55.1
Years of compulsory education in primary and secondary	148	38.5
Completion rate in upper secondary education	113	21.1
Success rate rate in the last grade of lower secondary education	109	48.0
Completion	80	43.0
Assessment of 15-year-old students in math, science and reading	108	109
Learning-adjusted years of schooling	97	43.2
<b>Educational enabling environment</b>		
Expenditure	102	13.0
Government expenditure on primary education (% GDP)	117	16.4
Government expenditure on secondary education (% GDP)	118	11.1
Government funding per primary student (% GDP per capita)	111	17.9
Government funding per secondary student (% GDP per capita)	100	10.2
Resources	107	17.0
Pupil-based teacher ratio in primary education	47	80.7
Pupil-based teacher ratio in secondary education	85	88.6
Schools with access to computers in primary education (%)	82	0.8
Schools with access to computers in secondary education (%)	93	11.1
Early learning	103	67.1
Class attendance rate in early childhood education	104	109
Proportion of children who are developmentally on track	108	109
Proportion of children with stimulating home learning environments	88	45.1
Pupil-based teacher ratio in preprimary education	31	80.1
Quality and infrastructure	110	31
Completion rate in upper secondary education, gender parity	115	60.0
Completion rate in upper secondary education, wealth parity	110	3.8
Completion rate in upper secondary education, location parity	89	31.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	107	23.0
Firms offering formal training (%)	109	5.3
Labour force with short-cycle tertiary education (%)	72	30
Participation rate in formal and non-formal education and training	82	0.3
<b>TVET resources</b>		
Government expenditure on vocational education (%)	86	15.7
Share of students enrolled in secondary vocational programmes	137	0.3
Share of students enrolled in postsecondary vocational programmes	1	109
<b>TVET quality and infrastructure</b>		
Extent of staff training	140	37.3
Quality of vocational training	104	109
Ratio of high-skilled TVET occupations earnings to average wage	39	38.5
Ratio of medium-skilled TVET occupations earnings to average wage	24	85
<b>TVET labour market</b>		
Efficiency of the labour market	80	64.6
Firms considered well-integrated with workforce (%)	23	83.6
Employment educational mismatch (%)	88	44.6
Proportion of skilled production workers	115	15.1
Unemployment rate with vocational education	3	89.0
Real TVET unemployment	110	51.0
Share of TVET occupations	121	25
Manufacturing employment (%)	76	26.5
Quality and infrastructure	117	32.0
Enrollment in vocational education, gender parity	84	47.0
Useable employment rate	105	30.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	88	13.0
Government expenditure per tertiary student	115	2.8
Teaching staff compensation (% tertiary expenditure)	87	22.6
Enrollment	100	37.1
Enrollment in bachelor's or equivalent level (%)	92	13.1
Enrollment in masters, doctoral or equivalent (%)	102	1
Resources	108	31.4
Pupil-teacher ratio in tertiary education	103	31.9
Research in higher education (%)	81	30.0
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	108	9
Labour mobility rate	119	0.3
Academic freedom	107	42.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	83	71.4
Class attendance rate in tertiary education, wealth parity	48	29.0
Class attendance rate in tertiary education, location parity	60	2.1
<b>Outputs</b>		
Attainment	101	3.8
Educational attainment rate, bachelor's or equivalent	78	22.7
Educational attainment rate, master's or equivalent	84	0.8
Educational attainment rate, doctoral or equivalent	77	2.3
Employment	111	13.0
Labour force participation rate with advanced education	90	58.0
Unemployment rate with advanced education	1	108
Impact	110	18.0
University tertiary enrollment in R&D	110	25.0
UNRISD indicators per 100 personnel in higher education	83	16.4
<b>Government's contribution to economic growth</b>		
<b>Inputs</b>		
Government R&D expenditure	81	10.0
GDP (% GDP)	128	0.4
GERD per researcher	88	18.1
Researchers per thousand labour force	100	0.2
Tertiary graduates from STEM programmes (%)	14	82.2
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	106	109
GERD financed by business enterprises (%)	108	0
Researchers in business enterprises (%)	104	109
Firms that spend on R&D (%)	117	0.6
Quality and infrastructure	107	10.0
High-skilled employment (%)	80	3.8
Intellectual property payments (% total trade)	94	6.6
State of cluster development	102	31.7
<b>Outputs</b>		
<b>Government R&amp;D expenditure</b>		
Average documents per researcher	94	43.0
Citations per document	143	7.3
Patent applications (per 100 billion GDP)	108	109
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	81	12
Research and development expenditure (per 100 billion GDP)	104	109
PCT applications (per 100 billion GDP)	108	109
Firms producing new goods and services (%)	100	18.0

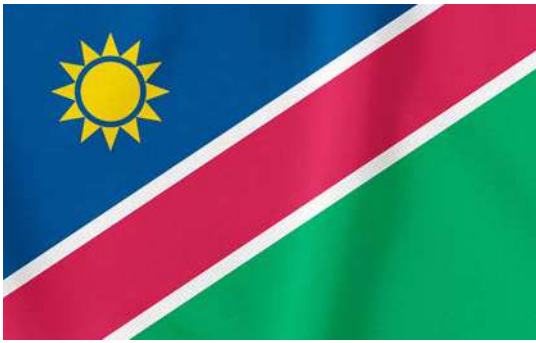


# MYANMAR

	Rank	Value
<b>Business environment</b>	81	65.9
Treatment applications (per 100 billion GDP)	84	10.7
Cultural goods exports (% exports)	89	10.4
Printing and publishing output (% manufactured output)	1	100
<b>Energy</b>	133	16.9
<b>Trade</b>	99	1.1
Access to institutions' provisions	194	194
Depth of innovative companies	194	194
ISO 9001 quality certificates (% GDP)	192	1
ISO 14001 environmental certificates (% GDP)	142	0.7
<b>Integrity</b>	91	11.1
CERD freedom from abuse (%)	17	42.0
Cost savings per strategic alliance deals (% GDP)	99	5.1
Computer software spending (% GDP)	194	194
<b>Government efficiency</b>	109	10.0
New business density per thousand population	111	1.8
Firms with new products/services (%)	74	84.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	122	36.9
<b>Infrastructure</b>	85	41.7
<b>Coverage</b>	89	41.3
3G/4G mobile network coverage (% population)	89	82.5
Secure Internet servers per 1 million population	143	0.5
Investment in telecommunication services (% GDP)	194	194
<b>Speed</b>	87	10.1
Mobile upload and download speeds	89	27.9
Fixed broadband upload and download speeds	74	9.8
Fixed broadband subscriptions (by speed) per hundred people	129	0.3
<b>Availability</b>	89	71.4
Fixed broadband latency (% QM per capita)	118	86.9
Mobile broadband basket (% QM per capita)	80	89.2
Internet and telephony competition	94	81.2
<b>Access</b>	127	18.8
<b>Subscriptions</b>	111	13.4
Active mobile-broadband subscriptions per fixed-line inhabitants	50	40.0
International Internet bandwidth per user	184	19.9
Households with Internet access at home (%)	138	9.8
<b>Skills and employment</b>	105	9.7
Individuals with standard ICT skills (%)	194	194
Tertiary graduates from ICT programmes (%)	184	19.0
ICT employment (%)	129	1.1
<b>Usage</b>	141	22.3
<b>Services</b>	109	11.5
Government online services	144	25.0
Fixed broadband Internet traffic per subscription	100	8
Mobile broadband Internet traffic per subscription	122	0.8
Internet users (%)	122	19.4
<b>Commerce</b>	129	11.1
ICT/FIT patent applications (per 100 billion GDP)	194	194
E-participation	142	26.2
Internet activities by individuals (%)	194	194
Trade in digitally deliverable services (% total trade)	72	40.1
<b>ECONOMY</b>	127	42.4
<b>Economic competitiveness</b>	122	46.7
<b>Infrastructure investment</b>	89	41.4
Overhead capital formation (% GDP)	19	87.0
Logistics performance	126	32.4
Transport productive capacity	189	5.8
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	104	22.1
Ease of starting a business	84	83.3
Recovery recovery rate	134	16
Entrepreneurial employee activity rate	194	194
Growth of corporate transactions	118	8
<b>Employee openness</b>	128	16.3
<b>Trust and development</b>	100	14.7
Trade (% GDP)	100	21.6
High-technology trade (% total trade)	117	34.1
Market concentration	84	77.2
Market concentration	105	85.0
<b>Product openness</b>	141	23.0
China's financial openness	128	8
Foreign direct investment, net inflows (% GDP)	41	47.7
Cost dynamics	194	194
<b>Financing and domestic value added</b>	81	47
<b>Financing and costs</b>	121	41.0
Domestic credit to private sector (% GDP)	110	10
IMRS financing gap (% GDP)	79	82.8
Tax and contribution rate (% profit)	49	76.4
Bank nonperforming loans (%)	194	194
Unsecured loans ratio	91	41.0
Medium- and high-tech activities value added	88	27.6
Industry and services value added (% GDP)	107	53.4
Labour underutilization rate	3	86.3
Output per worker	123	4.1
<b>ENABLING ENVIRONMENT</b>	128	46.4
<b>Governance</b>	142	16.7
<b>Political environment</b>	122	13.0
Peace and stability	128	9.8
View and accountability	122	21.7
Quality of institutions	189	17.5
Rule of law	143	10.0
Control of corruption	111	27.0
Government effectiveness	128	16.8
<b>Socio-economic</b>	112	45.3
<b>Gender equity</b>	122	47.7
Female-to-male ratio in parliament	190	16.1
Female-to-male labour force participation	122	57.1
Female-to-male ratio in internal wage	100	87.0
<b>Gender equality</b>	141	22.0
Social protection coverage (% population)	122	5.8
Adult literacy rate	79	85.0
Youth not in employment, education or training (%)	55	71.4
<b>Standard of living</b>	88	32.0
Poverty headcount ratio (% population)	74	85.0
GDP per capita	127	14
<b>Health and environment</b>	111	59.2
<b>Health</b>	111	89.0
Universal health coverage	100	81
Healthy life expectancy (years)	189	83.0
Under-five mortality rate	119	83
<b>Environmental performance</b>	89	83.0
Renewable energy consumption (%)	33	62.4
Household footprint per capita	84	81
Natural hazard exposure	190	22

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# NAMIBIA

**GKI RANK** 98/154

**GKI SCORE** 44.3

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Namibia is a modest performer in terms of its knowledge infrastructure. It ranks 98th out of 154 countries in the Global Knowledge Index 2021 and 5th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Firms constrained with inadequately educated workforce (%)
- + Firms that spend on R&D (%)
- + Female-to-male ratio in parliament
- + Tax and contribution rate (% profit)
- + Firms producing new goods and services (%)

### AREAS OF IMPROVEMENT

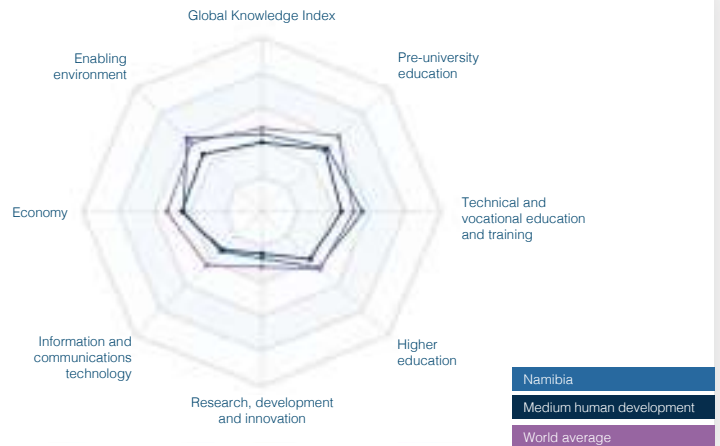
- High-technology trade (% total trade)
- Unemployment rate with vocational education
- Chinn-Ito financial openness
- Government expenditure on secondary education (% of GDP)
- Labour underutilization rate

### KEY INDICATORS

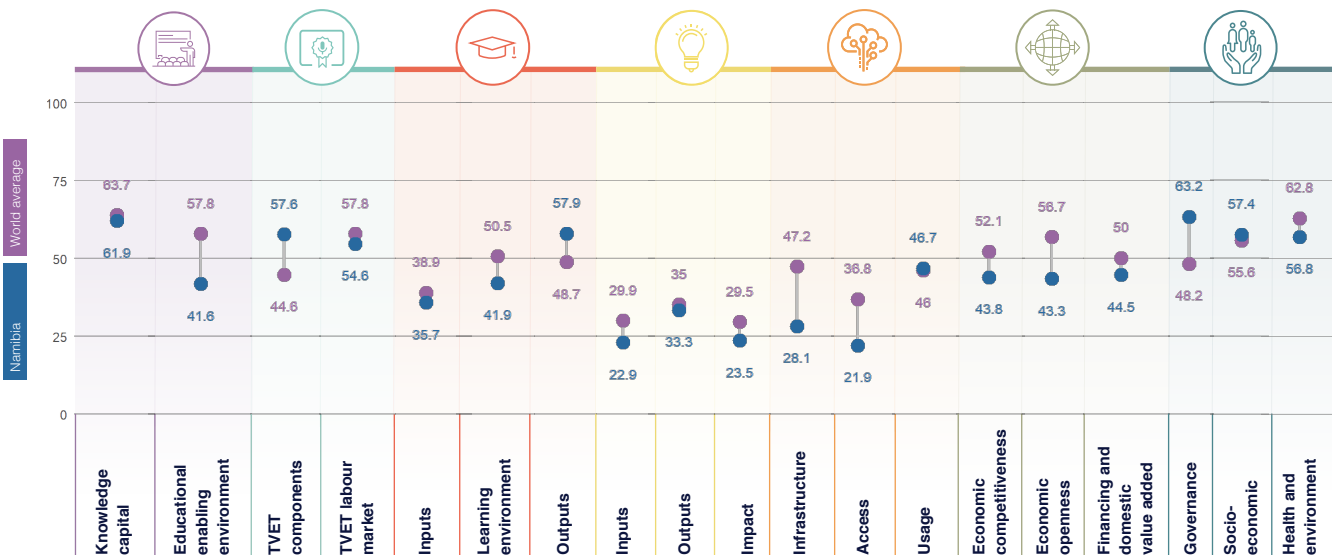
**GDP** US\$ billions ..... **22.33**  
**Population** ..... **2,540,916**  
**HDI** ..... **0.646**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	113	51.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	49	56.1
HIGHER EDUCATION	78	45.2
RESEARCH, DEVELOPMENT AND INNOVATION	102	26.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	107	32.2
ECONOMY	121	43.8
ENABLING ENVIRONMENT	56	59.1



## GKI PILLARS







# NAMIBIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	113	61.8
Enrolment	37	65.4
Net enrolment rate in primary education	90	65.4
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	103	63.2
Years of compulsory education in primary and secondary	126	63.2
Completion rate in upper secondary education	80	35
Success rate rate in the last grade of lower secondary education	75	40
Completion	104	50.0
Assessment of Grade 6 students in math, science and reading	116	116
Learning-adjusted years of schooling	112	35.8
<b>Educational enabling environment</b>		
Expenditure	102	0.4
Government expenditure on primary education (% GDP)	127	12
Government expenditure on secondary education (% GDP)	123	5.8
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	71	21.8
Pupil-based teacher ratio in primary education	80	25.0
Pupil-based teacher ratio in secondary education	43	23.8
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	127	23.8
Class attendance rate in early childhood education	87	23.8
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	81	41.2
Completion rate in upper secondary education, gender parity	64	60.0
Completion rate in upper secondary education, wealth parity	90	11.2
Completion rate in upper secondary education, location parity	85	41
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	116	11.0
Firms offering formal training (%)	75	23.4
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	20	3.5
<b>TVET resources</b>		
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolled in postsecondary vocational programmes	1	109
<b>TVET quality and infrastructure</b>		
Extent of staff training	42	16.9
Quality of vocational training	80	49.0
Ratio of high-skil TVET occupations earnings to average wage	116	116
Ratio of median-skil TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	81	12.2
Firms considered with inappropriately educated workforce (%)	4	16.0
Employment educational mismatch (%)	70	52.0
Proportion of skilled production workers	82	83.0
Unemployment rate with vocational education	100	40.0
Real TVET unemployment	111	51.0
Share of TVET occupations	100	43.4
Manufacturing employment (%)	113	25.0
<b>Quality and infrastructure</b>		
Enrolment in vocational education, gender parity	116	116
Useable employment rate	82	60.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	33	19.0
Government expenditure per tertiary student	35	20.0
Teaching staff compensation (% tertiary expenditure)	37	46
<b>Enrolment</b>		
Enrolment in bachelor's or equivalent level (%)	99	11.8
Enrolment in masters, doctoral or equivalent (%)	60	4.0
<b>Resources</b>		
Rapiteacher ratio in tertiary education	67	25.3
Researcher in higher education (%)	60	48.0
<b>Learning environment</b>		
<b>Timely and academic freedom</b>		
Teachers in tertiary education, gender parity	24	61.4
Labour mobility rate	55	18.0
Academic freedom	88	60.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	79	62.0
Class attendance rate in tertiary education, wealth parity	62	28.0
Class attendance rate in tertiary education, location parity	67	2.8
<b>Outputs</b>		
<b>Attainment</b>		
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
<b>Employment</b>		
Labour force participation rate with advanced education	44	28.2
Unemployment rate with advanced education	98	62.0
<b>Impact</b>		
University tertiary enrollment in R&D	81	45.1
OECD students per 1000 personnel in higher education	38	46.0
<b>Government expenditure and financing costs</b>		
<b>Inputs</b>		
Government expenditure	10	12.2
Government expenditure	10	12.2
GDP (% GDP)	74	0.8
GERD per researcher	15	48.0
Researchers per thousand labour force	83	2.3
Tertiary graduates from STEM programmes (%)	107	23.8
<b>Government expenditure and financing costs</b>		
<b>GERD performed by business enterprises (%)</b>		
GERD financed by business enterprises (%)	70	13.7
Researchers in business enterprises (%)	65	0.1
Firms that spend on R&D (%)	4	88.0
<b>Quality and infrastructure</b>		
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	121	0.6
State of cluster development	77	43.4
<b>Outputs</b>		
<b>Government expenditure and financing costs</b>		
Average documents per researcher	28	65.0
Citations per document	118	14.6
Patent applications (per 100 billion GDP)	116	116
<b>Government expenditure and financing costs</b>		
Intellectual property receipts (% total trade)	70	0
Research and development expenditure (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	54	58.7
Firms producing new goods and services (%)	13	26.7





# NAMIBIA

	Rank	Value
<b>Business environment</b>	109	5.1
Treatment applications (per 100 million GDP)	109	108
Cultural goods exports (% exports)	85	4.1
Printing and publishing output (% manufactured output)	109	109
<b>Energy</b>	105	47.5
<b>Energy</b>	105	47.5
Access to electricity (percentage)	89	6.8
Depth of innovative companies	80	47.0
ISO 9001 quality certificates (% GDP)	105	4.8
ISO 14001 environmental certificates (% GDP)	80	0.2
<b>Finance</b>	80	11.1
CERD received from abroad (%)	29	30.1
Cost of finance per strategic finance deals (% GDP)	50	78
Computer software spending (% GDP)	80	0.2
<b>Government services</b>	80	11.1
New business density per thousand population	80	0.8
Firms with web presence (percentage)	53	89
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	187	22.2
<b>Infrastructure</b>	122	26.5
<b>Coverage</b>	108	14.0
30MHz mobile network coverage (% population)	108	47.9
Secure Internet servers per 1 million population	80	2.8
Investment in telecommunication services (% GDP)	67	23.5
<b>Quality</b>	104	8.8
Mobile upload and download speeds	85	12.0
Fixed broadband upload and download speeds	80	4.3
Fixed broadband subscriptions (by speed) per hundred people	108	2.2
<b>Availability</b>	100	22.0
Fixed broadband bandwidth (% Gbps per capita)	112	80.8
Mobile broadband basket (% Gbps per capita)	104	40
Internet and telephone connectivity	100	30
<b>Access</b>	117	21.8
<b>Subscribers</b>	100	12.0
Active mobile-broadband subscriptions per hundred inhabitants	80	30.1
International Internet bandwidth per user	118	27.6
Households with Internet access at home (%)	108	8
<b>Skills and employment</b>	80	21.7
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	80	34.1
ICT employment (%)	84	0.2
<b>Usage</b>	78	46.7
<b>Services</b>	77	46.5
Government online services	100	57.8
Fixed broadband Internet traffic per subscription	104	0.8
Mobile broadband Internet traffic per subscription	104	104
Internet users (%)	111	57.0
<b>Commerce</b>	70	43.6
ICT FDI patent applications (per 100 million GDP)	21	67.1
E-participation	106	30
Internet activities by individuals (%)	104	104
Trade in digitally deliverable services (% total trade)	80	25.0
<b>ECONOMY</b>	121	43.8
<b>Economic complexity metrics</b>	100	43.8
<b>Manufacture innovation</b>	100	11.0
Overhead capital formation (% GDP)	104	26.2
Logistics performance	78	43.6
Transport productive capacity	118	16.0
Building quality control	123	56.7

	Rank	Value
<b>Business agility</b>	80	51.0
Cost of starting a business	107	72.2
Recovery recovery time	87	36.7
Entrepreneurial employee activity rate	54	12.5
Growth of corporate transactions	13	65.7
<b>Customer experience</b>	126	45.0
<b>Trade and investment</b>	100	14.1
Trade (% GDP)	89	30
High-technology trade (% total trade)	130	25.0
Market concentration	84	89.8
Market concentration	54	82.0
<b>Product innovation</b>	103	10.1
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	108	32.2
Cost dynamics	100	47.3
<b>Financing and domestic value added</b>	107	46.5
<b>Financing and costs</b>	40	81.0
Domestic credit to private sector (% GDP)	80	26.0
MSME financing gap (% GDP)	47	7.1
Tax and contribution rate (% profit)	80	87.1
Bank nonperforming loans (%)	80	33.0
<b>Unmet needs index</b>	101	10.4
Medium- and high-tech activities value added	117	6.4
Industry and services value added (% GDP)	71	82.0
Labour underutilization rate	148	13.0
Output per worker	81	12.0
<b>ENABLING ENVIRONMENT</b>	88	56.1
<b>Governance</b>	48	63.2
<b>Political environment</b>	40	65.0
Peace and stability	35	87.0
View and accountability	48	63.0
Quality of institutions	55	60.7
Rule of law	62	62.6
Control of corruption	50	63.0
Government effectiveness	70	65.8
<b>Socio-economic</b>	72	57.4
<b>Gender equity</b>	15	63.1
Female-to-male ratio in parliament	15	70.5
Female-to-male labour force participation	28	88.0
Female-to-male ratio in internal wage	104	104
<b>Gender equality</b>	102	47.0
Social protection coverage (% population)	95	22
Adult literacy rate	88	88.1
Youth not in employment, education or training (%)	100	30.7
<b>Standard of living</b>	70	61.7
Poverty headcount ratio (% population)	45	70
GDP per capita	86	7.4
<b>Health and environment</b>	124	56.8
<b>Health</b>	117	63.0
Universal health coverage	100	62
Healthy life expectancy (years)	101	28.8
Under-five mortality rate	118	84.0
<b>Environmental performance</b>	80	66.1
Renewable energy consumption (%)	62	21.5
Household footprint per capita	86	87.7
Natural hazard exposure	81	85

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# NEPAL

**GKI RANK** 128/154

**GKI SCORE** 36.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Nepal is a weak performer in terms of its knowledge infrastructure. It ranks 128th out of 154 countries in the Global Knowledge Index 2021 and 22nd out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Female-to-male labour force participation
- + Gross attendance ratio for tertiary education, gender parity
- + Labour underutilization rate
- + Completion rate in upper secondary education, gender parity
- + Cultural goods exports (% exports)

### AREAS OF IMPROVEMENT

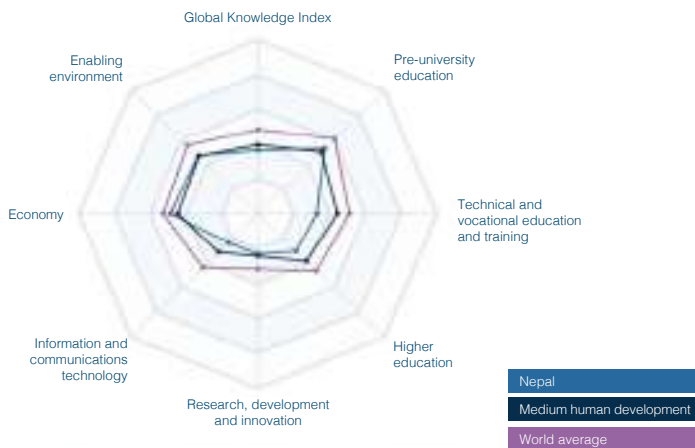
- Schools with access to computers in secondary education (%)
- Inbound mobility rate
- Pupil-teacher ratio in tertiary education
- Completion rate in upper secondary education
- Fixed broadband Internet traffic per subscription

### KEY INDICATORS

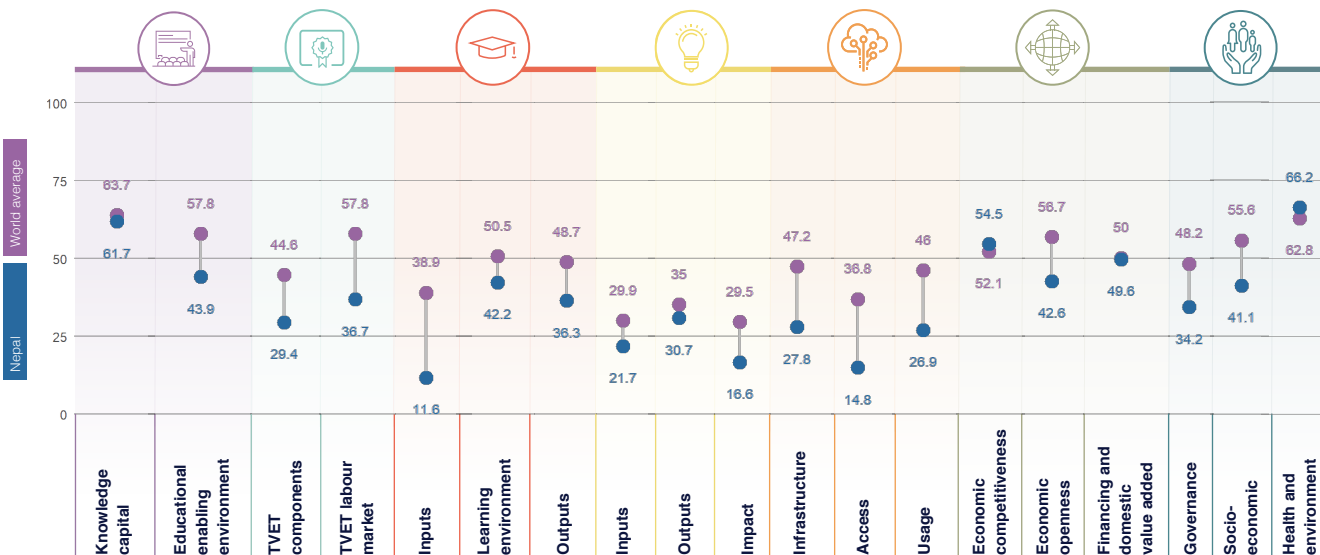
**GDP US\$ billions** 96.234  
**Population** 29,136,808  
**HDI** 0.602

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	108	52.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	148	33
HIGHER EDUCATION	146	30
RESEARCH, DEVELOPMENT AND INNOVATION	119	23
INFORMATION AND COMMUNICATIONS TECHNOLOGY	137	23.2
ECONOMY	90	48.9
ENABLING ENVIRONMENT	109	47.1



## GKI PILLARS





# NEPAL

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	83	81.7
Enrolment	77	87.5
Net enrolment rate in primary education	82	88.7
Net enrolment rate in lower secondary education	80	86.4
Net enrolment rate in upper secondary education	73	77.7
Completion	111	50.2
Years of compulsory education in primary and secondary	116	81.5
Completion rate in upper secondary education	100	5.8
Success rate rate in the last grade of lower secondary education	80	88
Outcomes	74	47.3
Assessment of 15-year-old students in math, science and reading	106	109
Learning-adjusted years of schooling	90	47.3
<b>Educational enabling environment</b>	117	43.8
Expenditure	80	22.7
Government expenditure on primary education (% GDP)	48	39.3
Government expenditure on secondary education (% GDP)	100	17.8
Government funding per primary student (% GDP per capita)	86	25.9
Government funding per secondary student (% GDP per capita)	108	6.4
Resources	111	30
Pupil-based teacher ratio in primary education	90	80.7
Pupil-based teacher ratio in secondary education	78	80.9
Schools with access to computers in primary education (%)	89	0.2
Schools with access to computers in secondary education (%)	86	0.2
Early learning	100	53.0
Class attendance rate in early childhood education	21	89.7
Proportion of children who use developmentally apt toys	47	44.4
Proportion of children with stimulating home learning environments	33	84.3
Pupil-based teacher ratio in preprimary education	45	85.1
Quality and inclusiveness	80	51.0
Completion rate in upper secondary education, gender parity	12	86.0
Completion rate in upper secondary education, wealth parity	80	13.0
Completion rate in upper secondary education, location parity	81	41.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	108	38.4
Companies training apprentices	80	34.0
Firms offering formal training (%)	81	38.8
Labour force with short-cycle tertiary education (%)	106	109
Participation rate in formal and non-formal education and training	106	108
TVET enrolment	108	0.0
Government expenditure on vocational education (%)	89	6.7
Share of students enrolled in secondary vocational programmes	123	3.1
Share of students enrolled in postsecondary vocational programmes	106	109
TVET quality and inclusiveness	80	42.4
Extent of staff training	121	41.7
Quality of vocational training	125	35.7
Ratio of high-skill TVET occupations earnings to average wage	30	40.6
Ratio of medium-skill TVET occupations earnings to average wage	30	52.5
<b>TVET labour market</b>	108	38.7
Efficiency of the labour market	80	33.1
Firms considered with inappropriately educated workforce (%)	79	84.6
Employment educational mismatch (%)	78	52.7
Proportion of skilled production workers	28	34.1
Unemployment rate with vocational education	83	60.0
Real TVET unemployment	101	22.6
Share of TVET occupations	105	19.0
Manufacturing employment (%)	108	26.1
Quality and inclusiveness	103	10.1
Enrolment in vocational education, gender parity	106	109
Useable employment rate	127	10.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	142	11.8
Expenditure	86	18.1
Government expenditure per tertiary student	118	2.4
Teaching staff compensation (% tertiary expenditure)	92	33.7
Enrolment	131	1.4
Enrolment in bachelor's or equivalent level (%)	103	6.1
Enrolment in masters, doctoral or equivalent (%)	87	6.8
Resources	141	10.3
Pupil-teacher ratio in tertiary education	138	9.3
Researchers in higher education (%)	106	109
<b>Learning environment</b>	100	42.3
Directly and indirectly funded	100	42.3
Teachers in tertiary education, gender parity	106	109
Labour mobility rate	128	0.1
Academic freedom	27	84.0
Quality and inclusiveness	100	42
Class attendance rate in tertiary education, gender parity	7	86
Class attendance rate in tertiary education, wealth parity	57	25.1
Class attendance rate in tertiary education, location parity	59	5.8
<b>Outputs</b>	124	36.3
Attainment	80	25
Educational attainment rate, bachelor's or equivalent	87	0.8
Educational attainment rate, master's or equivalent	73	5.1
Educational attainment rate, doctoral or equivalent	106	109
Employment	88	58.7
Labour force participation rate with advanced education	57	82.0
Unemployment rate with advanced education	84	75.7
Innovation	88	12.0
University tertiary enrollment in R&D	100	32.8
CRIDE documents per 100 personnel in higher education	106	109
<b>Government's contribution to innovation and economic growth</b>		
<b>Inputs</b>	102	27.2
Access to R&D expenditure	100	100
GDP (% GDP)	106	109
GERD per researcher	106	109
Researchers per thousand labour force	106	109
Tertiary graduates from STEM programmes (%)	106	109
<b>Quality and inclusiveness</b>	100	100
GERD performed by business enterprises (%)	106	109
GERD financed by business enterprises (%)	106	109
Researchers in business enterprises (%)	106	109
Firms that spend on R&D (%)	88	12.0
<b>Quality of research environment</b>	80	100
High-skill employment (%)	88	22.2
Intellectual property payments (% total trade)	106	109
State of cluster development	113	17.0
<b>Outputs</b>	80	10.7
Access to R&D expenditure	100	100
Average documents per researcher	106	109
Citations per document	88	27.0
Patent applications (per 100 billion GDP)	89	24.0
<b>Quality of research environment</b>	80	100
Intellectual property receipts (% total trade)	106	109
Research design applications (per 100 billion GDP)	108	0.8
PCT applications (per 100 billion GDP)	106	109
Firms producing new goods and services (%)	28	85.1





# NEPAL

	Rank	Value
<b>Business environment</b>	81	55.5
Trademark applications per 100 million GDP	81	25.3
Cultural goods exports (% exports)	95	46
Printing and publishing output (% manufactured output)	80	5.2
<b>Trade</b>	139	15.3
Trade	139	5
Rules of institutions' provisions	80	8.8
Depth of innovative companies	80	47.1
ISO 9001 quality certificates (% GDP)	124	1
ISO 14001 environmental certificates (% GDP)	125	1.4
<b>Energy</b>	105	5.5
CERO licensed from abroad (%)	116	11.8
Coal reserves per strategic storage deals (% GDP)	75	7.5
Computer software spending (% GDP)	117	1.4
<b>Government services</b>	100	10.2
New business density per thousand population	82	5.8
Firms with new products/services (%)	100	83.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	157	23.2
<b>Infrastructure</b>	138	37.8
<b>Coverage</b>	100	14.2
3G/4G mobile network coverage (% population)	147	23.9
Secure Internet servers per 1 million population	100	2.5
Investment in telecommunication services (% GDP)	116	11.8
<b>Quality</b>	119	8.1
Mobile speed and download speeds	86	10
Fixed broadband upload and download speeds	72	8.7
Fixed broadband subscriptions (y speed) per hundred people	128	0.1
<b>Availability</b>	81	22.3
Fixed broadband basket (% GNI per capita)	81	79.6
Mobile broadband basket (% GNI per capita)	100	49.0
Internet and telephone competition	118	80
<b>Access</b>	111	16.8
<b>Subscribers</b>	115	22.3
Active mobile-broadband subscriptions per fixed-line inhabitants	115	20.1
International Internet bandwidth per user	115	25
Households with Internet access at home (%)	125	17.7
<b>Skills and employment</b>	107	7.1
Individuals with standard ICT skills (%)	114	11.8
Tertiary graduates from ICT programmes (%)	114	11.8
ICT employment (%)	83	31.4
<b>Usage</b>	123	26.3
<b>Services</b>	140	14.4
Government online services	124	40
Fixed broadband internet traffic per subscription	104	8
Mobile broadband internet traffic per subscription	123	0.8
Internet users (%)	137	17.1
<b>Commerce</b>	140	16.5
ICT/FIT patent applications (per 100,000 GDP)	114	11.8
E-participation	123	36.0
Internet activities by individuals (%)	114	11.8
Trade in digitally deliverable services (% total trade)	85	41.0
<b>ECONOMY</b>	81	66.3
<b>Economic complexity/structure</b>	73	54.3
HS0222222222222222	80	41.6
Overhead capital formation (% GDP)	85	80.7
Logistics performance	111	37.6
Transport productive capacity	81	23.3
Building quality control	80	86.7

	Rank	Value
<b>Business agility</b>	107	61.2
Ease of starting a business	110	81.7
Recovery recovery rate	80	44.7
Entrepreneurial employee activity rate	116	11.8
Growth of corporate transactions	79	57.1
<b>Corporate openness</b>	110	42.8
Trade and investment	110	21.0
Trade (% GDP)	126	14.3
High-technology trade (% total trade)	71	48.1
Market concentration	85	84.8
Market concentration	130	88.7
Product diversity	131	51.5
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	117	30.4
Cost dynamics	100	46.7
<b>Financing and domestic value added</b>	73	66.8
<b>Financing and costs</b>	47	12.1
Domestic credit to private sector (% GDP)	34	33.2
IMRS financing gap (% GDP)	34	67.0
Tax and contribution rate (% profit)	86	89.8
Bank nonperforming loans (%)	20	83.0
Unsecured loans ratio	100	11.7
Medium- and high-tech activities value added	109	9.8
Industry and services value added (% GDP)	130	37.7
Labour underutilization rate	11	87.8
Output per worker	130	1.8
<b>ENABLING ENVIRONMENT</b>	100	47.1
<b>Governance</b>	101	34.2
<b>Political environment</b>	75	41.0
Peace and stability	81	41.5
View and accountability	86	42
Quality of institutions	118	25.5
Rule of law	105	34.1
Control of corruption	107	20.0
Government effectiveness	108	13.8
<b>Socio-economic</b>	125	41.1
<b>Gender equity</b>	45	23.9
Female-to-male ratio in parliament	45	48.8
Female-to-male labour force participation	8	87.2
Female-to-male ratio in internal wage	114	11.8
<b>Gender equality</b>	127	47.9
Social protection coverage (% population)	100	14.6
Adult literacy rate	114	68.7
Youth not in employment, education or training (%)	82	70.4
<b>Standard of living</b>	131	2.1
Poverty headcount ratio (% population)	114	11.8
GDP per capita	128	2.4
<b>Health and environment</b>	83	66.2
<b>Health</b>	110	81.1
Universal health coverage	121	40
Healthy life expectancy (years)	100	67.3
Under-five mortality rate	100	75
<b>Environmental performance</b>	81	33.0
Renewable energy consumption (%)	20	77.9
Household footprint per capita	25	86
Natural hazard exposure	117	43

\*All values are normalized to a scale from 0 (worst) to 100 (best).



<b>GKI SCORE</b>	<b>69.5</b>
<b>WORLD AVERAGE</b>	<b>48.4</b>

**GKI RANK** 5/154

# NETHERLANDS

## COUNTRY PERFORMANCE SUMMARY

Netherlands is a leading performer in terms of its knowledge infrastructure. It ranks 5th out of 154 countries in the Global Knowledge Index 2021 and 5th out of the 61 countries with very high human development.

### KEY INDICATORS

<b>GDP US\$ billions</b>	<b>947,499</b>
<b>Population</b>	<b>17,134,873</b>
<b>HDI</b>	<b>0.944</b>

### AREAS OF STRENGTH

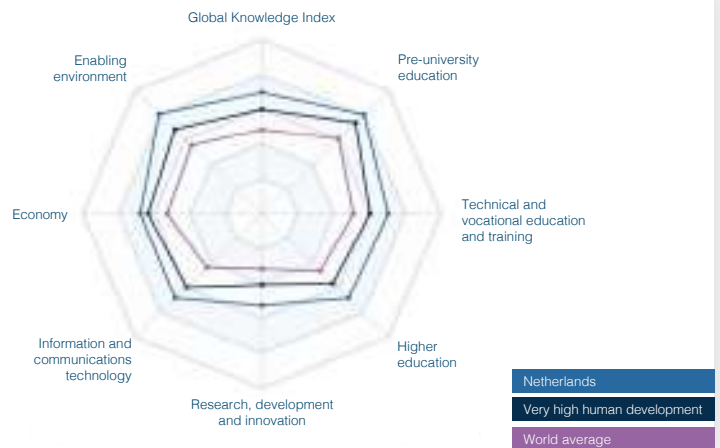
- + Government expenditure on vocational education (%)
- + Intellectual property receipts (% total trade)
- + Secure Internet servers per 1 million population
- + Insolvency recovery rate
- + Fixed-broadband subscriptions by speed per hundred people

### AREAS OF IMPROVEMENT

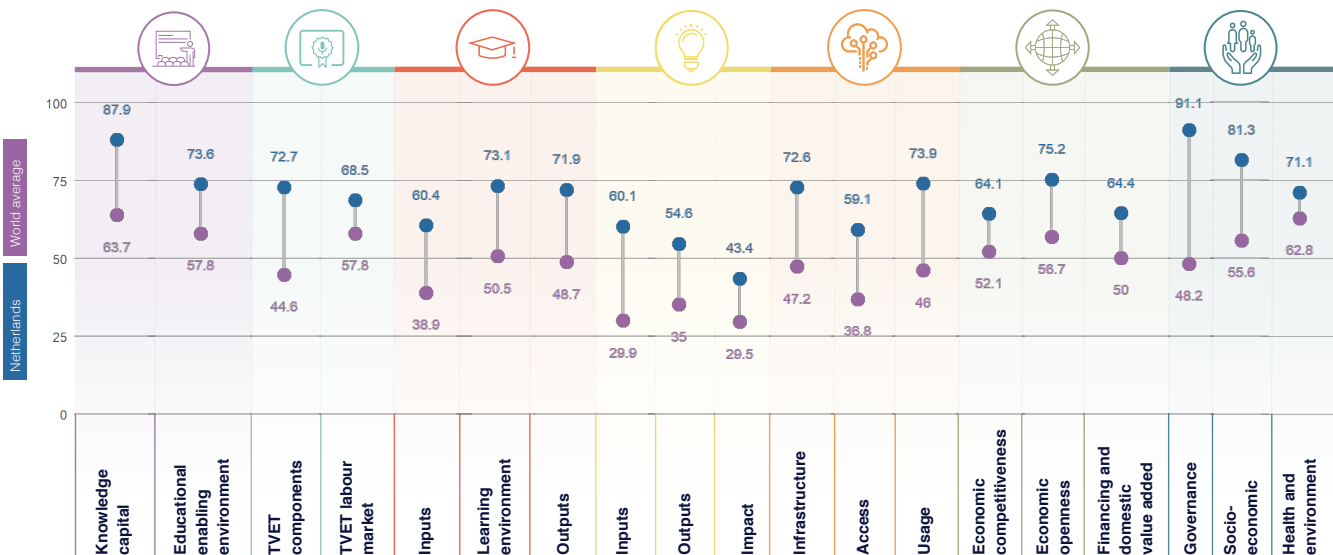
- Ecological footprint per capita
- Tertiary graduates from ICT programmes (%)
- Renewable energy consumption (%)
- Researchers in higher education (%)
- Foreign direct investment, net inflows (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	8	80.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	6	70.6
HIGHER EDUCATION	6	68.5
RESEARCH, DEVELOPMENT AND INNOVATION	6	52.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	12	68.5
ECONOMY	18	67.9
ENABLING ENVIRONMENT	8	81.2



## GKI PILLARS



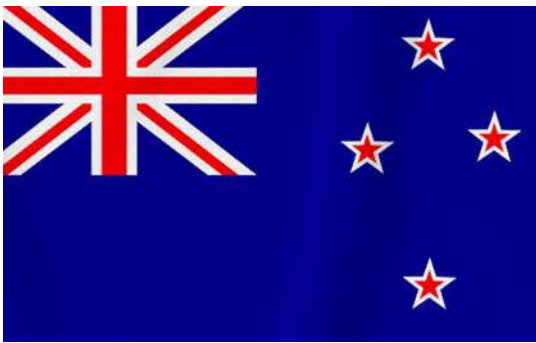


# NETHERLANDS

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	4	87.8
Enrollment	11	81
Net enrolment rate in primary education	27	93.6
Net enrolment rate in lower secondary education	40	90.1
Net enrolment rate in upper secondary education	6	90.1
Completion	6	97.3
Years of compulsory education in primary and secondary	5	82.0
Completion rate in upper secondary education	40	82.0
Success rate rate in the last grade of lower secondary education	104	104
Completion	11	70.4
Assessment of 15-year-old students in math, science and reading	19	88.7
Learning-adjusted years of schooling	9	81
<b>Educational enabling environment</b>		
Expenditure	60	31.0
Government expenditure on primary education (% GDP)	87	25.9
Government expenditure on secondary education (% GDP)	28	42
Government funding per primary student (% GDP per capita)	53	40.6
Government funding per secondary student (% GDP per capita)	30	37.4
Resources	1	100
Pupil-based teacher ratio in primary education	104	104
Pupil-based teacher ratio in secondary education	104	104
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
<b>Early learning</b>		
Class attendance rate in early childhood education	18	71.8
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
<b>Quality and inclusiveness</b>		
Completion rate in upper secondary education, gender parity	88	78.7
Completion rate in upper secondary education, wealth parity	5	84.1
Completion rate in upper secondary education, location parity	104	104
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communication and writing	11	71.0
Firms offering formal training (%)	17	87.5
Labour force with short-cycle tertiary education (%)	30	79.0
Participation rate in formal and non-formal education and training	4	86.8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	1	100
Share of students enrolled in secondary vocational programmes	7	80.0
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and inclusiveness</b>		
Extent of staff training	6	73.3
Quality of vocational training	3	77.1
Ratio of high-skill TVET occupations earnings to average wage	76	29.6
Ratio of median-skill TVET occupations earnings to average wage	57	40.0
<b>TVET labour market</b>		
Efficiency of the labour market	44	70.7
Firms considered with inappropriately educated workforce (%)	84	81.7
Employment educational mismatch (%)	37	76
Proportion of skilled production workers	40	88.7
Unemployment rate with vocational education	24	68.0
Real TVET unemployment	76	66.1
Share of TVET occupations	60	80.0
Manufacturing employment (%)	86	28.7
<b>Quality and inclusiveness</b>		
Enrollment in vocational education, gender parity	22	82.0
Useable employment rate	43	66.6

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	6	88.0
Government expenditure per tertiary student	10	68.0
Teaching staff compensation (% tertiary expenditure)	104	104
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	4	85.8
Enrollment in masters, doctoral or equivalent (%)	18	68.1
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	41	63.7
Researchers in higher education (%)	80	20
<b>Learning environment</b>		
<b>Quality and inclusiveness features</b>		
Teachers in tertiary education, gender parity	27	60.0
Labour mobility rate	21	41.2
Academic freedom	20	61.0
<b>Quality and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>		
Retention	71	32.0
Educational attainment rate, bachelor's or equivalent	6	81
Educational attainment rate, master's or equivalent	27	48.0
Educational attainment rate, doctoral or equivalent	31	50.0
Employment	17	67.0
Labour force participation rate with advanced education	34	60.1
Unemployment rate with advanced education	18	64.8
<b>Impact</b>		
University tertiary enrollment in R&D	6	76.8
OECD students per 1000 personnel in higher education	14	60.4
<b>Government's contribution and economic impact</b>		
Income	3	100.0
Share of GDP expenditure	10	40.1
GDP (% GDP)	12	43.7
GERD per researcher	27	38.0
Researchers per thousand labour force	11	67.0
Tertiary graduates from STEM programmes (%)	66	34.0
<b>Government's contribution and economic impact</b>		
GERD performed by business enterprises (%)	73	38.0
GERD financed by business enterprises (%)	23	63.0
Researchers in business enterprises (%)	6	80.0
Firms that spend on R&D (%)	18	62.0
<b>Quality and inclusiveness</b>		
High-skill employment (%)	104	104
Intellectual property payments (% total trade)	1	99
State of cluster development	6	35.8
<b>Outputs</b>		
Research in R&D expenditure	11	68.1
Average documents per researcher	40	61.0
Citations per document	26	38.0
Patent applications (per 100 billion GDP)	12	76
<b>Government's contribution and economic impact</b>		
Intellectual property receipts (% total trade)	1	99
Research design applications (per 100 billion GDP)	28	28.0
PCT applications (per 100 billion GDP)	11	60.4
Firms producing new goods and services (%)	7	81





# NEW ZEALAND

## KEY INDICATORS

GDP US\$ billions	215.597
Population	4,822,233
HDI	0.931

**GKI RANK** 24/154

**GKI SCORE** 63.3

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

New Zealand is a leading performer in terms of its knowledge infrastructure. It ranks 24th out of 154 countries in the Global Knowledge Index 2021 and 24th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

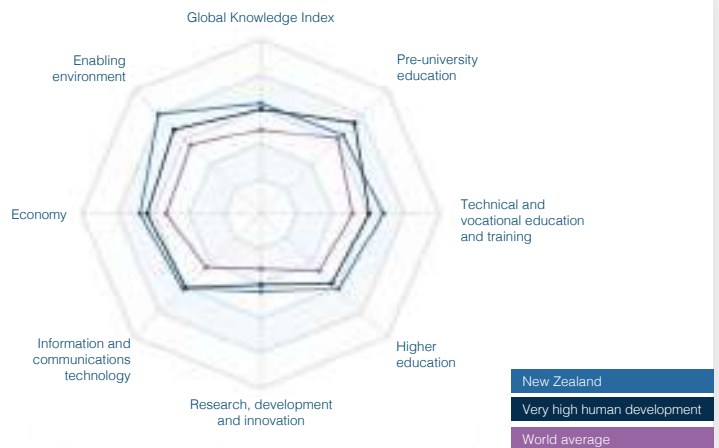
- + Ease of starting a business
- + Peace and stability
- + Voice and accountability
- + Rule of law
- + Net enrolment rate in lower secondary education

### AREAS OF IMPROVEMENT

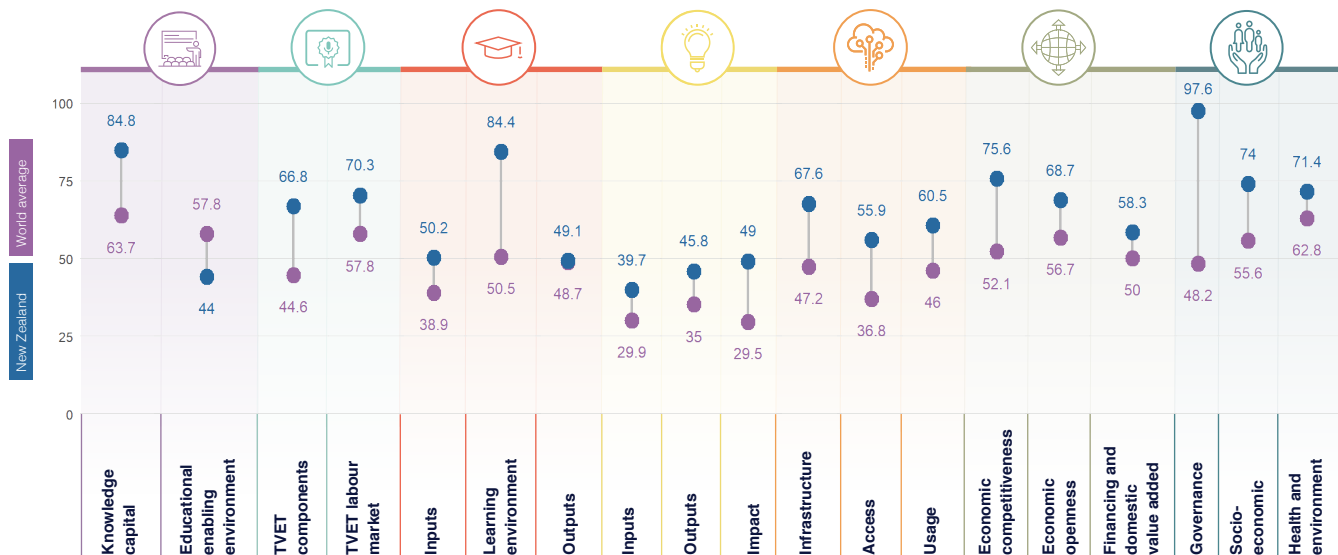
- Trade (% GDP)
- Mobile broadband Internet traffic per subscription
- Foreign direct investment, net inflows (% GDP)
- Enrolment in vocational education, gender parity
- Share of students enrolled in post-secondary vocational programmes

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	85	64.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	11	68.5
HIGHER EDUCATION	21	61.2
RESEARCH, DEVELOPMENT AND INNOVATION	23	44.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	24	61.4
ECONOMY	23	67.5
ENABLING ENVIRONMENT	9	81



## GKI PILLARS







# NEW ZEALAND

	Rank	Value
<b>FRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	64.4
Enrollment	18	84.8
Enrollment rate in primary education	2	95.5
Enrollment rate in lower secondary education	1	100
Enrollment rate in upper secondary education	3	99.9
Enrollment rate in tertiary education	9	86
Completion	64	75.9
Years of compulsory education in primary and secondary	12	76.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	116	116
Completion	11	77.9
Assessment of 15-year-old students in math, science and reading	12	88.9
Learning-adjusted years of schooling	11	85.9
<b>Educational enabling environment</b>		
Enrollment	41	51.9
Government expenditure on primary education (% GDP)	60	36.9
Government expenditure on secondary education (% GDP)	19	43.7
Government funding per primary student (% GDP per capita)	85	46.1
Government funding per secondary student (% GDP per capita)	88	27.9
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	88	49.9
Class attendance rate in early childhood education	90	49.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Enrollment	1	94.8
Enrollment rate in vocational training	4	91.9
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	25	81.9
Participation rate in formal and non-formal education and training	3	81.1
<b>TVET resources</b>		
Government expenditure on vocational education (%)	34	32
Share of students enrolled in secondary vocational programmes	42	31
Share of students enrolled in postsecondary vocational programmes	79	68.8
<b>TVET quality and infrastructure</b>		
Extent of staff training	21	82.9
Quality of vocational training	25	83.2
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Enrollment	85	70.9
<b>Efficiency of the labour market</b>		
Firms considered with inequality educated workforce (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	25	86.4
Real TVET unemployment	61	71.9
Share of TVET occupations	44	64.9
Manufacturing employment (%)	88	35.9
Quality and infrastructure	11	74.9
Enrollment in vocational education, gender parity	81	82
Unemployed employment rate	42	87.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrollment	25	41.1
Government expenditure per tertiary student	25	42.1
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	38	38.9
Enrollment in bachelor's or equivalent level (%)	19	43.2
Enrollment in masters, doctoral or equivalent (%)	48	35.9
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	88	38.7
Researcher in higher education (%)	30	62.1
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	17	62
Labour mobility rate	9	73.2
Academic freedom	42	88.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Enrollment	25	50.9
Educational attainment rate, bachelor's or equivalent	19	84.8
Educational attainment rate, master's or equivalent	41	23.9
Educational attainment rate, doctoral or equivalent	12	93.7
<b>Employment</b>		
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
<b>Impact</b>		
University tertiary enrollment in R&D	28	88.9
OECD students per 1000 personnel in higher education	63	28.1
<b>Government expenditure and efficiency</b>		
Enrollment	28	51.9
Government expenditure	28	51.9
GDP (% GDP)	28	27.1
OECD per researcher	79	38
Researchers per thousand labour force	17	62.4
Tertiary graduate from R&D programme (%)	88	42.9
<b>Government expenditure and efficiency</b>		
OECD performed by business enterprises (%)	28	29.9
OECD financed by business enterprises (%)	34	57.4
Researchers in business enterprises (%)	40	37.9
Firms that spend on R&D (%)	116	116
<b>Quality and infrastructure</b>		
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	22	41.9
State of cluster development	48	48.9
<b>Quality and infrastructure</b>		
Government expenditure	28	51.9
Average documents per researcher	42	80.2
Citations per document	36	27.9
Patent applications (per 100 billion GDP)	44	57.1
<b>Government expenditure and efficiency</b>		
Intellectual property receipts (% total trade)	13	50
Research and development expenditure (per 100 billion GDP)	91	38
PCT applications (per 100 billion GDP)	30	76.9
Firms producing new goods and services (%)	116	116



# NEW ZEALAND

	Rank	Value
<b>Consumer Innovation</b>	27	67.7
Treatment applications per 100 million GDP	11	76
Cultural goods exports (% exports)	66	10.5
Printing and publishing output (% manufactured output)	34	36.0
<b>Energy</b>	75	34
<b>Finance</b>	75	34
Ratio of institutions' provisions	47	23.2
Depth of innovative companies	35	63.0
ISO 9001 quality certificates (% GDP)	62	20.2
ISO 14001 environmental certificates (% GDP)	53	14.3
<b>Industry</b>	77	33.3
CERD forecast from abroad (%)	54	14.7
Joint ventures per strategic alliance deals (% GDP)	79	43.6
Computer software spending (% GDP)	44	25.0
<b>Government Services</b>	1	100
New business density per thousand population	4	60.8
Firms with new products/services (%)	116	116
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	24	67.8
<b>Infrastructure</b>	17	67.8
<b>Coverage</b>	25	54.3
30MHz mobile network coverage (% population)	22	67.0
Secure Internet servers per 1 million population	31	27.1
Investment in telecommunication services (% GDP)	43	40.2
<b>Speed</b>	14	67.0
Mobile upload and download speeds	11	60.0
Fixed broadband upload and download speeds	16	43.0
Fixed broadband subscriptions (by speed) per hundred people	79	33.0
<b>Availability</b>	17	67.0
Fixed broadband latency (% QM per capita)	29	66.0
Mobile broadband latency (% QM per capita)	15	60.1
Internet and telephone competition	1	100
<b>Access</b>	25	60.8
<b>Subscriptions</b>	25	60.1
Active mobile-broadband subscriptions per fixed-line inhabitants	20	50.4
International Internet bandwidth per user	35	67.1
Households with Internet access at home (%)	35	67.0
<b>Skills and employment</b>	37	44.5
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	22	49.0
ICT employment (%)	116	116
<b>Usage</b>	22	60.0
<b>Services</b>	37	50.0
Government online services	17	67.0
Fixed broadband internet traffic per subscription	45	20.0
Mobile broadband internet traffic per subscription	60	4.3
Internet users (%)	23	60.0
<b>Commerce</b>	27	67.0
ICT FDI patent applications (per 100 million GDP)	32	50
E-participation	4	60.0
Internet activities by individuals (%)	116	116
Trade in digitally deliverable services (% total trade)	50	45.7
<b>ECONOMY</b>	22	67.0
<b>Economic Competitiveness</b>	3	70.0
<b>Infrastructure Investment</b>	0	10.0
Overhead capital formation (% GDP)	67	67.0
Logistics performance	14	71.0
Transport productive capacity	35	37.7
Building quality control	1	100

	Rank	Value
<b>Business Agility</b>	0	60
Time of starting a business	1	100
Recovery recovery rate	20	66.5
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	50	21.4
<b>Employee activities</b>	20	66.7
Trade and investment	70	20.4
Trade (% GDP)	100	20.0
High-technology trade (% total trade)	50	40.0
Market concentration	62	60.0
Market concentration	61	67.7
Product diversity	27	60
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	110	34.1
Cost dynamics	1	100
<b>Financing and domestic value added</b>	32	60.0
<b>Financing and costs</b>	20	60.0
Domestic credit to private sector (% GDP)	10	60.7
MSME financing gap (% GDP)	116	116
Tax and contribution rate (% profit)	65	72.0
Bank nonperforming loans (%)	116	116
Unmet loan demand	11	60.0
Medium- and high-tech activities value added	76	34.0
Industry and services value added (% GDP)	55	64.7
Labour underutilization rate	40	70.0
Output per worker	30	60.0
<b>ENABLING ENVIRONMENT</b>	6	67
<b>Governance</b>	2	67.0
Political environment	1	60.0
Peace and stability	1	67.0
View and accountability	2	60
Quality of institutions	6	60.0
Rule of law	2	60
Control of corruption	4	60.0
Government effectiveness	15	60.0
<b>Socio-economic</b>	20	74
Gender equity	5	60.0
Female-to-male ratio in parliament	6	66.7
Female-to-male labour force participation	23	65.6
Female-to-male ratio in internal usage	1	100
Gender inequality	22	60.0
Social protection coverage (% population)	1	100
Adult literacy rate	116	116
Youth not in employment, education or training (%)	43	70.0
<b>Standard of living</b>	67	30
Poverty headcount ratio (% population)	116	116
GDP per capita	22	60
<b>Health and environment</b>	17	71.4
Health	10	60.0
Universal health coverage	1	67
Healthy life expectancy (years)	25	67.1
Under-five mortality rate	35	67.0
Environmental performance	61	60.0
Renewable energy consumption (%)	50	22.0
Household footprint per capita	100	60.0
Natural hazard exposure	67	30

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# NICARAGUA

**GKI RANK** 114/154

**GKI SCORE** 40.1  
**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**  
Nicaragua is a modest performer in terms of its knowledge infrastructure. It ranks 114th out of 154 countries in the Global Knowledge Index 2021 and 14th out of the 27 countries with medium human development.

- AREAS OF STRENGTH**
- + Female-to-male ratio in parliament
  - + Proportion of skilled production workers
  - + Labour force participation rate with advanced education
  - + Transport productive capacity
  - + Firms offering formal training (%)

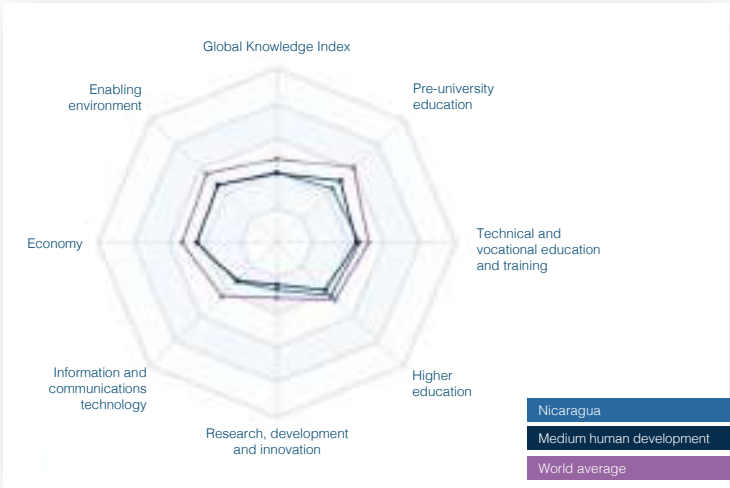
- AREAS OF IMPROVEMENT**
- Building quality control
  - Industrial design applications (per 100 billion GDP)
  - Intellectual property receipts (% total trade)
  - Research institutions prominence
  - Extent of corporate transparency

**KEY INDICATORS**

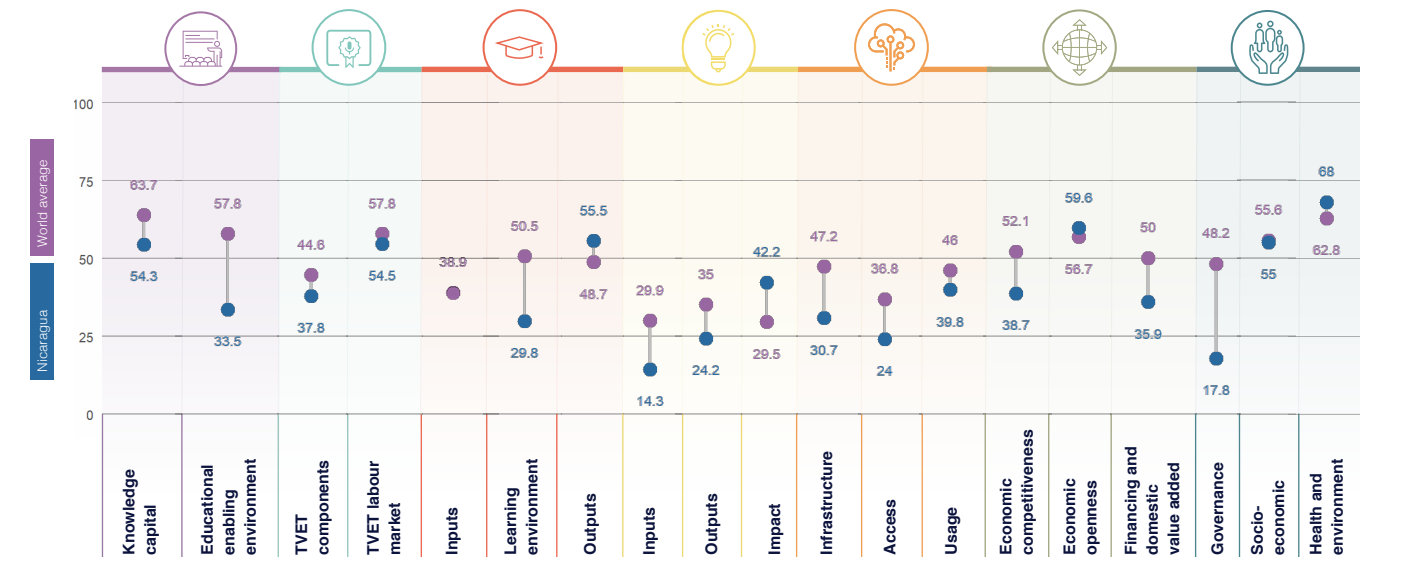
GDP US\$ billions	34.979
Population	6,624,554
HDI	0.66

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	121	43.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	102	46.1
HIGHER EDUCATION	87	42.7
RESEARCH, DEVELOPMENT AND INNOVATION	99	26.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	109	31.5
ECONOMY	118	44.7
ENABLING ENVIRONMENT	110	46.9



## GKI PILLARS







# NICARAGUA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	121	43.8
Enrollment	167	54.3
Enrollment rate in primary education	88	55.5
Enrollment rate in lower secondary education	82	83.8
Enrollment rate in upper secondary education	89	52.9
Completion	125	41.2
Years of compulsory education in primary and secondary	132	48.2
Completion rate in upper secondary education	94	42.2
Success rate rate in the last grade of lower secondary education	104	104
Completion	81	43.5
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	100	42.5
<b>Educational enabling environment</b>		
Expenditure	104	104
Government expenditure on primary education (% GDP)	104	104
Government expenditure on secondary education (% GDP)	104	104
Government funding per primary student (% GDP per capita)	104	104
Government funding per secondary student (% GDP per capita)	104	104
Resources	113	10.2
Pupil-based teacher ratio in primary education	104	104
Pupil-based teacher ratio in secondary education	104	104
Schools with access to computers in primary education (%)	79	66.2
Schools with access to computers in secondary education (%)	104	104
Early learning	104	104
Class attendance rate in early childhood education	104	104
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	81	60.5
Completion rate in upper secondary education, gender parity	112	65.7
Completion rate in upper secondary education, wealth parity	87	36.5
Completion rate in upper secondary education, location parity	80	45.9
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	87	57.1
Firms offering formal training (%)	13	71.7
Labour force with short-cycle tertiary education (%)	104	104
Participation rate in formal and non-formal education and training	82	4.8
TVET resources	104	104
Government expenditure on vocational education (%)	104	104
Share of students enrolled in secondary vocational programmes	104	104
Share of students enrolled in postsecondary vocational programmes	104	104
TVET quality and infrastructure	128	21.4
Extent of staff training	128	45.4
Quality of vocational training	134	34.5
Ratio of high-skil TVET occupations earnings to average wage	104	104
Ratio of medium-skill TVET occupations earnings to average wage	104	104
<b>TVET labour market</b>		
Efficiency of the labour market	81	54.5
Firms considered with inequality educated workforce (%)	89	80.8
Employment educational mismatch (%)	82	41.5
Proportion of skilled production workers	7	84.1
Unemployment rate with vocational education	104	104
Real TVET unemployment	81	21.7
Share of TVET occupations	100	41
Manufacturing employment (%)	82	31.4
Quality and infrastructure	104	61.2
Enrollment in vocational education, gender parity	104	104
Useable employment rate	82	60.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	104	104
Government expenditure per tertiary student	104	104
Teaching staff compensation (% tertiary expenditure)	104	104
Enrollment	104	104
Enrollment in bachelor's or equivalent level (%)	104	104
Enrollment in masters, doctoral or equivalent (%)	104	104
Resources	104	104
Pupil-teacher ratio in tertiary education	104	104
Researchers in higher education (%)	104	104
<b>Learning environment</b>		
Directly paid academic freedom	112	18.2
Teachers in tertiary education, gender parity	104	104
Labour mobility rate	104	104
Academic freedom	122	18.2
Quality and infrastructure	81	41.2
Class attendance rate in tertiary education, gender parity	44	38.0
Class attendance rate in tertiary education, wealth parity	52	28.5
Class attendance rate in tertiary education, location parity	28	18.0
<b>Outputs</b>		
Attainment	104	104
Educational attainment rate, bachelor's or equivalent	104	104
Educational attainment rate, master's or equivalent	104	104
Educational attainment rate, doctoral or equivalent	104	104
Employment	89	82.0
Labour force participation rate with advanced education	11	87.5
Unemployment rate with advanced education	72	80
Innovation	117	27.1
University tertiary enrollment in R&D	121	27.1
CRISIS documents per 100 personnel in higher education	104	104
<b>Government's contribution to innovation and economic growth</b>		
Balance	117	14.2
Government R&D expenditure	104	0
GDP (% GDP)	104	2
GERD per researcher	104	104
Researchers per thousand labour force	104	104
Tertiary graduates from STEM programmes (%)	104	104
Quality and infrastructure	81	21.7
GERD performed by business enterprises (%)	104	104
GERD financed by business enterprises (%)	104	104
Researchers in business enterprises (%)	104	104
Firms that spend on R&D (%)	28	26.2
Quality and infrastructure	104	0
High-skilled employment (%)	104	104
Intellectual property payments (% total trade)	124	0.3
State of cluster development	125	23.7
<b>Science</b>		
Government R&D expenditure	104	21.4
Average documents per researcher	104	104
Citations per document	48	21.1
Patent applications (per 100 billion GDP)	122	13.7
Quality and infrastructure	81	0
Intellectual property receipts (% total trade)	117	0
Research design applications (per 100 billion GDP)	113	0.1
PCT applications (per 100 billion GDP)	84	43.5
Firms producing new goods and services (%)	23	87.9



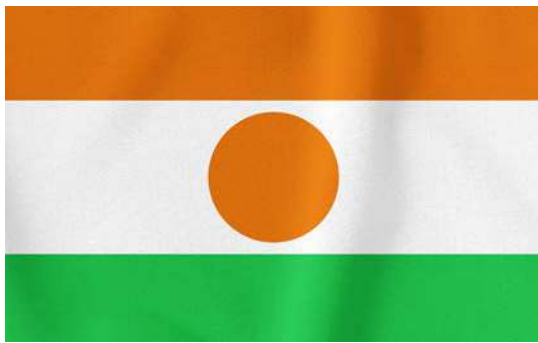


# NICARAGUA

	Rank	Value
<b>Consumer Electronics</b>		
Smartphone applications (per 100 million GDP)	83	24.0
Cultural goods exports (% exports)	87	25
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations (percentage)	115	8
Depth of innovative companies	130	37.0
ISO 9001 quality certificates (% GDP)	118	24
ISO 14001 environmental certificates (% GDP)	127	14
<b>Industry</b>		
CERD licensed from abroad (%)	109	109
Joint ventures per strategic industry deals (% GDP)	104	104
Computer software spending (% GDP)	106	106
<b>Government Services</b>		
New business density per thousand population	106	106
Firms with new products/services (%)	87	33.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>108</b>	<b>21.3</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
3G/4G mobile network coverage (% population)	121	81.0
Secure Internet servers per 1 million population	114	1.8
Investment in telecommunication services (% GDP)	143	1.6
<b>Speed</b>		
Mobile spread and download speeds	70	18.7
Fixed-broadband upload and download speeds	80	4
Fixed-broadband subscriptions (by speed) per hundred people	106	106
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	107	43.0
Mobile broadband basket (% QM per capita)	100	34.3
Internet and telephony competition	75	87.1
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	112	21.6
International Internet bandwidth per user	100	32.1
Households with Internet access at home (%)	102	16.0
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	106	106
Tertiary graduates from ICT programmes (%)	106	106
ICT employment (%)	106	106
<b>Usage</b>		
<b>Services</b>		
Government online services	89	54.7
Fixed broadband Internet traffic per subscription	106	106
Mobile broadband Internet traffic per subscription	106	106
Internet users (%)	102	23.0
<b>Commerce</b>		
eTPUET patent applications (per 100,000 GDP)	70	60.0
E-participation	89	51.4
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	104	27.0
<b>ECONOMY</b>	<b>118</b>	<b>46.7</b>
<b>Economic Competitiveness</b>		
<b>Efficiency</b>		
Overhead capital formation (% GDP)	110	30
Logistics performance	109	36.3
Transport productive capacity	13	50.0
Building quality control	100	23.0

	Rank	Value
<b>Business Agility</b>		
Time of starting a business	123	79.6
Recovery recovery time	81	38.0
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	118	8
<b>Business operations</b>		
Trade credit (days)	124	20.0
Taxes (% GDP)	47	30.0
High-technology trade (% total trade)	125	20.0
Market concentration	86	76.7
Market concentration	146	57.0
Product diversity	41	60.0
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	21	57.0
Cost dynamics	104	46.1
<b>Financing and domestic value added</b>	<b>122</b>	<b>35.0</b>
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	104	10.0
MSME financing gap (% GDP)	80	52.0
Tax and contribution rate (% profit)	141	40.0
Bank nonperforming loans (%)	81	85
Unsecured loans ratio	143	22.0
Medium- and high-tech activities value added	106	106
Industry and services value added (% GDP)	108	40.0
Labour underutilization rate	146	14.9
Output per worker	122	4.3
<b>ENABLING ENVIRONMENT</b>	<b>119</b>	<b>40.0</b>
<b>Governance</b>		
Political environment	123	31
Peace and stability	114	23.1
View and accountability	147	18.0
Quality of institutions	141	16.0
Rule of law	146	9.1
Control of corruption	144	10.0
Government effectiveness	121	26
<b>Socio-economic</b>		
Gender equity	30	27.4
Female-to-male ratio in parliament	1	100
Female-to-male labour force participation	127	54.0
Female-to-male ratio in internal wage	106	106
Gender inequality	106	22.0
Social protection coverage (% population)	112	12
Adult literacy rate	86	37.0
Youth not in employment, education or training (%)	85	83.0
Standard of living	81	31.7
Poverty headcount ratio (% population)	75	80.0
GDP per capita	110	6.2
<b>Health and environment</b>		
<b>Health</b>		
Universal health coverage	65	25
Healthy life expectancy (years)	75	71.1
Under-five mortality rate	84	87.0
Environmental performance	11	58.0
Renewable energy consumption (%)	39	52.1
Household footprint per capita	89	80.7
Natural hazard exposure	124	34

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 153/154

**GKI SCORE** 26.5

**WORLD AVERAGE** 48.4

# NIGER

## COUNTRY PERFORMANCE SUMMARY

Niger is a weak performer in terms of its knowledge infrastructure. It ranks 153rd out of 154 countries in the Global Knowledge Index 2021 and 26th out of the 27 countries with low human development.

### KEY INDICATORS

GDP US\$ billions	28.972
Population	24,206,636
HDI	0.394

### AREAS OF STRENGTH

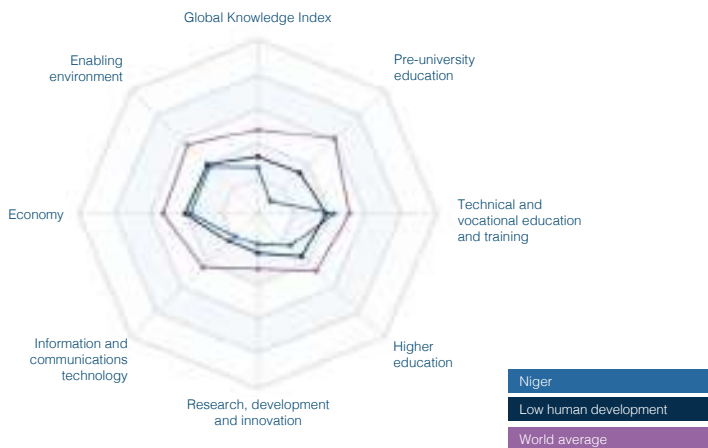
- + Printing and publishing output (% manufactured output)
- + Investment in telecommunication services (% GDP)
- + Renewable energy consumption (%)
- + Gross fixed capital formation (% GDP)
- + Enrolment in vocational education, gender parity

### AREAS OF IMPROVEMENT

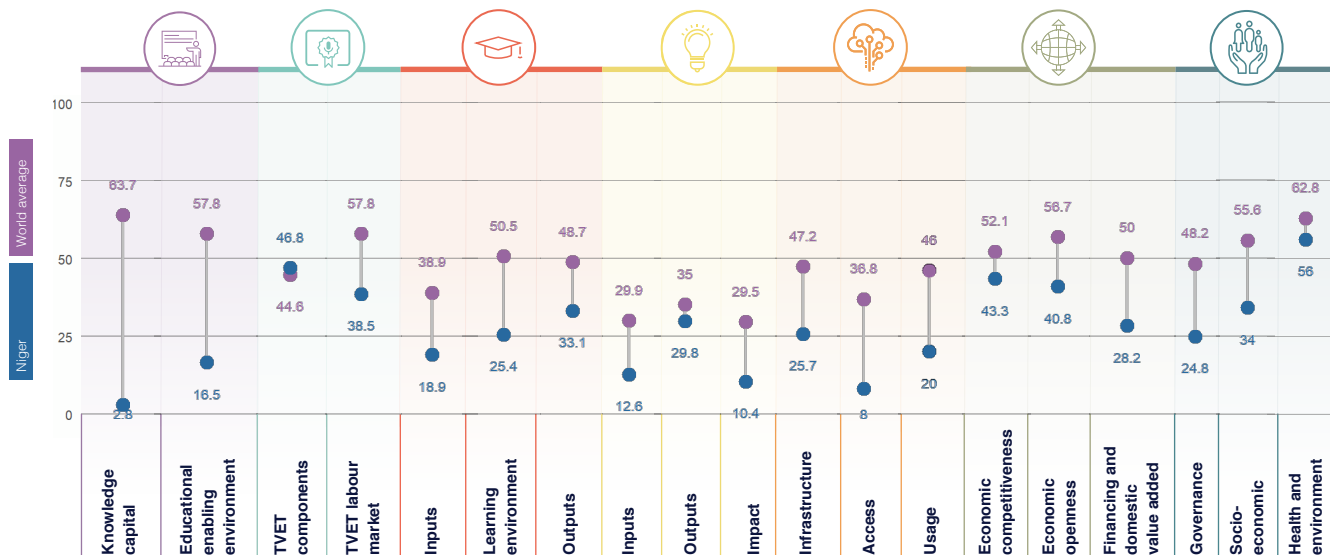
- Net enrolment rate in primary education
- Vulnerable employment rate
- Cultural goods exports (% exports)
- 3G/4G mobile network coverage (% population)
- Secure Internet servers per 1 million population

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	154	9.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	121	42.6
HIGHER EDUCATION	151	25.8
RESEARCH, DEVELOPMENT AND INNOVATION	144	17.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	150	17.9
ECONOMY	143	37.4
ENABLING ENVIRONMENT	142	38.3



## GKI PILLARS





# NIGER

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	184	9.7
Enrollment	147	3.8
Net enrolment rate in primary education	148	8
Net enrolment rate in lower secondary education	131	9.8
Net enrolment rate in upper secondary education	138	8
Completion	150	13.3
Years of compulsory education in primary and secondary	148	8
Completion rate in upper secondary education	136	8
Success rate rate in the last grade of lower secondary education	142	2.8
Completion	142	4.5
Assessment of 15-year-old students in math, science and reading	146	11.9
Learning-adjusted years of schooling	148	4.8
<b>Educational enabling environment</b>	<b>183</b>	<b>16.8</b>
Expenditure	119	10.3
Government expenditure on primary education (% GDP)	72	21.4
Government expenditure on secondary education (% GDP)	112	2.1
Government funding per primary student (% GDP per capita)	88	22.7
Government funding per secondary student (% GDP per capita)	104	13.6
Resources	119	22.5
Pupil-based teacher ratio in primary education	82	35.3
Pupil-based teacher ratio in secondary education	116	11.9
Schools with access to computers in primary education (%)	80	2
Schools with access to computers in secondary education (%)	85	30
Early learning	143	11.4
Class attendance rate in early childhood education	127	8.4
Proportion of children who are developmentally on track	116	11.6
Proportion of children with stimulating home learning environments	116	11.6
Pupil-based teacher ratio in preprimary education	80	17.4
Quality and infrastructure	127	11
Completion rate in upper secondary education, gender parity	127	30.2
Completion rate in upper secondary education, wealth parity	104	8.4
Completion rate in upper secondary education, location parity	128	2.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>86</b>	<b>40.8</b>
Companies training apprentices	119	11.1
Firms offering formal training (%)	71	22.1
Labour force with short-cycle tertiary education (%)	75	22.3
Participation rate in formal and non-formal education and training	116	11.6
TVET resources	80	11.3
Government expenditure on vocational education (%)	26	41.2
Share of students enrolled in secondary vocational programmes	81	11.4
Share of students enrolled in postsecondary vocational programmes	1	10.9
TVET quality and infrastructure	116	11.6
Extent of staff training	116	11.6
Quality of vocational training	116	11.6
Ratio of high-skil TVET occupations earnings to average wage	116	11.6
Ratio of medium-skill TVET occupations earnings to average wage	116	11.6
<b>TVET labour market</b>	<b>132</b>	<b>36.8</b>
Efficiency of the labour market	111	14.3
Firms considered well matched with workforce (%)	71	89.6
Employment educational mismatch (%)	112	7.7
Proportion of skilled production workers	38	88.1
Unemployment rate with vocational education	54	81
Real TVET unemployment	111	14.3
Share of TVET occupations	148	13.7
Manufacturing employment (%)	131	18.8
Quality and infrastructure	122	13.6
Enrollment in vocational education, gender parity	25	81.7
Useable employment rate	102	3

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>138</b>	<b>18.8</b>
Expenditure	114	11.1
Government expenditure per tertiary student	89	21.1
Teaching staff compensation (% tertiary expenditure)	82	3.3
Enrollment	138	2.8
Enrollment in bachelor's or equivalent level (%)	138	8
Enrollment in masters, doctoral or equivalent (%)	101	5
Resources	112	43.3
Pupil-teacher ratio in tertiary education	52	28.6
Researchers in higher education (%)	100	18.5
<b>Learning environment</b>	<b>146</b>	<b>23.4</b>
Timely and academic freedom	121	34.3
Teachers in tertiary education, gender parity	118	11.5
Labour mobility rate	42	15.1
Academic freedom	79	23.2
Quality and infrastructure	91	16.1
Class attendance rate in tertiary education, gender parity	95	21.9
Class attendance rate in tertiary education, wealth parity	85	2.4
Class attendance rate in tertiary education, location parity	25	16.3
<b>Outputs</b>	<b>131</b>	<b>33.1</b>
Attainment	88	8.2
Educational attainment rate, bachelor's or equivalent	106	0.3
Educational attainment rate, master's or equivalent	88	1.8
Educational attainment rate, doctoral or equivalent	56	12.5
Employment	22	16
Labour force participation rate with advanced education	80	84.7
Unemployment rate with advanced education	48	87.3
Impact	111	13.3
University tertiary enrollment in FTE	116	11.6
CRIDE indicators per FTE personnel in higher education	79	18.9
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>128</b>	<b>13.3</b>
Access to credit resources	119	11.1
GDP (% GDP)	116	11.6
GDP per researcher	116	11.6
Researchers per thousand labour force	101	0.3
Tertiary graduates from STEM programmes (%)	108	22.6
Quality and infrastructure	91	16.1
GDP performed by business enterprises (%)	116	11.6
GDP financed by business enterprises (%)	116	11.6
Researchers in business enterprises (%)	116	11.6
Firms that spend on R&D (%)	78	15.1
Quality and infrastructure	116	11.6
High-skilled employment (%)	21	24.9
Intellectual property payments (% total trade)	131	8
State of cluster development	116	11.6
<b>Outputs</b>	<b>87</b>	<b>18.3</b>
Access to credit resources	119	11.1
Average documents per researcher	89	35.3
Citations per document	81	21
Patent applications (per 100 billion GDP)	89	37.9
Quality and infrastructure	116	11.6
Intellectual property receipts (% total trade)	118	1.1
Research design applications (per 100 billion GDP)	114	0.1
PCT applications (per 100 billion GDP)	85	38.5
Firms producing new goods and services (%)	87	42.1





# NIGER

	Rank	Value		Rank	Value
<b>Consumer electronics</b>	87	25.7	<b>Business agility</b>	87	47.3
Treatment applications per 100 million GDP	123	1.1	Ease of starting a business	92	87.6
Cultural goods exports (% exports)	143	8	Recovery recovery rate	120	22.7
Printing and publishing output (% manufactured output)	1	100	Entrepreneurial employee activity rate	116	119
<b>Energy</b>	150	16.3	Growth of corporate transactions	88	26.0
<b>Energy</b>	150	16.3	<b>Executive openness</b>	118	60.8
Renewable investment's proportion	114	114	Trust and development	120	43.0
Depth of innovative companies	114	114	Taxs (% GDP)	128	12.9
ISO 9001 quality certificates (% GDP)	141	0.8	High-technology trade (% total trade)	71	42.7
ISO 14001 environmental certificates (% GDP)	100	1.1	Market concentration	87	71.9
<b>Finance</b>	100	11.9	Market concentration	140	66.0
CERD received from abroad (%)	118	118	Product diversity	112	11.0
Joint ventures per strategic alliance deals (% GDP)	118	3.5	Charitable financial openness	86	16.4
Computer software spending (% GDP)	114	1.8	Foreign direct investment, net inflows (% GDP)	40	45.2
<b>Government effectiveness</b>	100	11.0	Gov dynamics	114	119
New business density per thousand population	129	0.3	<b>Financing and domestic value added</b>	118	25.2
Firms with new products/services (%)	89	54.7	Financing and loans	100	11.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	116	17.9	Domestic credit to private sector (% GDP)	140	3.4
<b>Infrastructure</b>	144	23.7	IMR financing gap (% GDP)	100	17.2
<b>Coverage</b>	100	10.4	Tax and contribution rate (% profit)	118	80.1
30MHz mobile network coverage (% population)	104	1	Bank nonperforming loans (%)	114	119
Secure Internet servers per 1 million population	103	8	Unmet basic needs	100	10.4
Investment in telecommunication services (% GDP)	62	82.3	Medium- and high-tech activities value added	88	30.6
<b>Quality</b>	111	1	Industry and services value added (% GDP)	148	25.3
Mobile speed and download speeds	111	8	Labour underutilization rate	88	20
Fixed-broadband upload and download speeds	100	3.1	Output per worker	147	0.7
Fixed-broadband subscriptions (y speed) per hundred people	143	8	<b>ENABLING ENVIRONMENT</b>	145	36.3
<b>Availability</b>	154	47.0	<b>Governance</b>	123	24.8
Fixed broadband bandwidth (% Gbps per capita)	149	27.7	Political environment	128	16.7
Mobile broadband basket (% Gbps per capita)	148	14.0	Peace and stability	142	0.1
Internet and telephony competition	1	100	View and accountability	100	23.5
<b>Access</b>	144	8	Quality of institutions	112	19.0
<b>Subscriptions</b>	100	11.9	Rule of law	114	22.7
Active mobile-broadband subscriptions per fixed-line inhabitants	102	0.8	Control of corruption	112	27.8
International Internet bandwidth per user	145	0.4	Government effectiveness	111	29.3
Households with Internet access at home (%)	107	9.5	<b>Socio-economic</b>	142	34
<b>Skills and employment</b>	121	9.5	Gender equity	118	10.4
Individuals with standard ICT skills (%)	81	2.3	Female-to-male ratio in parliament	71	35
Tertiary graduates from ICT programmes (%)	89	23.9	Female-to-male labour force participation	86	30.1
ICT employment (%)	114	2.8	Female-to-male ratio in internal wage	110	52.1
<b>Usage</b>	144	20	Government access	114	21.2
<b>Services</b>	152	9.5	Social protection coverage (% population)	105	15.3
Government online services	108	29.4	Adult literacy rate	100	16.8
Fixed broadband Internet traffic per subscription	87	0.8	Youth not in employment, education or training (%)	100	40.0
Mobile broadband Internet traffic per subscription	111	1.8	Standard of living	100	21.5
Internet users (%)	101	5.1	Poverty headcount ratio (% population)	104	42.7
<b>Connectivity</b>	120	10.0	GDP per capita	119	0.4
ICT FDI parent applications (per 100 million GDP)	54	47.1	<b>Health and environment</b>	132	56
E-participation	106	29.0	Health	111	23.6
Internet activities by individuals (%)	114	119	Universal health coverage	145	37
Trade in digitally deliverable services (% total trade)	100	14.0	Healthy life expectancy (years)	100	27.8
<b>ECONOMY</b>	140	37.8	Unemployment rate	142	32
<b>Economic complexity/structure</b>	118	43.3	Government performance	11	30.1
Manufacturing investment	100	11.0	Renewable energy consumption (%)	11	80.0
Overhead capital formation (% GDP)	89	87.0	Household budget per capita	82	80.2
Logistics performance	140	26.7	Natural hazard exposure	81	90
Transport productive capacity	145	6.2			
Building quality control	126	23.0			

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# NIGERIA

**GKI RANK** 124/154

**GKI SCORE** 37.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Nigeria is a weak performer in terms of its knowledge infrastructure. It ranks 124th out of 154 countries in the Global Knowledge Index 2021 and 5th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Firms constrained with inadequately educated workforce (%)
- + Renewable energy consumption (%)
- + Ecological footprint per capita
- + Gross fixed capital formation (% GDP)
- + Firms producing new goods and services (%)

### AREAS OF IMPROVEMENT

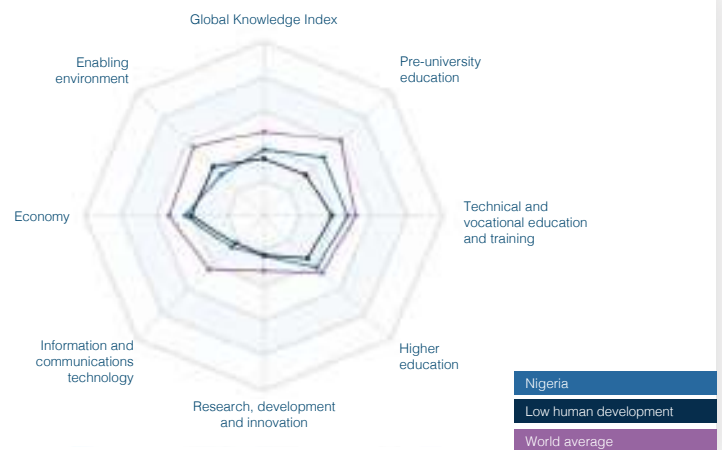
- Transport productive capacity
- Intellectual property receipts (% total trade)
- Cultural goods exports (% exports)
- Fixed-broadband subscriptions by speed per hundred people
- Under-five mortality rate

### KEY INDICATORS

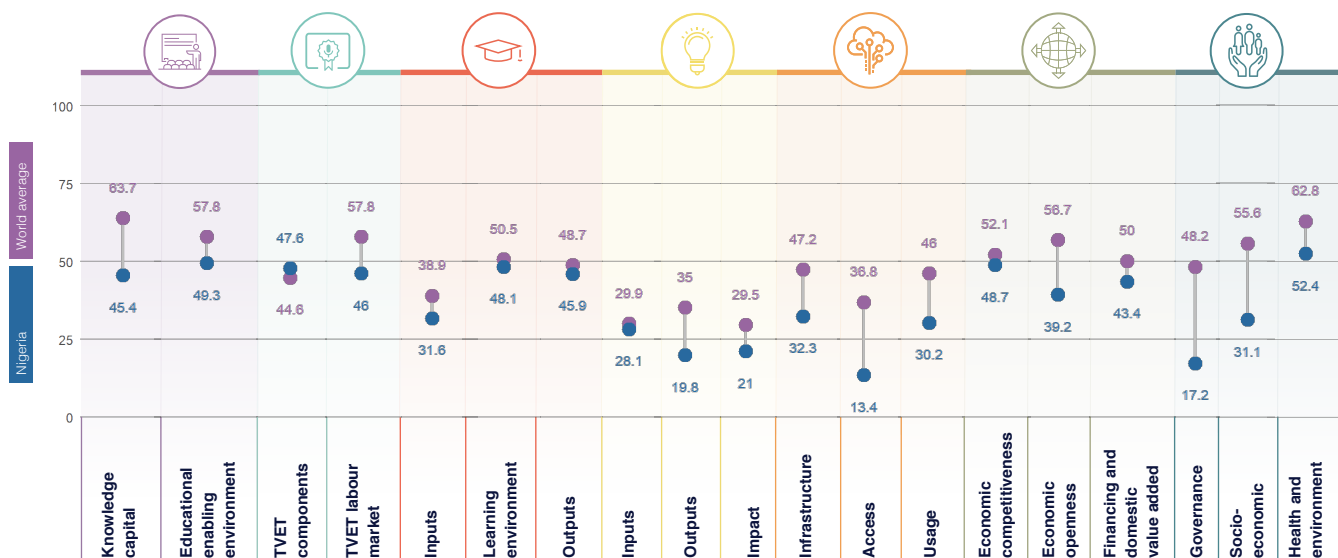
**GDP US\$ billions** 1,013.531  
**Population** 206,139,587  
**HDI** 0.539

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	117	47.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	97	46.8
HIGHER EDUCATION	92	41.9
RESEARCH, DEVELOPMENT AND INNOVATION	120	23
INFORMATION AND COMMUNICATIONS TECHNOLOGY	126	25.3
ECONOMY	122	43.8
ENABLING ENVIRONMENT	150	33.6



## GKI PILLARS



# NIGERIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	124	65.4
Enrolment	196	196
Net enrolment rate in primary education	196	196
Net enrolment rate in lower secondary education	196	196
Net enrolment rate in upper secondary education	196	196
Completion	117	61.1
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	79	50.0
Success rate rate in the last grade of lower secondary education	196	196
Completion	121	10.7
Assessment of 15-year-old students in math, science and reading	196	196
Learning-adjusted years of schooling	125	26.7
<b>Educational enabling environment</b>	<b>166</b>	<b>60.3</b>
Enrolment	196	196
Government expenditure on primary education (% GDP)	196	196
Government expenditure on secondary education (% GDP)	196	196
Government funding per primary student (% GDP per capita)	196	196
Government funding per secondary student (% GDP per capita)	196	196
Resources	86	61.0
Pupil-based teacher ratio in primary education	81	53.7
Pupil-based teacher ratio in secondary education	49	78.3
Schools with access to computers in primary education (%)	196	196
Schools with access to computers in secondary education (%)	196	196
Early learning	120	37.0
Class attendance rate in early childhood education	119	17.6
Proportion of children who are developmentally on track	33	37.5
Proportion of children with stimulating home learning environments	37	56.7
Pupil-based teacher ratio in preprimary education	196	196
Quality and infrastructure	196	61.0
Completion rate in upper secondary education, gender parity	100	75.0
Completion rate in upper secondary education, wealth parity	94	12.0
Completion rate in upper secondary education, location parity	82	47.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>61</b>	<b>47.8</b>
Companies training apprentices	41	11.0
Firms offering formal training (%)	85	37.3
Labour force with short-cycle tertiary education (%)	40	35.0
Participation rate in formal and non-formal education and training	196	196
TVET enrolment	196	196
Government expenditure on vocational education (%)	196	196
Share of students enrolled in secondary vocational programmes	196	196
Share of students enrolled in postsecondary vocational programmes	196	196
TVET quality and infrastructure	100	37.0
Extent of staff training	100	44.1
Quality of vocational training	136	30.0
Ratio of high-skill TVET occupations earnings to average wage	196	196
Ratio of medium-skill TVET occupations earnings to average wage	196	196
<b>TVET labour market</b>	<b>121</b>	<b>46</b>
Efficiency of the labour market	56	11.4
Firms considered with inappropriately educated workforce (%)	8	61.2
Employment educational mismatch (%)	196	196
Proportion of skilled production workers	81	61.4
Unemployment rate with vocational education	82	71.0
Real TVET unemployment	76	69.0
Share of TVET occupations	33	60.0
Manufacturing employment (%)	184	26.7
Quality and infrastructure	100	10.1
Enrolment in vocational education, gender parity	196	196
Useable employment rate	141	13.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>107</b>	<b>31.6</b>
Enrolment	196	196
Government expenditure per tertiary student	196	196
Teaching staff compensation (% tertiary expenditure)	196	196
Enrolment	138	24
Enrolment in bachelor's or equivalent level (%)	126	3.1
Enrolment in masters, doctoral or equivalent (%)	119	1.7
Resources	90	61.7
Pupil-teacher ratio in tertiary education	86	63.7
Research in higher education (%)	196	196
<b>Learning environment</b>	<b>88</b>	<b>43.1</b>
Directly paid academic freedom	41	10.2
Teachers in tertiary education, gender parity	101	37.0
Labour mobility rate	196	196
Academic freedom	42	63.0
Quality and infrastructure	71	33.1
Class attendance rate in tertiary education, gender parity	68	33.0
Class attendance rate in tertiary education, wealth parity	55	28.0
Class attendance rate in tertiary education, location parity	85	2.0
<b>Outputs</b>	<b>87</b>	<b>45.8</b>
Enrolment	196	196
Educational attainment rate, bachelor's or equivalent	196	196
Educational attainment rate, master's or equivalent	196	196
Educational attainment rate, doctoral or equivalent	196	196
Employment	101	63.4
Labour force participation rate with advanced education	51	78.0
Unemployment rate with advanced education	120	64
Impact	122	26.8
University tertiary enrollment in FTE	116	35.4
UNITE documents per FTE personnel in higher education	196	196
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>10</b>	<b>10.1</b>
Access to FDI resources	196	196
GDP (% GDP)	196	196
GERD per researcher	196	196
Researchers per thousand labour force	196	196
Tertiary graduates from STEM programmes (%)	196	196
Quality and infrastructure	100	10.1
GERD performed by business enterprises (%)	196	196
GERD financed by business enterprises (%)	196	196
Researchers in business enterprises (%)	196	196
Firms that spend on R&D (%)	48	27.0
Quality and infrastructure	100	10.1
High-skill employment (%)	196	196
Intellectual property payments (% total trade)	80	11.2
State of cluster development	71	48.0
<b>Outputs</b>	<b>106</b>	<b>10.0</b>
Access to FDI resources	196	196
Average documents per researcher	196	196
Citations per document	121	11.7
Patent applications (per 100 billion GDP)	81	42.1
Quality and infrastructure	100	10.1
Intellectual property receipts (% total trade)	117	0
Research design applications (per 100 billion GDP)	88	8
PCT applications (per 100 billion GDP)	156	15.1
Firms producing new goods and services (%)	24	67.0

# NIGERIA

	Rank	Value
<b>Business environment</b>		
Treatment applications per 100 million GDP	104	5.8
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	196	116
<b>Energy</b>	111	35
<b>Trade</b>	91	11.1
Access to institutions' provisions	89	21.8
Depth of innovative companies	54	33
ISO 9001 quality certificates (% GDP)	138	1.2
ISO 14001 environmental certificates (% GDP)	147	0.8
<b>Finance</b>	110	39
CERD received from abroad (%)	106	116
Joint ventures per strategic industry deals (% GDP)	85	5.2
Computer software spending (% GDP)	83	10
<b>Government services</b>	91	11.1
New business density per thousand population	94	4
Firms with new products/services (%)	84	88.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>128</b>	<b>25.3</b>
<b>Infrastructure</b>	121	33.3
<b>Coverage</b>	138	12.3
3G/4G mobile network coverage (% population)	127	21.7
Secure Internet servers per 1 million population	118	1.4
Investment in telecommunication services (% GDP)	117	17.9
<b>Speed</b>	129	6.8
Mobile internet and download speeds	81	50.4
Fixed broadband upload and download speeds	83	4.2
Fixed broadband subscriptions (y-over) per hundred people	138	8
<b>Availability</b>	91	33.4
Fixed broadband latency (% QM per usage)	132	48.0
Mobile broadband basket (% QM per capita)	87	50.0
Internet and telephony competition	1	100
<b>Access</b>	127	13.6
<b>Subscriptions</b>	100	11.1
Active mobile-broadband subscriptions per fixed-line inhabitants	128	17.0
International Internet bandwidth per user	148	15.8
Households with Internet access at home (%)	141	7.3
<b>Skills and employment</b>	116	116
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	116	116
ICT employment (%)	106	116
<b>Usage</b>	123	30.2
<b>Services</b>	105	11.4
Government online services	105	51.8
Fixed broadband internet traffic per subscription	77	7.8
Mobile broadband internet traffic per subscription	100	5.8
Internet users (%)	118	30
<b>Commerce</b>	107	37
eTPU/T purchase applications (per 100 million GDP)	104	21.0
E-participation	108	45.0
Internet activities by individuals (%)	106	116
Trade in digitally deliverable services (% total trade)	89	40.0
<b>ECONOMY</b>	<b>122</b>	<b>63.9</b>
<b>Economic competitiveness</b>	81	46.7
<b>Infrastructure investment</b>	100	44.0
Overhead capital formation (% GDP)	24	84.3
Logistics performance	107	36.3
Transport productive capacity	100	3.8
Building quality control	72	78.7

	Rank	Value
<b>Business agility</b>	81	31.0
Ease of starting a business	81	85.2
Recovery recovery time	100	30.9
Entrepreneurial employee activity rate	84	2.7
Growth of corporate transactions	11	85.7
<b>Customer experience</b>	128	16.3
Trust and dissatisfaction	143	10
Trade (% GDP)	140	1.3
High-technology trade (% total trade)	87	42.0
Market concentration	148	29.4
Market concentration	49	82.0
Product ownership	112	36.0
Charitable financial openness	89	35
Foreign direct investment, net inflows (% GDP)	100	30.3
Cost dynamics	87	48.9
<b>Financing and domestic value added</b>	112	40.4
<b>Financing and costs</b>	124	41.0
Domestic credit to private sector (% GDP)	106	3.8
MSME financing gap (% GDP)	86	37.9
Tax and contribution rate (% profit)	85	72.7
Bank nonperforming loans (%)	89	34.0
Unmet loan demand	91	31.0
Medium- and high-tech activities value added	47	59.1
Industry and services value added (% GDP)	117	50
Labour underutilization rate	81	82.0
Output per worker	106	6.7
<b>ENABLING ENVIRONMENT</b>	<b>148</b>	<b>33.6</b>
<b>Governance</b>	141	17.2
<b>Political environment</b>	100	18.0
Peace and stability	140	4.2
View and accountability	100	32.4
Quality of institutions	100	15.0
Rule of law	138	21.9
Control of corruption	100	13.0
Government effectiveness	101	18
<b>Socio-economic</b>	147	31.1
<b>Gender equity</b>	141	33.2
Female-to-male ratio in parliament	148	3.7
Female-to-male labour force participation	89	34.7
Female-to-male ratio in internal wage	116	116
<b>Government services</b>	116	31.3
Social protection coverage (% population)	115	6.4
Adult literacy rate	108	61.1
Youth not in employment, education or training (%)	106	21.0
<b>Standard of living</b>	101	21.7
Poverty headcount ratio (% population)	100	43.7
GDP per capita	117	18
<b>Health and environment</b>	143	22.4
<b>Health</b>	116	21.0
Universal health coverage	100	42
Healthy life expectancy (years)	142	28
Under-five mortality rate	152	8
<b>Environmental performance</b>	11	79.4
Renewable energy consumption (%)	11	82.0
Household footprint per capita	21	86.6
Natural hazard exposure	72	59

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# NORTH MACEDONIA

## KEY INDICATORS

GDP US\$ billions	33.018
Population	2,083,380
HDI	0.774

**GKI RANK** 45/154

**GKI SCORE** 54.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

North Macedonia is a strong performer in terms of its knowledge infrastructure. It ranks 45th out of 154 countries in the Global Knowledge Index 2021 and 3rd out of the 39 countries with high human development.

### AREAS OF STRENGTH

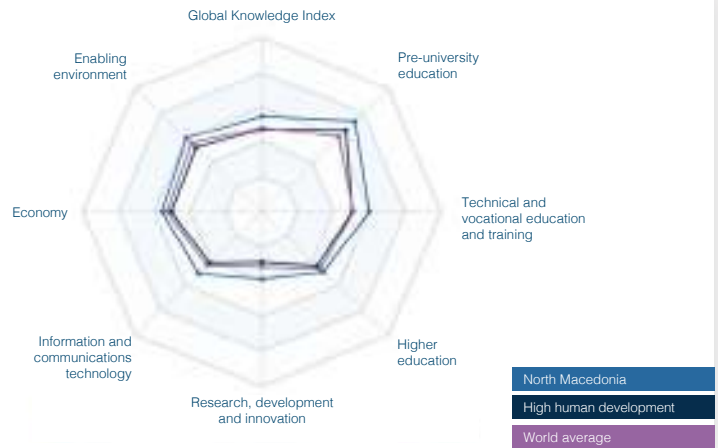
- + MSME financing gap (% GDP)
- + Years of compulsory education in primary and secondary
- + Tax and contribution rate (% profit)
- + ISO 14001 environmental certificates (% GDP)
- + Citations per document

### AREAS OF IMPROVEMENT

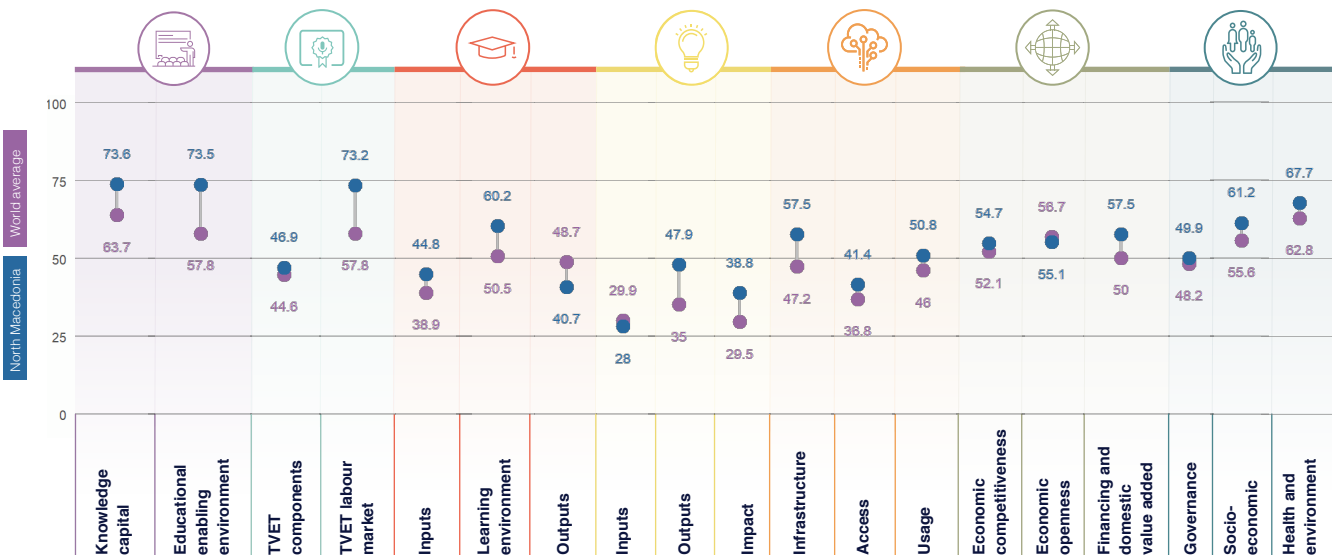
- Assessment of 15-year-old students in math, science and reading
- Unemployment rate with vocational education
- Ratio of medium-skill TVET occupations earnings to average wage
- Labour force with short-cycle tertiary education (%)
- Extent of staff training

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	46	73.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	40	60
HIGHER EDUCATION	59	48.6
RESEARCH, DEVELOPMENT AND INNOVATION	36	38.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	58	49.9
ECONOMY	59	55.8
ENABLING ENVIRONMENT	54	59.6



## GKI PILLARS







# NORTH MACEDONIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	48	73.8
Enrollment	83	87.8
Net enrolment rate in primary education	104	87.0
Net enrolment rate in lower secondary education	106	106
Net enrolment rate in upper secondary education	106	106
Completion	101	81.0
Years of compulsory education in primary and secondary	1	109
Completion rate in upper secondary education	35	80.0
Success rate rate in the last grade of lower secondary education	73	70
Completion	101	11.0
Assessment of 15-year-old students in math, science and reading	80	80.0
Learning-adjusted years of schooling	89	40
<b>Educational enabling environment</b>		
Expenditure	106	106
Government expenditure on primary education (% GDP)	106	106
Government expenditure on secondary education (% GDP)	106	106
Government funding per primary student (% GDP per capita)	106	106
Government funding per secondary student (% GDP per capita)	106	106
Resources	106	106
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	106	106
Schools with access to computers in secondary education (%)	106	106
Early learning	88	24.0
Class attendance rate in early childhood education	88	24.4
Proportion of children who are developmentally on track	24	73.0
Proportion of children with stimulating home learning environments	8	88.0
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	81	81.0
Completion rate in upper secondary education, gender parity	58	81.4
Completion rate in upper secondary education, wealth parity	52	50.1
Completion rate in upper secondary education, location parity	1	109
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Domestic training expenditure	101	10.4
Firms offering formal training (%)	39	46
Labour force with short-cycle tertiary education (%)	81	50.1
Participation rate in formal and non-formal education and training	45	17
TVET resources	101	101
Government expenditure on vocational education (%)	106	106
Share of students enrolled in secondary vocational programmes	33	44
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	106	106
Extent of staff training	104	34.7
Quality of vocational training	106	106
Ratio of high-skilled TVET occupations earnings to average wage	71	21.6
Ratio of medium-skilled TVET occupations earnings to average wage	100	10.0
<b>TVET labour market</b>		
Efficiency of the labour market	71	80.0
Firms considered with inappropriately educated workforce (%)	81	84.0
Employment educational mismatch (%)	29	75.2
Proportion of skilled production workers	87	80
Unemployment rate with vocational education	100	50.0
Real TVET unemployment	0	71.1
Share of TVET occupations	20	71.0
Manufacturing employment (%)	1	70.0
Quality and infrastructure	61	81.0
Enrollment in vocational education, gender parity	106	106
Useable employment rate	82	81.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	106	106
Government expenditure per tertiary student	106	106
Teaching staff compensation (% tertiary expenditure)	106	106
Enrollment	11	10.0
Enrollment in bachelor's or equivalent level (%)	88	21.7
Enrollment in masters, doctoral or equivalent (%)	88	0.6
Resources	47	10.4
Pupil-teacher ratio in tertiary education	55	37.0
Researchers in higher education (%)	34	80
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	25	86.7
Labour mobility rate	52	18.2
Academic freedom	50	88.0
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	81	87.1
Class attendance rate in tertiary education, wealth parity	9	86.0
Class attendance rate in tertiary education, location parity	28	18.3
<b>Outputs</b>		
Skilled labour	118	80.7
Skilled labour	101	30
Educational attainment rate, bachelor's or equivalent	40	85.0
Educational attainment rate, master's or equivalent	60	7.3
Educational attainment rate, doctoral or equivalent	83	12.1
Skilled labour	101	88.0
Labour force participation rate with advanced education	52	78.0
Unemployment rate with advanced education	112	68.0
<b>Impact</b>		
University tertiary enrollment in R&D	121	32.0
OECD indicators per 100 personnel in higher education	57	50.0
<b>Government's contribution to economic growth</b>		
GDP	71	7.2
GDP per researcher	84	11
Researchers per thousand labour force	50	11
Tertiary graduates from STEM programmes (%)	81	43.0
<b>Government's contribution to economic growth</b>		
GDP performed by business enterprises (%)	86	3.1
GDP financed by business enterprises (%)	50	37.2
Researchers in business enterprises (%)	48	25.2
Firms that spend on R&D (%)	72	18.0
<b>Government's contribution to economic growth</b>		
High-skilled employment (%)	22	82.0
Intellectual property payments (% total trade)	12	85.0
State of digital development	106	106
<b>Government's contribution to economic growth</b>		
Average documents per researcher	45	81.0
Citations per document	9	71.0
Patent applications (per 100 billion GDP)	50	80
<b>Government's contribution to economic growth</b>		
Intellectual property receipts (% total trade)	48	11
Research and development expenditure (per 100 billion GDP)	69	7.3
PCT applications (per 100 billion GDP)	55	56.4
Firms producing new goods and services (%)	30	84.2

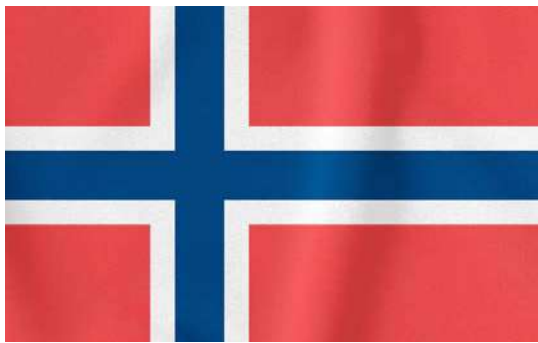


# NORTH MACEDONIA

	Rank	Value
<b>Business environment</b>		
Treatment applications (per 100 billion GDP)	116	116
Cultural goods exports (% exports)	86	8
Printing and publishing output (% manufactured output)	44	57.9
<b>Energy</b>		
Renewable	5	51.2
Renewable investment percentage	87	7.1
Depth of innovative companies	116	116
ISO 9001 quality certificates (% GDP)	15	77.0
ISO 14001 environmental certificates (% GDP)	1	100
<b>Environment</b>		
CERD received from abroad (%)	75	8.1
Cost savings per strategic storage deals (% GDP)	97	5.2
Computer software spending (% GDP)	79	12.4
<b>Government services</b>		
New business density per thousand population	41	10
Firms with web portals/services (%)	29	34.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>58</b>	<b>61.9</b>
<b>Infrastructure</b>		
Coverage		
3G/4G mobile network coverage (% population)	29	68.7
Secure Internet servers per 1 million population	59	5.8
Investment in telecommunication services (% GDP)	24	49.6
Quality		
Mobile upload and download speeds	116	116
Fixed broadband upload and download speeds	116	116
Fixed broadband subscriptions (by speed) per hundred people	89	64.2
Availability		
Fixed broadband latency (% QM per capita)	85	72.7
Mobile broadband basket (% QM per capita)	80	87
Internet and telephony competition	1	100
<b>Access</b>		
Subscribers		
Active mobile-broadband subscriptions per fixed-line inhabitants	90	27.9
International Internet bandwidth per user	100	21.8
Households with Internet access at home (%)	89	80
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	53	27.5
Tertiary graduates from ICT programmes (%)	25	49.0
ICT employment (%)	40	35.0
<b>Usage</b>		
Services		
Government online services	57	76.1
Fixed broadband Internet traffic per subscriber	58	21.6
Mobile broadband Internet traffic per subscriber	88	11.1
Internet users (%)	46	60.4
<b>Outcomes</b>		
ICT FDI patent applications (per 100 billion GDP)	67	41.2
E-participation		
Internet activities by individuals (%)	80	53.1
Trade in digitally deliverable services (% total trade)	80	47.0
<b>ECONOMY</b>	<b>54</b>	<b>55.8</b>
<b>Economic competitiveness</b>		
OECD innovation benchmark	15	44.1
Overhead capital formation (% GDP)	94	44.1
Logistics performance	63	43.8
Transport productive capacity	62	25.3
Building quality control	22	86.7

	Rank	Value
<b>Business agility</b>		
Time of starting a business	73	86.6
Recovery recovery time	45	52.1
Entrepreneurial employee activity rate	54	12.5
Growth of corporate transactions	13	85.7
<b>Business openness</b>		
Trade and investment		
Trade (% GDP)	20	66.3
High-technology trade (% total trade)	105	38.0
Market concentration	62	77.7
Market concentration	102	37.0
Product diversity	10	47.0
Charitable financial openness	78	44.8
Foreign direct investment, net inflows (% GDP)	34	43.5
Cost dynamics	39	45.0
<b>Financing and domestic value added</b>		
Financing and costs		
Domestic credit to private sector (% GDP)	89	20.8
IMRS financing gap (% GDP)	1	100
Tax and contribution rate (% profit)	4	84.0
Bank nonperforming loans (%)	54	60.0
Unmet loan demand	10	59.1
Medium- and high-tech activities value added	50	37.4
Industry and services value added (% GDP)	89	55.0
Labour underutilization rate	118	46
Output per worker	69	17.2
<b>ENABLING ENVIRONMENT</b>	<b>58</b>	<b>59.4</b>
<b>Governance</b>		
Political environment	63	50.4
Peace and stability	84	50.0
Value and accountability	71	56.2
Quality of institutions	73	49.4
Rule of law	68	52.8
Control of corruption	84	36
Government effectiveness	86	51.7
<b>Socio-economic</b>		
Gender equity	95	25.5
Female-to-male ratio in parliament	22	86.7
Female-to-male labour force participation	100	84.0
Female-to-male ratio in internal wage	74	54.0
Gender inequality	73	69.2
Social protection coverage (% population)	74	37.2
Adult literacy rate	29	87.0
Youth not in employment, education or training (%)	80	63.0
<b>Standard of living</b>		
Poverty headcount ratio (% population)	82	70
GDP per capita	68	10.8
<b>Health and environment</b>		
Health		
Universal health coverage	55	72
Healthy life expectancy (years)	84	73.6
Under-five mortality rate	41	86.4
<b>Environmental performance</b>		
Renewable energy consumption (%)	86	21.7
Household footprint per capita	80	78.8
Natural hazard exposure	55	63

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# NORWAY

**GKI RANK**

**9/154**

**GKI SCORE**

**68.7**

**WORLD AVERAGE**

**48.4**

## COUNTRY PERFORMANCE SUMMARY

Norway is a leading performer in terms of its knowledge infrastructure. It ranks 9th out of 154 countries in the Global Knowledge Index 2021 and 9th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Voice and accountability
- + Rule of law
- + Natural hazard exposure
- + Insolvency recovery rate
- + Government expenditure per tertiary student

### AREAS OF IMPROVEMENT

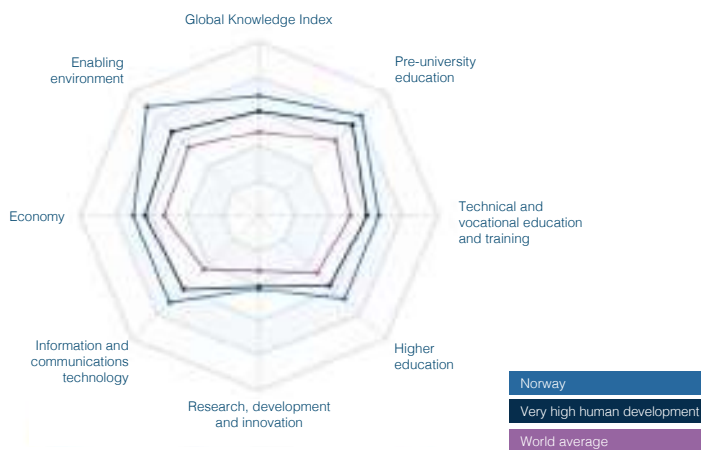
- Share of students enrolled in post-secondary vocational programmes
- Ratio of medium-skill TVET occupations earnings to average wage
- Manufacturing employment (%)
- Enrolment in vocational education, gender parity
- Ecological footprint per capita

### KEY INDICATORS

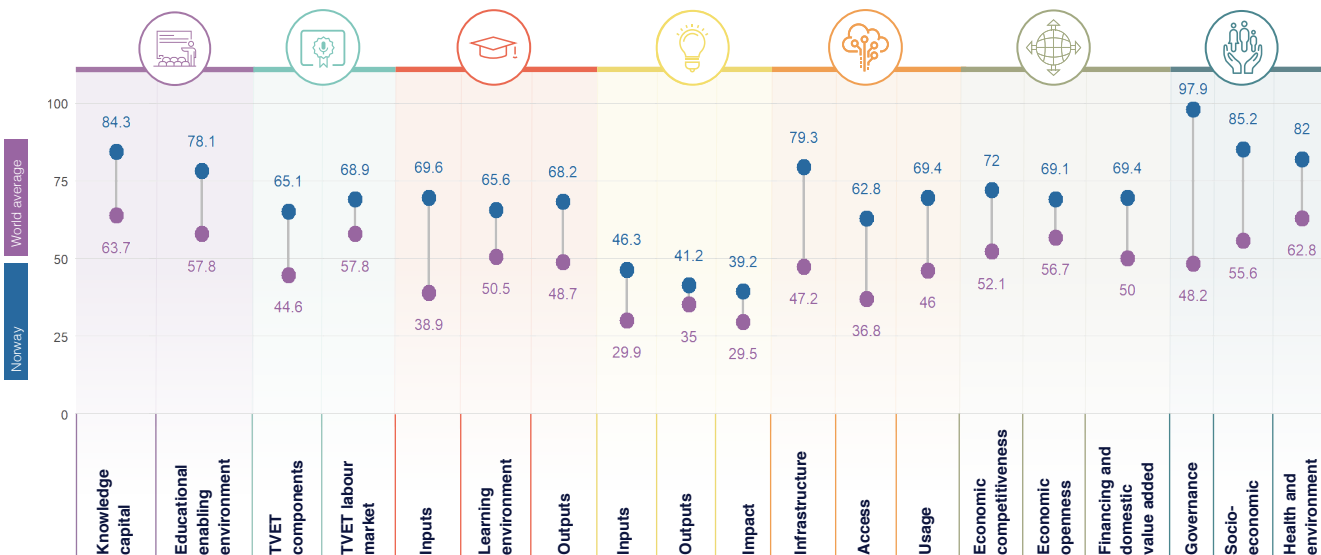
GDP US\$ billions	342.047
Population	5,421,242
HDI	0.957

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	5	81.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	14	67
HIGHER EDUCATION	8	67.8
RESEARCH, DEVELOPMENT AND INNOVATION	27	42.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	8	70.5
ECONOMY	10	70.1
ENABLING ENVIRONMENT	1	88.4



## GKI PILLARS







# NORWAY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	23	84.3
Enrolment	24	90.7
Net enrolment rate in primary education	3	100
Net enrolment rate in lower secondary education	99	99.4
Net enrolment rate in upper secondary education	99	99.7
Completion	41	90.0
Years of compulsory education in primary and secondary	42	79.0
Completion rate in upper secondary education	49	90.7
Success rate rate in the last grade of lower secondary education	20	83.2
Completion	19	73.0
Assessment of 7th-grade students in math, science and reading	20	86.5
Learning-adjusted years of schooling	98	85.1
<b>Educational enabling environment</b>		
Expenditure	24	45.4
Government expenditure on primary education (% GDP)	99	41.5
Government expenditure on secondary education (% GDP)	20	43.7
Government funding per primary student (% GDP per capita)	20	83.1
Government funding per secondary student (% GDP per capita)	23	43.4
Resources	1	100
Pupil-based teacher ratio in primary education	104	104
Pupil-based teacher ratio in secondary education	104	104
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	33	72.7
Class attendance rate in early childhood education	73	72.7
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	11	94.1
Completion rate in upper secondary education, gender parity	70	86.0
Completion rate in upper secondary education, wealth parity	9	35
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	7	81.1
Firms offering formal training (%)	104	104
Labour force with short-cycle tertiary education (%)	17	84.0
Participation rate in formal and non-formal education and training	6	81.2
TVET enrolment	21	81.1
Government expenditure on vocational education (%)	24	44
Share of students enrolled in secondary vocational programmes	25	45.1
Share of students enrolling in postsecondary vocational programmes	1	100
TVET quality and infrastructure	44	44.1
Extent of staff training	84	84.2
Quality of vocational training	90	89.0
Ratio of high-skill TVET occupations earnings to average wage	74	21.2
Ratio of medium-skill TVET occupations earnings to average wage	85	37.1
<b>TVET labour market</b>		
Efficiency of the labour market	7	81.1
Firms considered with inappropriately educated workforce (%)	104	104
Employment educational mismatch (%)	95	84.0
Proportion of skilled production workers	104	104
Unemployment rate with vocational education	62	80.0
High TVET unemployment	90	41.0
Share of TVET occupations	71	56.2
Manufacturing employment (%)	114	24.0
Quality and infrastructure	20	74.1
Enrolment in vocational education, gender parity	94	81.1
Useable employment rate	9	95.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	5	75.0
Government expenditure per tertiary student	3	85.4
Teaching staff compensation (% tertiary expenditure)	11	83.0
Enrolment	3	84.2
Enrolment in bachelor's or equivalent level (%)	17	48
Enrolment in master's, doctoral or equivalent (%)	8	65.0
Resources	98	83.2
Pupil-teacher ratio in tertiary education	9	60.9
Researcher in higher education (%)	66	37.0
<b>Learning environment</b>		
Directly paid academic freedom	34	83.8
Teachers in tertiary education, gender parity	23	84.0
Labour mobility rate	56	15.1
Academic freedom	27	63.4
Quality and infrastructure	104	104
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>		
Attainment	22	57.0
Educational attainment rate, bachelor's or equivalent	18	74.3
Educational attainment rate, master's or equivalent	96	43.7
Educational attainment rate, doctoral or equivalent	14	52
Employment	11	80.0
Labour force participation rate with advanced education	15	84.0
Unemployment rate with advanced education	18	80.0
Impact	22	86.1
University tertiary enrollment in R&D	20	81.7
OECD indicators per 100 personnel in higher education	24	54.8
<b>Government's contribution and economic state</b>		
Balance	21	64.2
Share of GDP expenditure	10	60.0
GDP (% GDP)	10	41.0
GERD per researcher	28	37
Researchers per thousand labour force	6	76.1
Tertiary graduate from STEM programmes (%)	67	38.7
<b>Government's contribution and economic state</b>		
GERD performed by business enterprises (%)	21	29.0
GERD financed by business enterprises (%)	38	52
Researchers in business enterprises (%)	22	89.0
Firms that spend on R&D (%)	104	104
Quality and infrastructure	95	30.4
High-skill employment (%)	104	104
Intellectual property payments (% total trade)	71	14.2
State of cluster development	18	84.0
<b>Outputs</b>		
Share of GDP expenditure	10	60.0
Average documents per researcher	55	63.7
Citations per document	48	37.4
Patent applications (per 100 billion GDP)	21	89.2
<b>Government's contribution and economic state</b>		
Intellectual property receipts (% total trade)	30	21.0
Research design applications (per 100 billion GDP)	98	4.4
PCT applications (per 100 billion GDP)	20	80.0
Firms producing new goods and services (%)	104	104





# NORWAY

	Rank	Value
<b>Consumer Innovation Performance</b>	10	77.9
Treatment applications per 100 million GDP	54	22.3
Cultural goods exports (% exports)	88	3.3
Printing and publishing output (% manufactured output)	43	20.0
<b>Science</b>	35	59.3
<b>Health</b>	9	84.1
Risks of institutions' persistence	32	32
Depth of innovative companies	39	57.2
ISO 9001 quality certificates (% GDP)	37	31
ISO 14001 environmental certificates (% GDP)	24	35.3
<b>Energy</b>	70	60.0
CERO forecast from abroad (%)	49	16.6
Coal reserves per strategic resource deals (% GDP)	18	45.7
Computer software spending (% GDP)	17	44
<b>Government Performance</b>	70	60.0
New business density per thousand population	17	42.6
Firms with new products/services (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	8	75.3
<b>Infrastructure</b>	3	75.3
<b>Coverage</b>	22	52.3
3G/4G mobile network coverage (% population)	17	60.0
Secure Internet servers per 1 million population	20	37.4
Investment in telecommunication services (% GDP)	100	22.3
<b>Quality</b>	1	84.4
Mobile speed and download speeds	106	106
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (by speed) per hundred people	3	64.4
<b>Availability</b>	10	56.2
Fixed broadband bandwidth (% Gbps per capita)	19	60.9
Mobile broadband basket (% Gbps per capita)	34	75.0
Internet and telephony competition	1	100
<b>Access</b>	14	62.9
<b>Subscriptions</b>	27	62.3
Active mobile-broadband subscriptions per fixed-line inhabitants	30	45.0
International Internet bandwidth per user	47	41.0
Households with Internet access at home (%)	6	66.3
<b>Skills and employment</b>	7	67.2
Individuals with standard ICT skills (%)	4	81.4
Tertiary graduates from ICT programmes (%)	72	29.0
ICT employment (%)	9	66.3
<b>Usage</b>	15	63.4
<b>Services</b>	10	67.3
Government online services	19	67.7
Fixed broadband Internet traffic per subscription	106	106
Mobile broadband Internet traffic per subscription	45	15.1
Internet users (%)	6	66.0
<b>Commerce</b>	22	71.0
eTPU/T online applications (per 100 million GDP)	25	64.4
e-participation	17	66.0
Internet activities by individuals (%)	64	35.6
Trade in digitally deliverable services (% total trade)	40	55.2
<b>ECONOMY</b>	14	70.7
<b>Economic Competitiveness</b>	5	72
<b>REGULATION INNOVATION</b>	20	63.0
Overhead capital formation (% GDP)	34	65.1
Logistics performance	19	67.4
Transport productive capacity	33	39.7
Building quality control	25	73.3

	Rank	Value
<b>Business Agility</b>	9	84
Ease of starting a business	21	54.5
Recovery recovery rate	2	99.8
Entrepreneurial employee activity rate	24	42
Growth of corporate transactions	1	100
<b>Employee experience</b>	33	65.1
Trust and disaffection	70	19.7
Tax (% GDP)	66	25.7
High-technology trade (% total trade)	46	51.0
Market concentration	62	69.9
Market concentration	62	67.0
Product innovation	10	100.1
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	100	35.3
Data dynamics	1	100
<b>Financing and domestic value added</b>	13	65.4
<b>Financing and credit</b>	6	71.0
Domestic credit to private sector (% GDP)	6	63.0
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	75	71.0
Bank nonperforming loans (%)	4	67.0
Unmet loan demand	10	67.2
Medium- and high-tech activities value added	32	47.1
Industry and services value added (% GDP)	54	65.2
Labour underutilization rate	28	61.4
Output per worker	6	81
<b>ENABLING ENVIRONMENT</b>	1	66.4
<b>Governance</b>	1	67.0
Political environment	3	67.3
Peace and stability	4	64.5
View and accountability	1	100
Quality of institutions	9	63.0
Rule of law	3	66.0
Control of corruption	6	67.0
Government effectiveness	4	66.0
<b>Socio-economic</b>	2	65.2
Gender equity	7	69.0
Female-to-male ratio in parliament	12	61.7
Female-to-male labour force participation	20	68.6
Female-to-male ratio in internal wage	30	59
Gender inequality	9	62.0
Social protection coverage (% population)	20	65.7
Adult literacy rate	106	106
Youth not in employment, education or training (%)	6	36
Standard of living	6	70.1
Poverty headcount ratio (% population)	25	62.7
GDP per capita	1	67.4
<b>Health and environment</b>	2	82
Health	6	63.0
Universal health coverage	1	87
Healthy life expectancy (years)	17	69.0
Under-five mortality rate	7	65.0
Environmental performance	22	71.0
Renewable energy consumption (%)	31	65.1
Household footprint per capita	128	67.6
Natural hazard exposure	2	94

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 52/154

**GKI SCORE** 52.3

**WORLD AVERAGE** 48.4

# OMAN

## COUNTRY PERFORMANCE SUMMARY

Oman is a strong performer in terms of its knowledge infrastructure. It ranks 52nd out of 154 countries in the Global Knowledge Index 2021 and 49th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **135.814**  
**Population** ..... **5,106,622**  
**HDI** ..... **0.813**

### AREAS OF STRENGTH

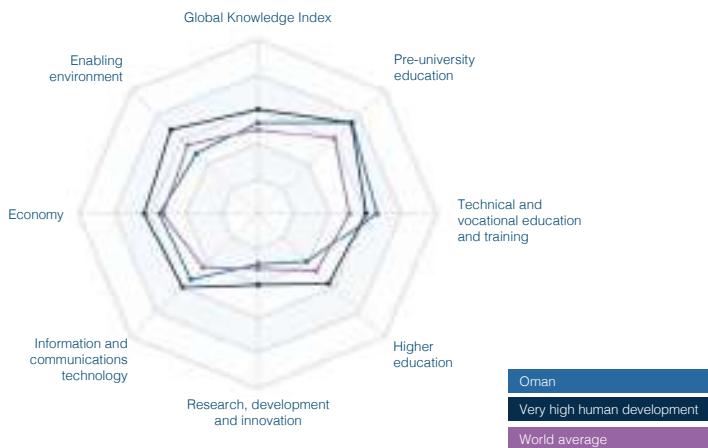
- + Gross intake ratio to the last grade of lower secondary education
- + Industry and services value added (% GDP)
- + Pupil-trained teacher ratio in primary education
- + Tertiary graduates from STEM programmes (%)
- + Vulnerable employment rate

### AREAS OF IMPROVEMENT

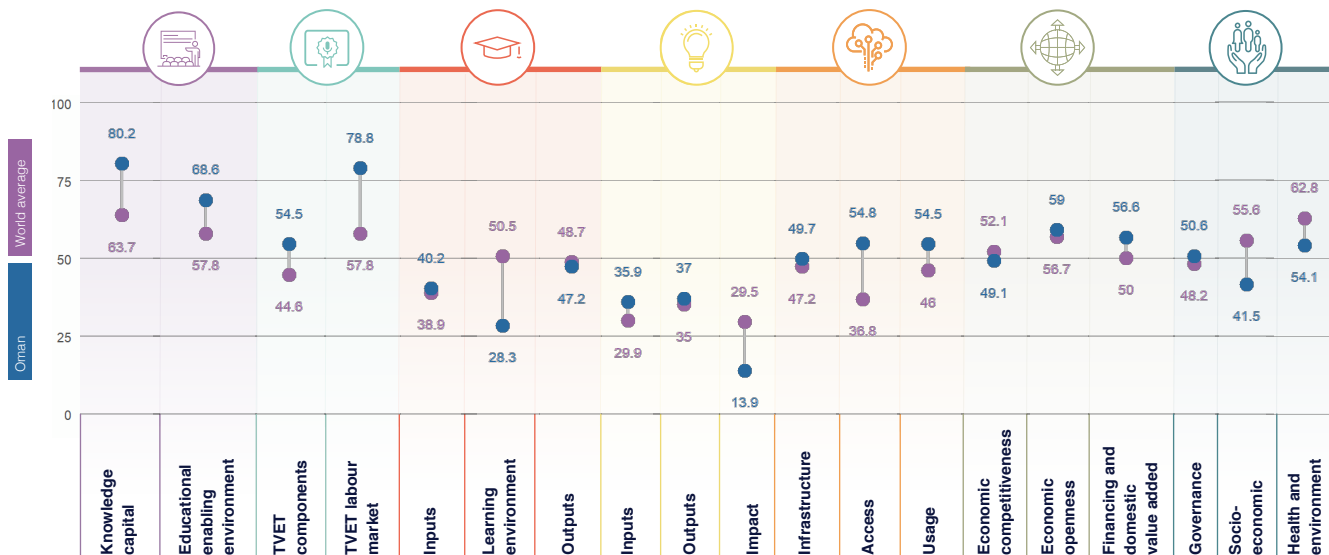
- Share of students enrolled in secondary vocational programmes
- Debt dynamics
- Female-to-male ratio in parliament
- Researchers in business enterprises (%)
- Renewable energy consumption (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	41	74.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	16	66.6
HIGHER EDUCATION	110	38.6
RESEARCH, DEVELOPMENT AND INNOVATION	82	28.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	49	53
ECONOMY	64	54.9
ENABLING ENVIRONMENT	100	48.7



## GKI PILLARS





# OMAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	29	90.2
Enrollment	81	83.5
Net enrolment rate in primary education	28	95
Net enrolment rate in lower secondary education	47	86.5
Net enrolment rate in upper secondary education	47	83.7
Completion	12	85.5
Years of compulsory education in primary and secondary	42	79.9
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	2	96
Completion	21	80.7
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	85	83.7
<b>Educational enabling environment</b>		
Expenditure	11	41.7
Government expenditure on primary education (% GDP)	29	41.2
Government expenditure on secondary education (% GDP)	10	46
Government funding per primary student (% GDP per capita)	8	80.8
Government funding per secondary student (% GDP per capita)	17	45.8
Resources	21	81
Pupil-based teacher ratio in primary education	5	87.5
Pupil-based teacher ratio in secondary education	13	89.8
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	116	116
Class attendance rate in early childhood education	117	117
Proportion of children who are developmentally on track	43	49.8
Presence of children with stimulating home learning environments	27	81.3
Pupil-based teacher ratio in preprimary education	22	80.1
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communications training and learning	116	116
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	11	100.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	135	135
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	11	100.7
Extent of staff training	28	87.8
Quality of vocational training	30	89.7
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of median-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	1	100.7
Firms considered well-integrated with labour (%)	116	116
Employment educational mismatch (%)	116	116
Presence of skilled production workers	116	116
Unemployment rate with vocational education	10	80.7
Real TVET unemployment	11	100.2
Share of TVET occupations	45	84.7
Manufacturing employment (%)	72	26.1
Quality and infrastructure	11	100.2
Enrollment in vocational education, gender parity	116	116
Useable employment rate	5	87.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	25	48.9
Government expenditure per tertiary student	20	49.8
Teaching staff compensation (% tertiary expenditure)	32	49.2
Enrollment	10	14.3
Enrollment in bachelor's or equivalent level (%)	80	26.1
Enrollment in masters, doctoral or equivalent (%)	116	2.5
Resources	10	100
Ratios/teacher ratio in tertiary education	88	35
Research in higher education (%)	55	44
<b>Learning environment</b>		
Directly paid academic freedom	116	116
Teachers in tertiary education, gender parity	81	50.2
Labour mobility rate	72	13.1
Academic freedom	128	21.5
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Skilled labour	10	21.2
Educational attainment rate, bachelor's or equivalent	81	43.5
Educational attainment rate, master's or equivalent	63	8.1
Educational attainment rate, doctoral or equivalent	47	14.1
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	9	112.2
University tertiary enrollment in R&D	38	88.7
OECD indicators per 100 personnel in higher education	8	85.9
<b>Government's contribution to innovation and economic growth</b>		
Impact	11	100.2
Quality and infrastructure	11	100.2
GDP (% GDP)	81	4.2
GERD per researcher	11	83.8
Researchers per thousand labour force	78	3.1
Tertiary graduates from STEM programmes (%)	4	12.1
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	85	1.8
GERD financed by business enterprises (%)	53	38.3
Researchers in business enterprises (%)	84	0
Firms that spend on R&D (%)	116	116
Quality and infrastructure	11	100.2
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	116	116
State of cluster development	28	58.4
<b>Support</b>		
Quality and infrastructure	11	100.2
Average documents per researcher	8	81.1
Citations per document	38	23.2
Patent applications (per 100 billion GDP)	92	36.2
<b>Government's contribution to innovation and economic growth</b>		
Intellectual property receipts (% total trade)	116	116
Research and development expenditure (per 100 billion GDP)	111	0.3
PCT applications (per 100 billion GDP)	83	45.5
Firms producing new goods and services (%)	116	116





# OMAN

	Rank	Value
<b>Consumer Electronics</b>	95	45.1
Treatment applications per 100 million GDP	23	56
Cultural goods exports (% exports)	82	8.8
Printing and publishing output (% manufactured output)	94	0.2
<b>Energy</b>	149	10.0
<b>Finance</b>	35	22.2
Access to venture capital	83	8.8
Depth of innovative companies	30	55.0
ISO 9001 quality certificates (% GDP)	60	17.9
ISO 14001 environmental certificates (% GDP)	00	10.0
<b>Industry</b>	100	0.0
CERD freedom from abuse (%)	87	2.9
Cost savings per strategic alliance deals (% GDP)	35	22.6
Computer software spending (% GDP)	100	0.7
<b>Government Services</b>	100	0.0
New business density per thousand population	70	6.9
Firms with new products/services (%)	106	10.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>41</b>	<b>32.1</b>
<b>Infrastructure</b>	87	40.7
<b>Coverage</b>	20	10.1
3G/4G mobile network coverage (% population)	28	88.0
Secure Internet servers per 1 million population	95	2.7
Investment in telecommunication services (% GDP)	29	49.0
<b>Speed</b>	15	20.2
Mobile upload and download speeds	26	16.1
Fixed broadband upload and download speeds	62	10.4
Fixed broadband subscriptions (y-speed) per hundred people	81	12
<b>Availability</b>	15	20.2
Fixed broadband latency (% QM per capita)	78	73.0
Mobile broadband basket (% QM per capita)	62	80.0
Internet and telephony competition	70	50.4
<b>Access</b>	24	34.0
<b>Subscribers</b>	15	10.1
Active mobile-broadband subscriptions per fixed-line inhabitants	25	50.0
International Internet bandwidth per user	25	50.1
Households with Internet access at home (%)	14	64.6
<b>Skills and employment</b>	37	44.0
Individuals with standard ICT skills (%)	30	52.0
Tertiary graduates from ICT programmes (%)	6	77.1
ICT employment (%)	100	4.4
<b>Usage</b>	21	54.0
<b>Services</b>	37	50.0
Government online services	24	85.0
Fixed broadband Internet traffic per subscriber	15	42.7
Mobile broadband Internet traffic per subscriber	80	50.0
Internet users (%)	11	80
<b>Commerce</b>	80	60.0
eTPU/T purchase applications (per 100 million GDP)	81	37.7
E-participation	37	60.0
Internet activities by individuals (%)	40	49.0
Trade in digitally deliverable services (% total trade)	80	32.0
<b>ECONOMY</b>	<b>24</b>	<b>32.0</b>
<b>Economic Competitiveness</b>	37	45.0
<b>Infrastructure Investment</b>	10	0.1
Overhead capital formation (% GDP)	65	80.7
Logistics performance	40	54.0
Transport productive capacity	80	25.0
Building quality control	75	73.0

	Rank	Value
<b>Business Agility</b>	80	47.0
Cost of starting a business	27	80.0
Recovery recovery rate	81	44.0
Entrepreneurial employee activity rate	80	8
Growth of corporate transactions	80	42.0
<b>Customer experience</b>	20	20
<b>Trade and Investment</b>	10	14.0
Trade (% GDP)	45	37.0
High-technology trade (% total trade)	90	40.7
Market concentration	118	81.0
Market concentration	100	80.1
<b>Product Innovation</b>	10	10.1
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	25	54.0
Cost dynamics	128	34.0
<b>Financing and domestic value added</b>	47	50.0
<b>Financing and costs</b>	10	10.0
Domestic credit to private sector (% GDP)	45	25.0
MSME financing gap (% GDP)	106	10.6
Tax and contribution rate (% profit)	32	80.0
Bank nonperforming loans (%)	106	10.6
<b>Unmet needs index</b>	10	10.0
Medium- and high-tech activities value added	25	52.0
Industry and services value added (% GDP)	5	85.4
Labour underutilization rate	50	76.0
Output per worker	50	21.0
<b>ENABLING ENVIRONMENT</b>	<b>100</b>	<b>46.7</b>
<b>Governance</b>	84	50.0
<b>Political environment</b>	50	37.0
Peace and stability	81	57.0
View and accountability	107	10.0
Quality of institutions	52	60.0
Rule of law	48	71.0
Control of corruption	50	62
Government effectiveness	85	58.0
<b>Socio-economic</b>	123	41.0
<b>Gender equity</b>	108	40.7
Female-to-male ratio in parliament	149	0.4
Female-to-male labour force participation	140	37.7
Female-to-male ratio in internal wage	1	100
<b>Government</b>	100	10.0
Social protection coverage (% population)	900	15.0
Adult literacy rate	64	84.8
Youth not in employment, education or training (%)	108	80.1
<b>Standard of living</b>	110	21.0
Poverty headcount ratio (% population)	106	10.6
GDP per capita	44	24.0
<b>Health and environment</b>	137	54.1
<b>Health</b>	80	10.4
Universal health coverage	70	60
Healthy life expectancy (years)	80	80.0
Under-five mortality rate	84	81.0
<b>Environmental performance</b>	140	11.7
Renewable energy consumption (%)	152	0
Household footprint per capita	142	40.0
Natural hazard exposure	100	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 123/154

**GKI SCORE** 37.9

**WORLD AVERAGE** 48.4

# PAKISTAN

## COUNTRY PERFORMANCE SUMMARY

Pakistan is a modest performer in terms of its knowledge infrastructure. It ranks 123rd out of 154 countries in the Global Knowledge Index 2021 and 20th out of the 27 countries with medium human development.

### KEY INDICATORS

**GDP US\$ billions** 1,021,135  
**Population** 220,892,331  
**HDI** 0.557

### AREAS OF STRENGTH

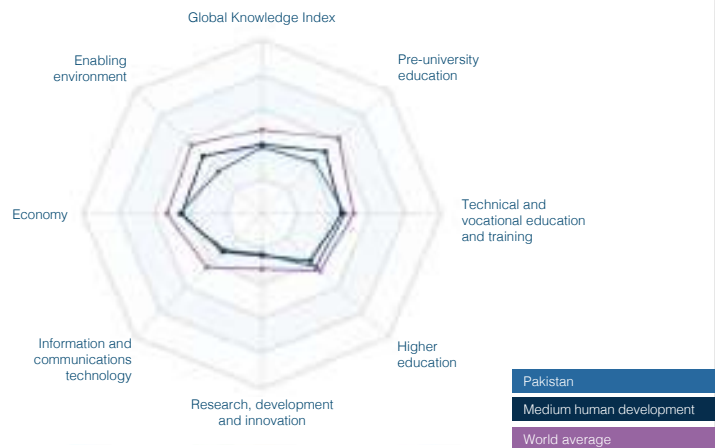
- + Researchers in higher education
- + Labour underutilization rate
- + Ecological footprint per capita
- + Market concentration
- + Completion rate in upper secondary education, gender parity

### AREAS OF IMPROVEMENT

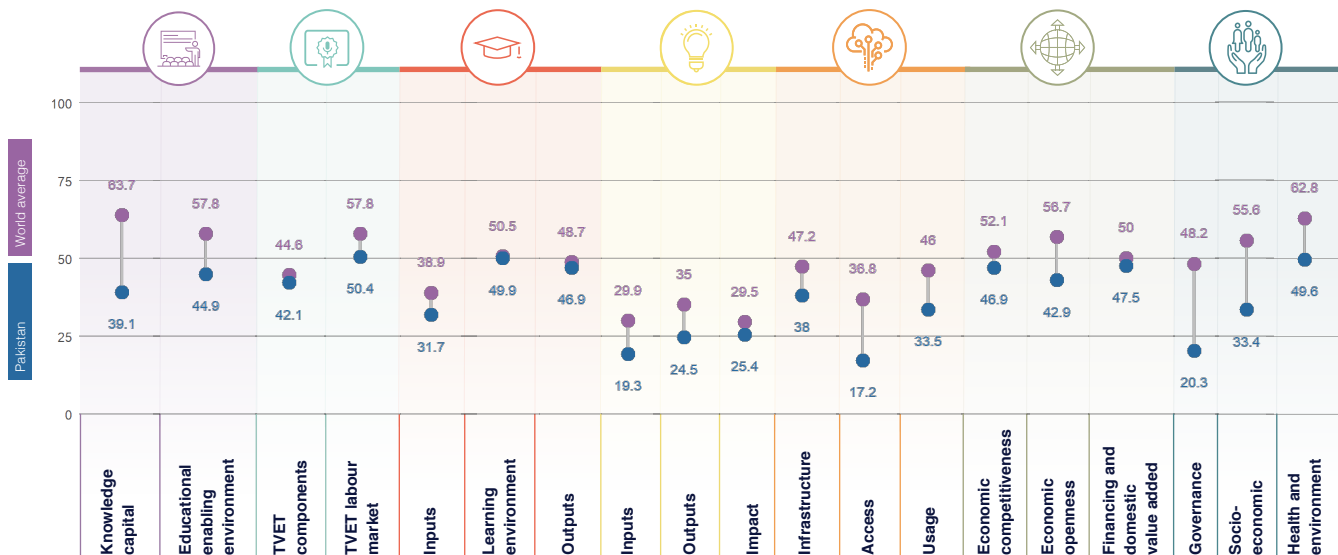
- Peace and stability
- Trade (% GDP)
- Individuals with standard ICT skills (%)
- ICT PCT patent applications (per 100 billion GDP)
- PCT applications (per 100 billion GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	126	42
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	100	46.3
HIGHER EDUCATION	86	42.8
RESEARCH, DEVELOPMENT AND INNOVATION	118	23.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	114	29.5
ECONOMY	110	45.8
ENABLING ENVIRONMENT	144	34.4



## GKI PILLARS





# PAKISTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	134	26.5
Enrolment	196	116
Net enrolment rate in primary education	196	116
Net enrolment rate in lower secondary education	196	116
Net enrolment rate in upper secondary education	196	116
Completion	112	31
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	106	27.4
Success rate rate in the last grade of lower secondary education	121	20.4
Completion	133	27.1
Assessment of 15-year-old students in math, science and reading	196	116
Learning-adjusted years of schooling	120	27.1
<b>Educational enabling environment</b>	113	66.9
Expenditure	113	10
Government expenditure on primary education (% GDP)	112	10.0
Government expenditure on secondary education (% GDP)	111	11.7
Government funding per primary student (% GDP per capita)	108	19.1
Government funding per secondary student (% GDP per capita)	72	22.0
Resources	101	17.0
Pupil-based teacher ratio in primary education	91	39.1
Pupil-based teacher ratio in secondary education	87	37.2
Schools with access to computers in primary education (%)	65	46.2
Schools with access to computers in secondary education (%)	196	116
Early learning	37	63.0
Class attendance rate in early childhood education	39	63.6
Proportion of children who are developmentally on track	196	116
Proportion of children with stimulating home learning environments	196	116
Pupil-based teacher ratio in preprimary education	196	116
Quality and infrastructure	81	41.0
Completion rate in upper secondary education, gender parity	63	37.3
Completion rate in upper secondary education, wealth parity	112	2.5
Completion rate in upper secondary education, location parity	86	41.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	64	41.1
Companies training apprentices	33	30.0
Firms offering formal training (%)	58	38.6
Labour force with short-cycle tertiary education (%)	196	116
Participation rate in formal and non-formal education and training	196	116
TVET enrolment	34	33.0
Government expenditure on vocational education (%)	64	10.6
Share of students enrolled in secondary vocational programmes	119	5
Share of students enrolled in postsecondary vocational programmes	1	104
TVET quality and infrastructure	64	40.0
Extent of staff training	87	50.2
Quality of vocational training	94	40.0
Ratio of high-skill TVET occupations earnings to average wage	31	40.4
Ratio of medium-skill TVET occupations earnings to average wage	20	50.0
<b>TVET labour market</b>	111	36.4
Efficiency of the labour market	37	31.0
Firms considered with inappropriately educated workforce (%)	75	55.2
Employment educational mismatch (%)	98	35.3
Proportion of skilled production workers	81	63.0
Unemployment rate with vocational education	34	65.0
High TVET unemployment	36	33.0
Share of TVET occupations	106	41.2
Manufacturing employment (%)	29	65.7
Quality and infrastructure	106	41.0
Enrolment in vocational education, gender parity	196	116
Useable employment rate	118	41.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	106	31.7
Expenditure	106	13.7
Government expenditure per tertiary student	72	16.7
Teaching staff compensation (% tertiary expenditure)	196	116
Enrolment	110	5.3
Enrolment in bachelor's or equivalent level (%)	107	7.8
Enrolment in masters, doctoral or equivalent (%)	112	3.5
Resources	34	75
Ratios/teacher ratio in tertiary education	91	63.0
Researchers in higher education (%)	2	54.2
<b>Learning environment</b>	78	48.8
<b>Quality and academic freedom</b>	81	16.0
Teachers in tertiary education, gender parity	196	116
Labour mobility rate	196	116
Academic freedom	60	58.0
Quality and infrastructure	41	43.4
Class attendance rate in tertiary education, gender parity	28	64.4
Class attendance rate in tertiary education, wealth parity	33	39.0
Class attendance rate in tertiary education, location parity	64	2.3
<b>Outputs</b>	83	46.3
<b>Enrolment</b>	196	116
Educational attainment rate, bachelor's or equivalent	196	116
Educational attainment rate, master's or equivalent	196	116
Educational attainment rate, doctoral or equivalent	196	116
Employment	100	66.0
Labour force participation rate with advanced education	119	52.0
Unemployment rate with advanced education	75	78.0
Impact	119	27.8
University tertiary enrollment in FTE	48	47.7
OECD students per FTE personnel in higher education	68	7.1
<b>Government of Sindh, Government of Punjab, Government of Balochistan</b>		
<b>Inputs</b>	114	16.3
Government expenditure on tertiary education	101	3.3
GDP (% GDP)	87	4.6
GERD per researcher	98	5.7
Researchers per thousand labour force	62	6.2
Tertiary graduates from STEM programmes (%)	196	116
<b>Quality and infrastructure</b>	31	31.0
GERD performed by business enterprises (%)	196	116
GERD financed by business enterprises (%)	196	116
Researchers in business enterprises (%)	196	116
Firms that spend on R&D (%)	22	45.4
<b>Quality and infrastructure</b>	100	22.0
High-skill employment (%)	62	19.0
Intellectual property payments (% total trade)	79	11.7
State of cluster development	53	48.0
<b>Outputs</b>	100	24.0
<b>Quality and infrastructure</b>	31	31.0
Average documents per researcher	93	41.4
Citations per document	67	26.0
Patent applications (per 100 billion GDP)	87	39.0
<b>Quality and infrastructure</b>	100	11.0
Intellectual property receipts (% total trade)	83	5.5
Research and development expenditure (per 100 billion GDP)	87	2.1
PCT applications (per 100 billion GDP)	156	0
Firms producing new goods and services (%)	74	38.0



# PAKISTAN

	Rank	Value
<b>Business environment</b>	108	37.9
Treatment applications (per 100 million GDP)	85	24.7
Cultural goods exports (% exports)	96	5.8
Printing and publishing output (% manufactured output)	106	10.8
<b>Energy</b>	95	25.4
<b>Finance</b>	77	30.0
Access to venture capital	33	21.8
Depth of innovative companies	30	54.5
ISO 9001 quality certificates (% GDP)	21	7.8
ISO 14001 environmental certificates (% GDP)	30	4.4
<b>Logistics</b>	77	30.0
CERD received from abroad (%)	89	2.5
Cost of letters per strategic distance dealt (% GDP)	99	11.8
Computer software spending (% GDP)	32	28.5
<b>Government services</b>	85	31.3
New business density per thousand population	128	0.4
Firms with web portals/enterprise (%)	29	24
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	714	23.3
<b>Infrastructure</b>	188	38
<b>Coverage</b>	122	22.1
3G/4G mobile network coverage (% population)	115	80
Secure Internet servers per 1 million population	119	1.4
Investment in telecommunication services (% GDP)	121	18.9
<b>Quality</b>	122	8.7
Mobile upload and download speeds	83	13.1
Fixed broadband upload and download speeds	100	2.8
Fixed broadband subscriptions (y-speed) per hundred people	112	1.3
<b>Availability</b>	87	10
Fixed broadband basket (% GNI per capita)	117	87.2
Mobile broadband basket (% GNI per capita)	29	25.9
Internet and telephony competition	1	100
<b>Access</b>	124	17.3
<b>Subscriptions</b>	107	11.1
Active mobile-broadband subscriptions per fixed-line inhabitants	138	17.2
International Internet bandwidth per user	82	42.1
Households with Internet access at home (%)	104	24
<b>Skills and employment</b>	100	5.1
Individuals with standard ICT skills (%)	84	0.5
Tertiary graduates from ICT programmes (%)	106	10.8
ICT employment (%)	88	8.1
<b>Usage</b>	189	23.3
<b>Services</b>	110	21.2
Government online services	82	82.0
Fixed broadband Internet traffic per subscription	29	18.0
Mobile broadband Internet traffic per subscription	88	14.5
Internet users (%)	143	12.5
<b>Commerce</b>	100	25.0
ICT/FIT patent applications (per 100 million GDP)	112	11.7
E-participation	89	51.4
Internet activities by individuals (%)	106	10.8
Trade in digitally deliverable services (% total trade)	30	55.1
<b>ECONOMY</b>	715	43.9
<b>Economic competitiveness</b>	85	48.3
REGISTRATION BURDEN	122	41.0
Overhead capital formation (% GDP)	100	27.1
Logistics performance	118	33.0
Transport productive capacity	124	15.8
Building quality control	22	86.7

	Rank	Value
<b>Business agility</b>	81	52.0
Cost of starting a business	84	89.3
Recovery time	58	46.5
Entrepreneurial employee activity rate	84	2.7
Growth of corporate transactions	20	21.4
<b>Corporate openness</b>	128	42.8
Trust and dissemination	12	87.0
Tax (% GDP)	145	7.8
High-technology trade (% total trade)	82	48.1
Market concentration	88	28.9
Market concentration	19	54.0
Product diversity	141	29.0
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	100	31.8
Cost dynamics	100	37.0
<b>Financing and domestic value added</b>	88	47.3
<b>Financing and costs</b>	100	22.0
Domestic credit to private sector (% GDP)	128	5.8
IMRS financing gap (% GDP)	40	21.5
Tax and contribution rate (% profit)	88	25.7
Bank nonperforming loans (%)	89	61.1
Unmet loan demand	14	40
Medium- and high-tech activities value added	86	28.7
Industry and services value added (% GDP)	128	44.7
Labour underutilization rate	8	89.4
Output per worker	110	5.2
<b>ENABLING ENVIRONMENT</b>	144	34.4
<b>Governance</b>	128	20.3
Political environment	141	14.2
Peace and stability	145	5.8
View and accountability	103	22.9
Quality of institutions	118	26.4
Rule of law	117	25.0
Control of corruption	122	22.1
Government effectiveness	108	31.7
<b>Socio-economic</b>	144	33.4
Gender equity	144	25.1
Female-to-male ratio in parliament	89	25.5
Female-to-male labour force participation	107	18.6
Female-to-male ratio in internal wage	100	80.0
Gender inequality	111	23.1
Social protection coverage (% population)	122	6.8
Adult literacy rate	112	65.0
Youth not in employment, education or training (%)	134	32.5
Standard of living	84	88.0
Poverty headcount ratio (% population)	84	89.0
GDP per capita	120	24
<b>Health and environment</b>	148	40.8
Health	101	63.0
Universal health coverage	120	40
Healthy life expectancy (years)	128	47.3
Under-five mortality rate	100	43.4
Environmental performance	80	63.7
Renewable energy consumption (%)	40	43.2
Household footprint per capita	11	87.9
Natural hazard exposure	145	20

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# PALESTINE, STATE OF

## KEY INDICATORS

GDP US\$ billions	25.909
Population	5,101,416
HDI	0.708

**GKI RANK** 106/154

**GKI SCORE** 42

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Palestine, State of is a modest performer in terms of its knowledge infrastructure. It ranks 106th out of 154 countries in the Global Knowledge Index 2021 and 37th out of the 39 countries with high human development.

### AREAS OF STRENGTH

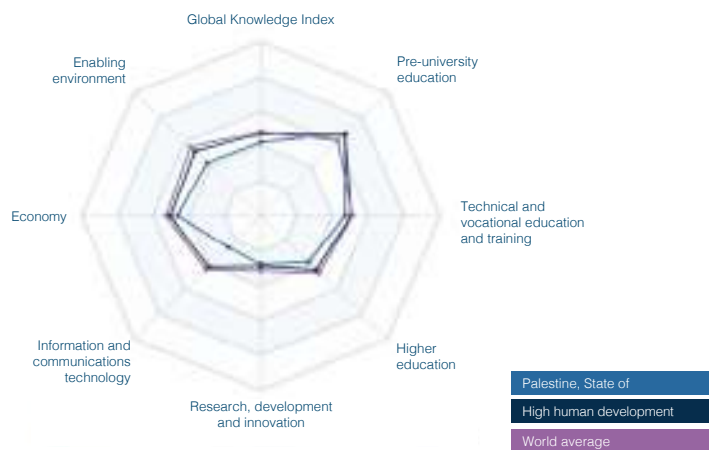
- + Gross attendance ratio for tertiary education, location parity
- + Gross attendance ratio for tertiary education, wealth parity
- + Firms constrained with inadequately educated workforce (%)
- + Tax and contribution rate (% profit)
- + Ecological footprint per capita

### AREAS OF IMPROVEMENT

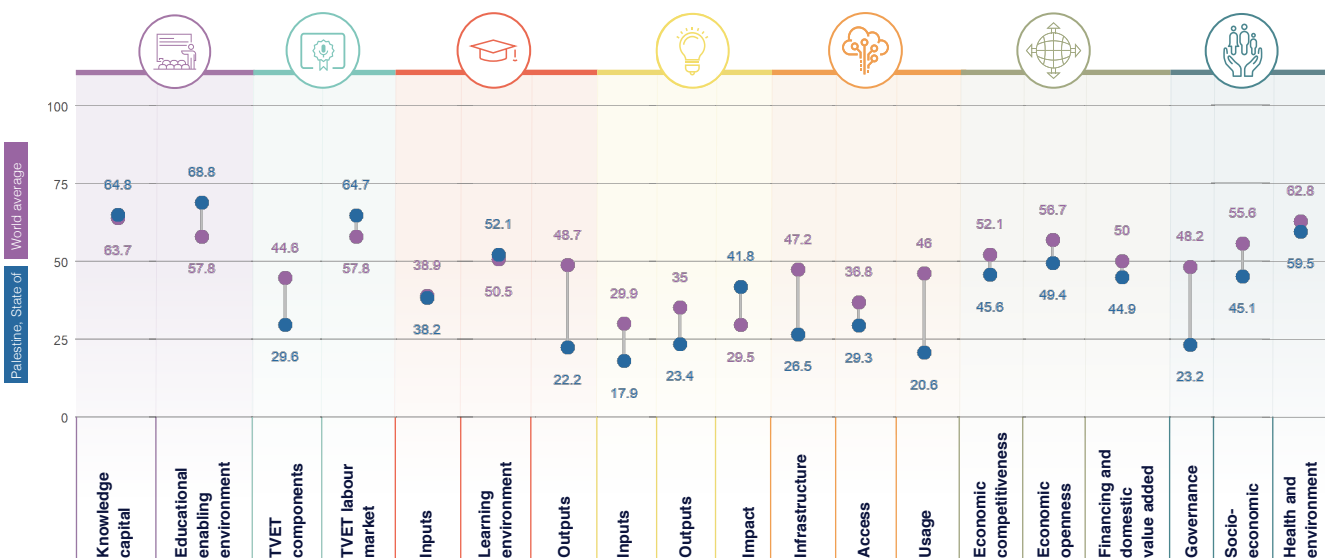
- Unemployment rate with advanced education
- Inbound mobility rate
- Intellectual property receipts (% total trade)
- Government online services
- E-participation

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	75	66.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	94	47.1
HIGHER EDUCATION	117	37.5
RESEARCH, DEVELOPMENT AND INNOVATION	93	27.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	124	25.5
ECONOMY	103	46.6
ENABLING ENVIRONMENT	124	42.6



## GKI PILLARS







# PALESTINE, STATE OF

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	68.8
Enrollment	100	70
Net enrolment rate in primary education	100	93.2
Net enrolment rate in lower secondary education	88	87.8
Net enrolment rate in upper secondary education	88	72.0
Completion	85	81.4
Years of compulsory education in primary and secondary	42	78.0
Completion rate in upper secondary education	70	64.0
Success rate rate in the last grade of lower secondary education	88	80.0
Completion	88	81.1
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	78	85.1
<b>Educational enabling environment</b>	<b>88</b>	<b>88.8</b>
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	79	88.3
Pupil-based teacher ratio in primary education	72	82.5
Pupil-based teacher ratio in secondary education	77	80.4
Schools with access to computers in primary education (%)	50	80.5
Schools with access to computers in secondary education (%)	45	80.0
Early learning	73	81.2
Class attendance rate in early childhood education	78	86.1
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	87	84.8
Pupil-based teacher ratio in preprimary education	52	81
Quality and infrastructure	88	88.0
Completion rate in upper secondary education, gender parity	119	80.4
Completion rate in upper secondary education, wealth parity	44	83.4
Completion rate in upper secondary education, location parity	82	86.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>111</b>	<b>88.8</b>
Communications training and learning	111	81.1
Firms offering formal training (%)	109	81
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	70	82.3
TVET resources	88	81
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	108	1.8
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	116	81.2
Extent of staff training	116	116
Quality of vocational training	116	116
Ratio of high-skill TVET occupations earnings to average wage	100	115.0
Ratio of medium-skill TVET occupations earnings to average wage	35	40.4
<b>TVET labour market</b>	<b>87</b>	<b>84.7</b>
Efficiency of the labour market	88	83.0
Firms considered with inappropriately educated workforce (%)	6	80.2
Employment educational mismatch (%)	32	77.3
Proportion of skilled production workers	89	88.0
Unemployment rate with vocational education	112	34.5
Real TVET unemployment	88	81.7
Share of TVET occupations	87	80.0
Manufacturing employment (%)	48	81.7
Quality and infrastructure	88	81.0
Enrollment in vocational education, gender parity	70	86.2
Useable employment rate	62	36.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>78</b>	<b>88.2</b>
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	88	81.7
Enrollment in bachelor's or equivalent level (%)	87	81
Enrollment in masters, doctoral or equivalent (%)	88	15.4
Resources	88	80.0
Pupil-teacher ratio in tertiary education	106	85.4
Researchers in higher education (%)	41	86.1
<b>Learning environment</b>	<b>87</b>	<b>82.1</b>
Directly paid academic freedom	101	81
Teachers in tertiary education, gender parity	86	88.0
Labour mobility rate	121	8
Academic freedom	88	82.0
Quality and infrastructure	8	71.1
Class attendance rate in tertiary education, gender parity	88	88.0
Class attendance rate in tertiary education, wealth parity	3	88.0
Class attendance rate in tertiary education, location parity	1	86
<b>Outputs</b>	<b>100</b>	<b>82.2</b>
Attainment	88	81.4
Educational attainment rate, bachelor's or equivalent	88	85.0
Educational attainment rate, master's or equivalent	58	7.2
Educational attainment rate, doctoral or equivalent	48	12.0
Employment	101	88.0
Labour force participation rate with advanced education	80	83.0
Unemployment rate with advanced education	100	9.4
Impact	119	8.8
University tertiary enrollment in R&D	116	116
CRIDE indicators per 100 personnel in higher education	100	4.6
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>108</b>	<b>81.2</b>
Access to R&D resources	88	81.4
GDP (% GDP)	65	8.8
GERD per researcher	116	116
Researchers per thousand labour force	51	85
Tertiary graduates from STEM programmes (%)	100	27.0
<b>Quality and infrastructure</b>	<b>88</b>	<b>81.1</b>
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	88	4.8
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	9.5
Quality of research environment	88	81.1
High-skill employment (%)	11	83.0
Intellectual property payments (% total trade)	119	0.7
State of cluster development	116	116
<b>Outputs</b>	<b>100</b>	<b>81.0</b>
Access to R&D resources	116	81.1
Average documents per researcher	108	34.5
Citations per document	80	28.0
Patent applications (per 100 billion GDP)	116	116
<b>Quality and infrastructure</b>	<b>88</b>	<b>81.1</b>
Intellectual property receipts (% total trade)	117	8
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	100	81



# PALESTINE, STATE OF

	Rank	Value
<b>Consumer Electronics</b>	101	25.3
Treatment applications per 100 million GDP	116	116
Cultural goods exports (% exports)	85	11.5
Printing and publishing output (% manufactured output)	37	32.0
<b>Energy</b>	89	11.5
<b>Finance</b>	111	5.1
Ratio of institutions' provisions	114	114
Depth of innovative companies	114	114
ISO 9001 quality certificates (% GDP)	80	8
ISO 14001 environmental certificates (% GDP)	52	4.2
<b>Industry</b>	9	10
CERD received from abroad (%)	34	40
Joint ventures per strategic industry deals (% GDP)	114	114
Computer software spending (% GDP)	114	114
<b>Science and Technology</b>	10	11.1
New business density per thousand population	114	114
Firms with new products/services (%)	93	34.4
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	124	25.2
<b>Infrastructure</b>	141	26.5
<b>Connectivity</b>	100	10
30MHz mobile network coverage (% population)	149	17.0
Secure Internet servers per 1 million population	70	4.2
Investment in telecommunication services (% GDP)	110	5.3
<b>Quality</b>	50	11.1
Mobile upload and download speeds	114	114
Fixed broadband upload and download speeds	114	114
Fixed broadband subscriptions (by speed) per hundred people	80	11.7
<b>Availability</b>	110	57.7
Fixed broadband bandwidth (% Gbps per capita)	184	82.0
Mobile broadband basket (% Gbps per capita)	37	50.7
Internet and telephony competition	118	80
<b>Access</b>	86	26.2
<b>Subscriptions</b>	90	12.3
Active mobile-broadband subscriptions per fixed-line inhabitants	142	7.2
International Internet bandwidth per user	85	40.0
Households with Internet access at home (%)	50	30.7
<b>Skills and employment</b>	111	11.2
Individuals with standard ICT skills (%)	74	7
Tertiary graduates from ICT programmes (%)	94	23.0
ICT employment (%)	64	17.0
<b>Usage</b>	144	20.0
<b>Services</b>	108	21.1
Government online services	100	8
Fixed broadband internet traffic per subscription	29	32.0
Mobile broadband internet traffic per subscription	38	19.2
Internet users (%)	70	80
<b>Commerce</b>	100	10.0
ICT FDI positive applications (per 100 million GDP)	114	114
E-participation	100	8
Internet activities by individuals (%)	86	17.9
Trade in digitally deliverable services (% total trade)	102	14.0
<b>ECONOMY</b>	103	46.5
<b>Economic Competitiveness</b>	103	46.5
<b>Infrastructure Investment</b>	50	11.4
Overhead capital formation (% GDP)	83	47
Logistics performance	114	114
Transport productive capacity	65	27.1
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	100	20.0
Ease of starting a business	144	30.2
Recovery recovery rate	114	114
Entrepreneurial employee activity rate	47	20.0
Growth of corporate transactions	86	20.0
<b>Customer experience</b>	102	46.4
<b>Trade and Investment</b>	41	63.0
Trade (% GDP)	85	26.5
High-technology trade (% total trade)	114	114
Market concentration	47	83.4
Market concentration	86	60.0
<b>Product Innovation</b>	100	11.2
Climate financial openness	114	114
Foreign direct investment, net inflows (% GDP)	102	33.2
Cost dynamics	114	114
<b>Financing and domestic value added</b>	100	41.0
<b>Financing and credit</b>	41	10
Domestic credit to private sector (% GDP)	75	19.2
MSME financing gap (% GDP)	114	114
Tax and contribution rate (% profit)	8	82.8
Bank nonperforming loans (%)	86	82.0
<b>Unmet basic needs</b>	141	11.0
Medium- and high-tech activities value added	110	6.6
Industry and services value added (% GDP)	100	56.4
Labour underutilization rate	114	20
Output per worker	80	11
<b>ENABLING ENVIRONMENT</b>	124	40.4
<b>Governance</b>	127	23.2
<b>Political environment</b>	108	14.7
Peace and stability	100	4.2
View and accountability	110	25.1
Quality of institutions	100	31.7
Rule of law	89	15.1
Control of corruption	105	21.3
<b>Government effectiveness</b>	110	28.0
<b>Socio-economic</b>	114	45.1
<b>Gender equity</b>	108	57.2
Female-to-male ratio in parliament	114	114
Female-to-male labour force participation	148	16
Female-to-male ratio in internal wage	75	85.4
<b>Government assets</b>	102	46.4
Social protection coverage (% population)	107	15.0
Adult literacy rate	86	84.0
Youth not in employment, education or training (%)	144	20.0
<b>Standard of living</b>	100	21.7
Poverty headcount ratio (% population)	80	59.2
GDP per capita	111	4.4
<b>Health and environment</b>	107	50.5
<b>Health</b>	114	114
Universal health coverage	114	114
Healthy life expectancy (years)	114	114
Under-five mortality rate	114	114
<b>Environmental performance</b>	90	88.0
Renewable energy consumption (%)	104	13.2
Household footprint per capita	8	88.0
Natural hazard exposure	45	67

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# PANAMA

**GKI RANK** 72/154

**GKI SCORE** 48.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Panama is a moderate performer in terms of its knowledge infrastructure. It ranks 72nd out of 154 countries in the Global Knowledge Index 2021 and 58th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Teachers in tertiary education, gender parity
- + Average documents per researcher
- + Gross fixed capital formation (% GDP)
- + GERD financed from abroad (%)
- + Printing and publishing output (% manufactured output)

### AREAS OF IMPROVEMENT

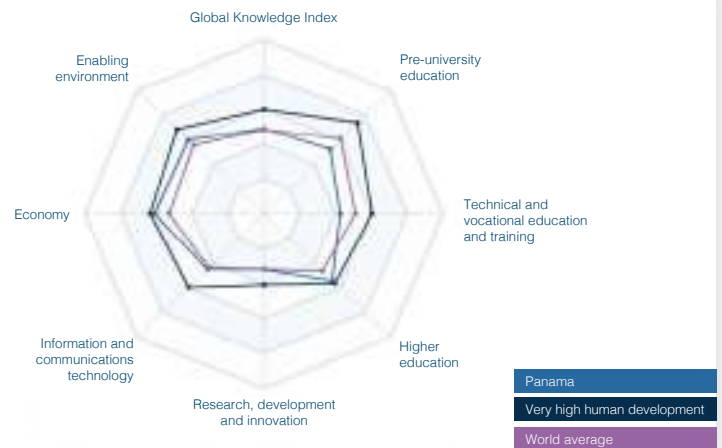
- Firms offering formal training (%)
- Firms with new product/service (%)
- Assessment of 15-year-old students in math, science and reading
- GERD performed by business enterprises (%)
- Industrial design applications (per 100 billion GDP)

### KEY INDICATORS

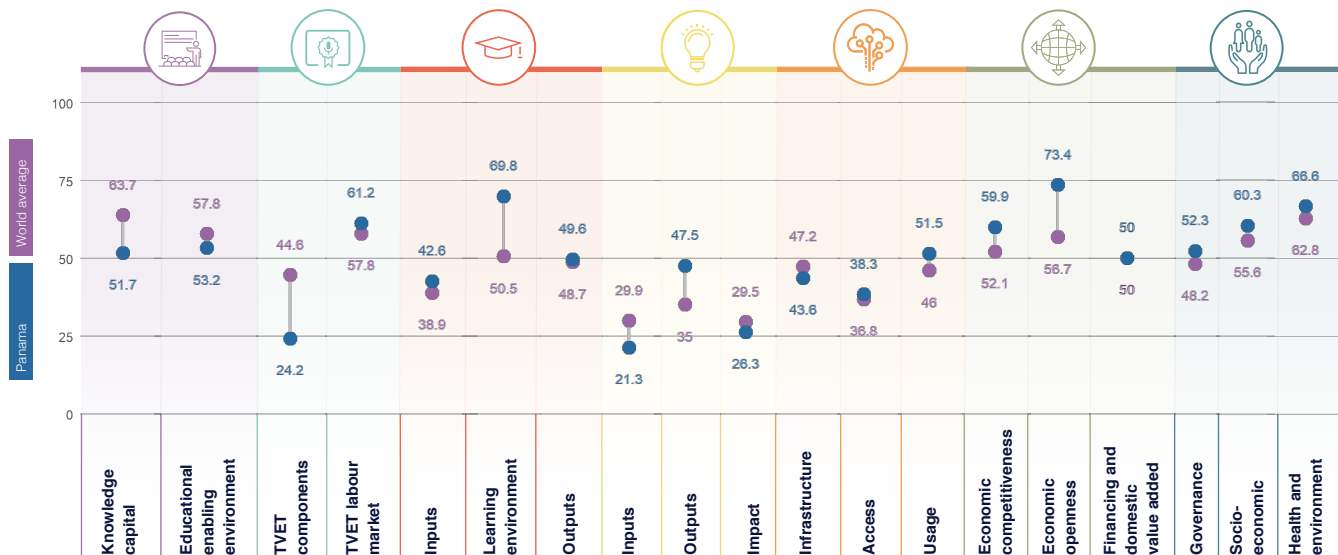
**GDP US\$ billions** 109.545  
**Population** 4,314,768  
**HDI** 0.815

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	111	52.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	120	42.7
HIGHER EDUCATION	37	54
RESEARCH, DEVELOPMENT AND INNOVATION	65	31.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	73	44.5
ECONOMY	42	61.1
ENABLING ENVIRONMENT	53	59.7



## GKI PILLARS







# PANAMA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	113	81.7
Enrollment	113	83.2
Net enrolment rate in primary education	113	83.8
Net enrolment rate in lower secondary education	108	85.3
Net enrolment rate in upper secondary education	87	83.7
Completion	93	83.8
Years of compulsory education in primary and secondary	67	83.2
Completion rate in upper secondary education	85	83.8
Success rate rate in the last grade of lower secondary education	89	83.8
Completion	124	85.4
Assessment of 15-year-old students in math, science and reading	74	12.8
Learning-adjusted years of schooling	100	40.3
<b>Educational enabling environment</b>	100	85.3
Expenditure	128	13.8
Government expenditure on primary education (% GDP)	118	16.4
Government expenditure on secondary education (% GDP)	118	9.1
Government funding per primary student (% GDP per capita)	117	18.8
Government funding per secondary student (% GDP per capita)	118	8.3
Resources	71	71.8
Pupil-based teacher ratio in primary education	42	84.8
Pupil-based teacher ratio in secondary education	29	85.8
Schools with access to computers in primary education (%)	89	47.8
Schools with access to computers in secondary education (%)	74	85.8
Early learning	75	80.8
Class attendance rate in early childhood education	129	7.8
Proportion of children who are developmentally on track	28	70.8
Proportion of children with stimulating home learning environments	37	72.2
Pupil-based teacher ratio in preprimary education	23	80.1
Quality and infrastructure	89	85.1
Completion rate in upper secondary education, gender parity	74	89
Completion rate in upper secondary education, wealth parity	81	45.3
Completion rate in upper secondary education, location parity	88	89.8
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	148	10.3
Domestic training expenditure	144	9.4
Firms offering formal training (%)	118	11.8
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	89	8
TVET resources	108	10.8
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	52	26.8
Share of students enrolling in postsecondary vocational programmes	114	114
TVET quality and infrastructure	108	10.8
Extent of staff training	82	80.1
Quality of vocational training	87	45.8
Ratio of high-skill TVET occupations earnings to average wage	88	28.8
Ratio of medium-skill TVET occupations earnings to average wage	107	30.8
<b>TVET labour market</b>	79	81.8
Efficiency of the labour market	81	81.8
Firms considered well-integrated into workforce (%)	83	83.8
Employment educational mismatch (%)	118	118
Proportion of skilled production workers	89	84.8
Unemployment rate with vocational education	118	118
Real TVET unemployment	89	11.2
Share of TVET occupations	80	54.8
Manufacturing employment (%)	87	29.8
Quality and infrastructure	118	11.7
Enrollment in vocational education, gender parity	33	89.8
Useable employment rate	80	81.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	43	43.8
Expenditure	88	11.8
Government expenditure per tertiary student	57	17.4
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	57	38
Enrollment in bachelor's or equivalent level (%)	44	29.7
Enrollment in masters, doctoral or equivalent (%)	28	28.4
Resources	11	83.4
Rapiteacher ratio in tertiary education	38	85.4
Researchers in higher education (%)	116	116
<b>Learning environment</b>	23	88.8
Timely and academic freedom	3	84.7
Teachers in tertiary education, gender parity	1	88.8
Labour mobility rate	116	116
Academic freedom	28	80.1
Quality and infrastructure	58	44.8
Class attendance rate in tertiary education, gender parity	79	67.8
Class attendance rate in tertiary education, wealth parity	28	48.2
Class attendance rate in tertiary education, location parity	28	22.8
<b>Outputs</b>	88	48.8
Attainment	42	41.7
Educational attainment rate, bachelor's or equivalent	47	88.8
Educational attainment rate, master's or equivalent	9	83.7
Educational attainment rate, doctoral or equivalent	88	11.2
Employment	82	18.8
Labour force participation rate with advanced education	32	88.4
Unemployment rate with advanced education	118	88.8
Impact	88	28.8
University tertiary enrollment in FTE	88	38.8
CRIDE students per FTE personnel in higher education	116	116
<b>Government of Panama's performance and economic data</b>		
<b>Inputs</b>	108	11.2
Government expenditure	11	11
GDP (% GDP)	88	2.8
GERD per researcher	11	84.8
Researchers per thousand labour force	88	0.4
Tertiary graduates from STEM programmes (%)	88	28.8
<b>Quality and infrastructure</b>	108	11.2
GERD performed by business enterprises (%)	87	8
GERD financed by business enterprises (%)	88	1.8
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	88	13.8
<b>Quality and infrastructure</b>	88	11.2
High-skill employment (%)	28	47.8
Intellectual property payments (% total trade)	118	1.4
State of cluster development	75	45.8
<b>Outputs</b>	23	11.2
Government expenditure	11	11.2
Average documents per researcher	1	108
Citations per document	14	38
Patent applications (per 100 billion GDP)	88	34.8
<b>Quality and infrastructure</b>	108	11.2
Intellectual property receipts (% total trade)	88	4.8
Research and development expenditure (per 100 billion GDP)	118	8
PCT applications (per 100 billion GDP)	88	25.8
Firms producing new goods and services (%)	118	13.8





# PANAMA

	Rank	Value
<b>Business environment</b>		
Trademark applications per 100 million GDP	49	34.7
Cultural goods exports (% exports)	29	38.8
Printing and publishing output (% manufactured output)	6	80
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	84	5.3
Depth of innovative companies	70	50.1
ISO 9001 quality certificates (% GDP)	80	6.1
ISO 14001 environmental certificates (% GDP)	118	1.8
<b>Integrity</b>		
CERD freedom from abuse (%)	6	86.1
Cost savings per strategic justice deals (% GDP)	81	8.8
Computer software spending (% GDP)	66	16.0
<b>Government efficiency</b>		
New business density per thousand population	32	23.0
Firms with one paid attorney (%)	115	45.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>73</b>	<b>46.3</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
30MHz mobile network coverage (% population)	112	89.0
Secure Internet servers per 1 million population	80	7.1
Investment in telecommunication services (% GDP)	66	21.8
<b>Speed</b>		
Mobile spread and download speeds	85	12.6
Fixed broadband upload and download speeds	37	22.5
Fixed broadband subscriptions (y speed) per hundred people	68	24.1
<b>Availability</b>		
Fixed broadband latency (% QM per user)	69	88.9
Mobile broadband basket (% QM per capita)	89	56.0
Internet and telephony competition	1	100
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	77	34.7
International Internet bandwidth per user	66	45.8
Households with Internet access at home (%)	74	30.6
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	49	35.0
ICT employment (%)	63	18.2
<b>Usage</b>		
<b>Services</b>		
Government online services	87	82.4
Fixed broadband Internet traffic per subscription	104	19
Mobile broadband Internet traffic per subscription	104	19
Internet users (%)	80	81.0
<b>Commerce</b>		
ICT FDI patent applications (per 100 million GDP)	71	40.1
E-participation	80	56.0
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	115	24.0
<b>ECONOMY</b>	<b>47</b>	<b>61.1</b>
<b>Economic complexity</b>		
<b>Manufacture</b>		
Open fixed capital formation (% GDP)	6	80.7
Logistics performance	35	56.6
Transport productive capacity	17	46.1
Building quality control	115	80

	Rank	Value
<b>Business agility</b>		
Ease of starting a business	46	80
Recovery recovery rate	110	26.5
Entrepreneurial employee activity rate	26	36.0
Growth of corporate transactions	50	21.4
<b>Business openness</b>		
Trade and investment	41	51.0
Trade (% GDP)	95	24.5
High-technology trade (% total trade)	81	44.2
Market concentration	37	89.6
Market concentration	33	83.0
Product diversity	11	81.4
Contract financial openness	1	100
Foreign direct investment, net inflows (% GDP)	14	87.1
Cost dynamics	41	80
<b>Financing and domestic value added</b>	<b>73</b>	<b>53</b>
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	24	41.1
MSME financing gap (% GDP)	100	20.0
Tax and contribution rate (% profit)	80	70.8
Bank nonperforming loans (%)	32	80.3
Unmet loan demand	10	41.4
Medium- and high-tech activities value added	121	1
Industry and services value added (% GDP)	15	70
Labour underutilization rate	88	63.4
Output per worker	43	27.0
<b>ENABLING ENVIRONMENT</b>	<b>53</b>	<b>59.7</b>
<b>Governance</b>		
Political environment	10	70
Peace and stability	37	54.3
View and accountability	44	63.8
Quality of institutions	81	45.5
Rule of law	79	48.0
Control of corruption	100	23.2
Government effectiveness	88	58.7
<b>Socio-economic</b>		
Gender equity	79	66.0
Female-to-male ratio in parliament	87	20.1
Female-to-male labour force participation	100	63.7
Female-to-male ratio in internal wage	1	100
Gender inequality	69	70
Social protection coverage (% population)	84	45.3
Adult literacy rate	83	84.0
Youth not in employment, education or training (%)	70	87.1
Standard of living	56	63.0
Poverty headcount ratio (% population)	60	80.3
GDP per capita	48	27.0
<b>Health and environment</b>	<b>87</b>	<b>66.8</b>
<b>Health</b>		
Universal health coverage	25	70
Healthy life expectancy (years)	37	81.0
Under-five mortality rate	79	85.0
Environmental performance	86	66.0
Renewable energy consumption (%)	72	25.3
Household footprint per capita	71	86.4
Natural hazard exposure	108	30

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 94/154

**GKI SCORE** 44.6

**WORLD AVERAGE** 48.4

# PARAGUAY

## COUNTRY PERFORMANCE SUMMARY

Paraguay is a modest performer in terms of its knowledge infrastructure. It ranks 94th out of 154 countries in the Global Knowledge Index 2021 and 30th out of the 39 countries with high human development.

### KEY INDICATORS

**GDP US\$ billions** 88.01  
**Population** 7,132,530  
**HDI** 0.728

### AREAS OF STRENGTH

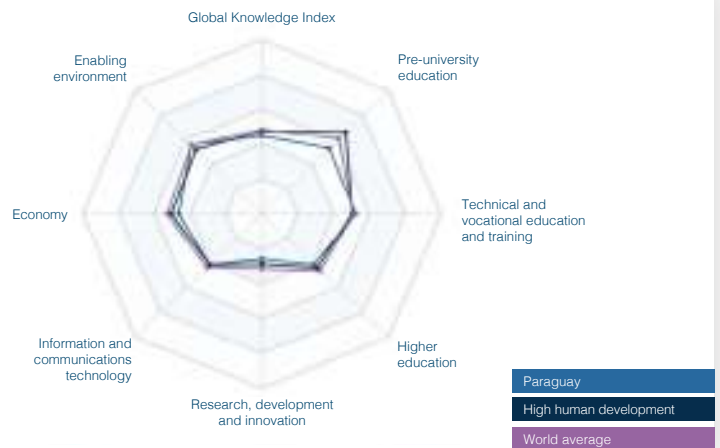
- + Participation rate in formal and non-formal education and training
- + Trademark applications (per 100 billion GDP)
- + Citations per document
- + Unemployment rate with advanced education
- + Enrolment in vocational education, gender parity

### AREAS OF IMPROVEMENT

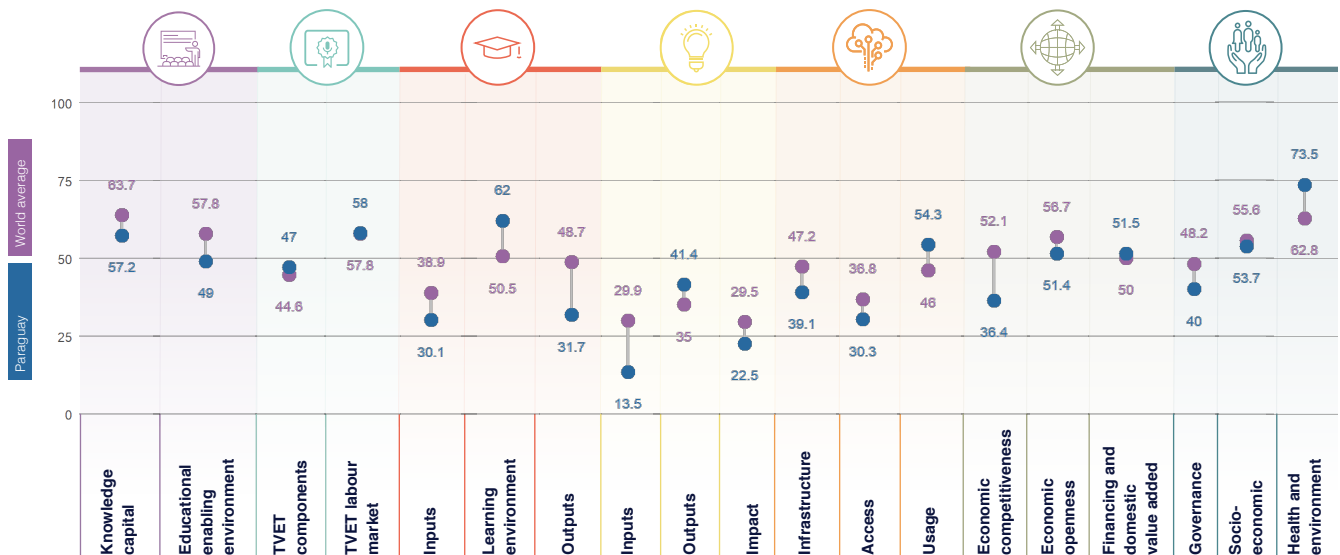
- University-industry collaboration in R&D
- Labour force participation rate with advanced education
- Trade in digitally deliverable services (% total trade)
- GERD performed by business enterprises (%)
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	107	53.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	74	52.5
HIGHER EDUCATION	98	41.2
RESEARCH, DEVELOPMENT AND INNOVATION	106	25.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	81	41.2
ECONOMY	105	46.4
ENABLING ENVIRONMENT	68	55.7



## GKI PILLARS





# PARAGUAY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	184	81.1
Enrollment	184	87.2
Net enrolment rate in primary education	100	40.2
Net enrolment rate in lower secondary education	110	85.1
Net enrolment rate in upper secondary education	88	85.2
Completion	85	85.3
Years of compulsory education in primary and secondary	9	82.9
Completion rate in upper secondary education	87	85.7
Success rate rate in the last grade of lower secondary education	100	48.0
Completion	82	40
Assessment of 15-year-old students in math, science and reading	144	114
Learning-adjusted years of schooling	88	40
<b>Educational enabling environment</b>		
Expenditure	87	27
Government expenditure on primary education (% GDP)	76	20.6
Government expenditure on secondary education (% GDP)	89	20.4
Government funding per primary student (% GDP per capita)	86	23.8
Government funding per secondary student (% GDP per capita)	87	21.1
Resources	100	81.1
Pupil-based teacher ratio in primary education	54	29.0
Pupil-based teacher ratio in secondary education	87	81.8
Schools with access to computers in primary education (%)	85	0.4
Schools with access to computers in secondary education (%)	87	21.8
Early learning	76	23.0
Class attendance rate in early childhood education	100	24.1
Proportion of children who are developmentally on track	23	73.4
Proportion of children with stimulating home learning environments	35	89.8
Pupil-based teacher ratio in preprimary education	21	81.2
Quality and infrastructure	87	81.8
Completion rate in upper secondary education, gender parity	88	81.0
Completion rate in upper secondary education, wealth parity	85	44.5
Completion rate in upper secondary education, location parity	88	86.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	11	13.0
Firms offering formal training (%)	29	87.8
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	1	100
<b>TVET resources</b>		
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	88	23.4
Share of students enrolled in postsecondary vocational programmes	114	114
<b>TVET quality and infrastructure</b>		
Extent of staff training	114	83.8
Quality of vocational training	131	35.0
Ratio of high-skil TVET occupations earnings to average wage	82	24.4
Ratio of medium-skill TVET occupations earnings to average wage	48	47.0
<b>TVET labour market</b>		
Efficiency of the labour market	111	54.0
Firms considered with inappropriately educated workforce (%)	89	45.4
Employment educational mismatch (%)	74	56.4
Proportion of skilled production workers	88	81.0
Unemployment rate with vocational education	114	114
Real TVET unemployment	80	11.8
Share of TVET occupations	88	48.7
Manufacturing employment (%)	80	20
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	39	84.3
Useable employment rate	83	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	35	23.0
Government expenditure per tertiary student	114	114
Teaching staff compensation (% tertiary expenditure)	86	27.8
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	114	114
Enrollment in masters, doctoral or equivalent (%)	114	114
<b>Resources</b>		
Rapiteacher ratio in tertiary education	114	114
Researchers in higher education (%)	88	37.2
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	114	114
Labour mobility rate	114	114
Academic freedom	84	81
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	82	38.0
Class attendance rate in tertiary education, wealth parity	31	41
Class attendance rate in tertiary education, location parity	28	11.2
<b>Outputs</b>		
Skilled	80	20.7
Educational attainment rate, bachelor's or equivalent	82	35.7
Educational attainment rate, master's or equivalent	83	25.1
Educational attainment rate, doctoral or equivalent	88	4.4
Skilled	114	83.0
Labour force participation rate with advanced education	128	91
Unemployment rate with advanced education	17	83.0
<b>Input</b>		
University tertiary enrollment in FTE	114	25.5
OMER scholars rate per FTE personnel in higher education	88	11.6
<b>Government expenditure and financing data</b>		
<b>Inputs</b>		
Share of GDP expenditure	107	100
GDP (% GDP)	88	2.7
GERD per researcher	48	27
Researchers per thousand labour force	88	1.6
Tertiary graduates from STEM programmes (%)	114	114
<b>Output and infrastructure</b>		
GERD performed by business enterprises (%)	87	9
GERD financed by business enterprises (%)	101	0.5
Researchers in business enterprises (%)	114	114
Firms that spend on R&D (%)	44	32.1
<b>Quality and infrastructure</b>		
High-skilled employment (%)	44	28.2
Intellectual property payments (% total trade)	100	4.1
State of cluster development	118	33.0
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	82	41.8
Citations per document	18	48.0
Patent applications (per 100 billion GDP)	101	31.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	114	114
Research design applications (per 100 billion GDP)	88	1.8
PCT applications (per 100 billion GDP)	107	37.0
Firms producing new goods and services (%)	18	80





# PARAGUAY

	Rank	Value
<b>Consumer electronics</b>	5	11.3
Treatment applications per 100 million GDP	1	189
Cultural goods exports (% exports)	118	2.3
Printing and publishing output (% manufactured output)	196	1.9
<b>Energy</b>	194	20.3
<b>Finance</b>	85	51.1
Access to venture capital	308	4.8
Depth of innovative companies	73	50.0
ISO 9001 quality certificates (% GDP)	63	19.0
ISO 14001 environmental certificates (% GDP)	88	3.3
<b>Industry</b>	85	51.1
CERD forecast from abroad (%)	32	25.0
Joint ventures per strategic industry deals (% GDP)	122	3.8
Computer software spending (% GDP)	106	3.4
<b>International trade</b>	87	51.1
New business density per thousand population	115	1
Firms with new products/services (%)	85	23.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>81</b>	<b>41.2</b>
<b>Infrastructure</b>	<b>85</b>	<b>26.3</b>
<b>Coverage</b>	<b>75</b>	<b>41.4</b>
3G/LTE mobile network coverage (% population)	70	81
Secure Internet servers per 1 million population	78	3.8
Investment in telecommunication services (% GDP)	51	11.4
<b>Speed</b>	<b>88</b>	<b>10.0</b>
Mobile spread and download speeds	88	10
Fixed broadband upload and download speeds	87	10
Fixed broadband subscriptions (y speed) per hundred people	88	8.8
<b>Availability</b>	<b>106</b>	<b>11.2</b>
Fixed broadband latency (% QM per capita)	87	87.8
Mobile broadband basket (% QM per capita)	118	40.1
Internet and telephone competition	105	70
<b>Access</b>	<b>81</b>	<b>36.3</b>
<b>Subscriptions</b>	<b>105</b>	<b>21.1</b>
Active mobile-broadband subscriptions per fixed-line inhabitants	101	26.3
International Internet bandwidth per user	117	28
Households with Internet access at home (%)	100	50.4
<b>Skills and employment</b>	<b>116</b>	<b>1.0</b>
Individuals with standard ICT skills (%)	116	1.8
Tertiary graduates from ICT programmes (%)	116	1.8
ICT employment (%)	106	1.8
<b>Usage</b>	<b>85</b>	<b>56.3</b>
<b>Services</b>	<b>11</b>	<b>11.5</b>
Government online services	84	70.8
Fixed broadband Internet traffic per subscription	104	1.8
Mobile broadband Internet traffic per subscription	106	1.8
Internet users (%)	80	72.1
<b>Commerce</b>	<b>100</b>	<b>10.7</b>
ICT/FIT patent applications (per 100,000 GDP)	106	1.8
E-participation	80	70
Internet activities by individuals (%)	58	80.8
Trade in digitally deliverable services (% total trade)	100	4.3
<b>ECONOMY</b>	<b>100</b>	<b>66.4</b>
<b>Economic complexity/structure</b>	<b>148</b>	<b>26.4</b>
<b>Manufacturing</b>	<b>100</b>	<b>11.2</b>
Overhead capital formation (% GDP)	87	43.0
Logistics performance	74	44.6
Transport productive capacity	108	15.3
Building quality control	126	82.0

	Rank	Value
<b>Business agility</b>	<b>148</b>	<b>22.7</b>
Ease of starting a business	105	76
Recovery recovery rate	116	25
Entrepreneurial employee activity rate	106	1.9
Growth of corporate transactions	118	8
<b>Corporate governance</b>	<b>81</b>	<b>51.4</b>
Trust and competitiveness	71	19.7
<b>Tax</b>	<b>87</b>	<b>25.7</b>
Tax (% GDP)	87	25.7
High-technology trade (% total trade)	30	58.0
Market concentration	100	87.1
Market concentration	86	87.1
Product diversity	10	11.2
Climate financial openness	78	44.8
Foreign direct investment, net inflows (% GDP)	112	35.2
Cost dynamics	88	45.0
<b>Financing and domestic value added</b>	<b>87</b>	<b>51.3</b>
<b>Financing and costs</b>	<b>43</b>	<b>61.0</b>
Domestic credit to private sector (% GDP)	81	18.3
IMRS financing gap (% GDP)	42	73.1
Tax and contribution rate (% profit)	86	72.8
Bank nonperforming loans (%)	39	80.0
Unmet loan demand	10	89.0
Medium- and high-tech activities value added	79	25.4
Industry and services value added (% GDP)	85	89.0
Labour underutilization rate	80	81.0
Output per worker	80	10.3
<b>ENABLING ENVIRONMENT</b>	<b>88</b>	<b>55.7</b>
<b>Governance</b>	<b>89</b>	<b>40</b>
Political environment	68	64.2
Peace and stability	70	47.8
View and accountability	70	80.1
Quality of institutions	100	89.0
Rule of law	86	31
Control of corruption	105	20.2
Government effectiveness	100	25.1
<b>Socio-economic</b>	<b>88</b>	<b>55.7</b>
Gender equity	91	82.4
Female-to-male ratio in parliament	117	10.4
Female-to-male labour force participation	100	87.8
Female-to-male ratio in internal wage	1	100
Gender inequality	88	82.2
Social protection coverage (% population)	80	20.4
Adult literacy rate	87	83
Youth not in employment, education or training (%)	81	84.2
<b>Standard of living</b>	<b>81</b>	<b>38.0</b>
Poverty headcount ratio (% population)	85	82.0
GDP per capita	81	10.8
<b>Health and environment</b>	<b>6</b>	<b>73.5</b>
<b>Health</b>	<b>81</b>	<b>11.4</b>
Universal health coverage	79	89
Healthy life expectancy (years)	73	72.2
Under-five mortality rate	80	84.0
Environmental performance	81	11.7
Renewable energy consumption (%)	34	81.0
Household footprint per capita	87	78.8
Natural hazard exposure	27	74

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 73/154

**GKI SCORE** 48.8

**WORLD AVERAGE** 48.4

# PERU

## COUNTRY PERFORMANCE SUMMARY

Peru is a moderate performer in terms of its knowledge infrastructure. It ranks 73rd out of 154 countries in the Global Knowledge Index 2021 and 15th out of the 39 countries with high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **371,291**  
**Population** ..... **32,971,846**  
**HDI** ..... **0.777**

### AREAS OF STRENGTH

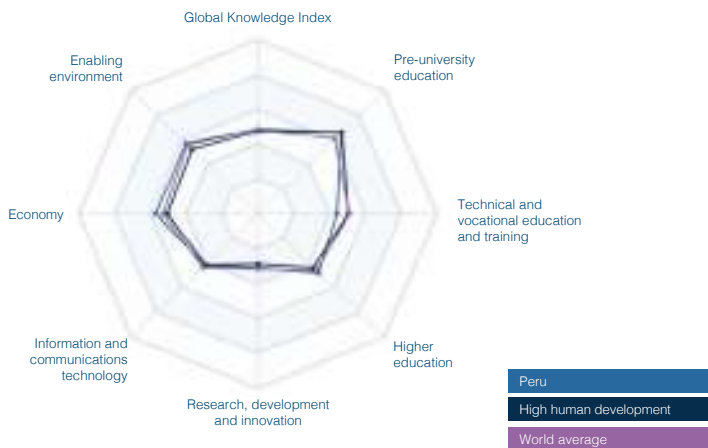
- + Completion rate in upper secondary education, gender parity
- + Firms offering formal training (%)
- + MSME financing gap (% GDP)
- + Firms producing new goods and services (%)
- + Academic freedom

### AREAS OF IMPROVEMENT

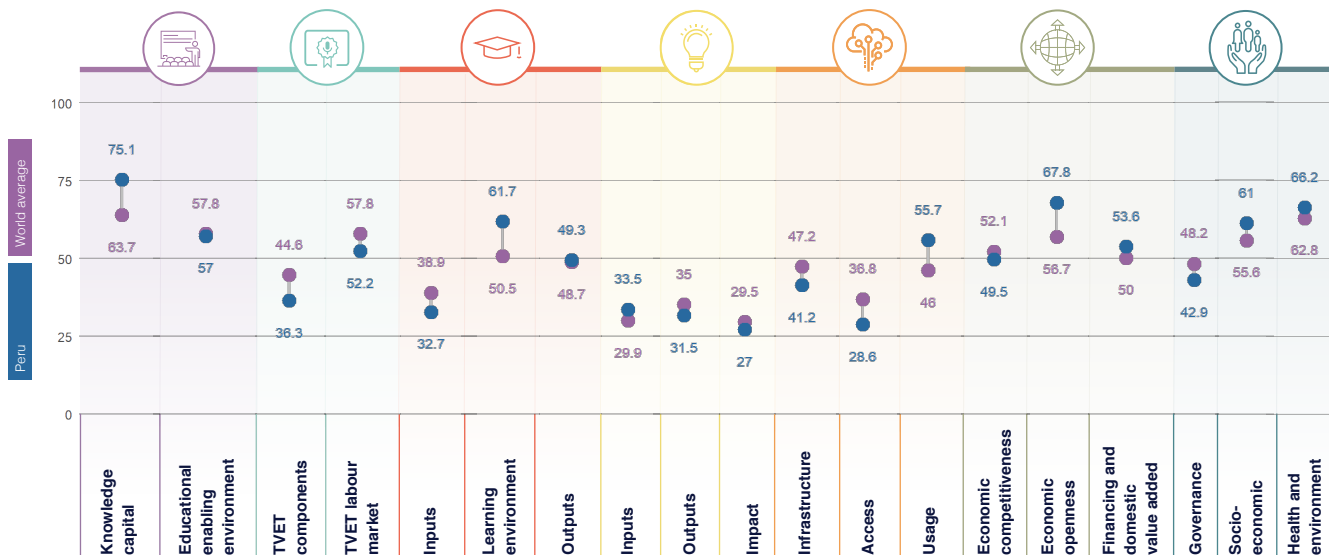
- Share of students enrolled in secondary vocational programmes
- ICT PCT patent applications (per 100 billion GDP)
- Joint ventures per strategic alliance deals (% GDP)
- Extent of staff training
- Natural hazard exposure

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	80	66
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	111	44.2
HIGHER EDUCATION	65	47.9
RESEARCH, DEVELOPMENT AND INNOVATION	74	30.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	79	41.8
ECONOMY	54	57
ENABLING ENVIRONMENT	64	56.7



## GKI PILLARS



	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	75.5
Enrollment	31	30
Net enrolment rate in primary education	87	94.5
Net enrolment rate in lower secondary education	86	97.8
Net enrolment rate in upper secondary education	22	85.8
Completion	17	85.3
Years of compulsory education in primary and secondary	28	88.8
Completion rate in upper secondary education	40	85
Success rate rate in the last grade of lower secondary education	18	83.1
Completion	54	44.1
Assessment of 15-year-old students in math, science and reading	88	27.9
Learning-adjusted years of schooling	86	80.8
<b>Educational enabling environment</b>	<b>88</b>	<b>87</b>
Expenditure	88	20.4
Government expenditure on primary education (% GDP)	78	29.2
Government expenditure on secondary education (% GDP)	82	23.4
Government funding per primary student (% GDP per capita)	87	28
Government funding per secondary student (% GDP per capita)	77	34
Resources	87	76.1
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	85	89.7
Schools with access to computers in secondary education (%)	86	82.8
Early learning	113	49.7
Class attendance rate in early childhood education	71	49.7
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	87	81.8
Completion rate in upper secondary education, gender parity	4	89.8
Completion rate in upper secondary education, wealth parity	35	72.9
Completion rate in upper secondary education, location parity	47	81.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>118</b>	<b>88.3</b>
Companies training apprentices	88	84.1
Firms offering formal training (%)	5	82.8
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	23	46.8
TVET resources	104	11.8
Government expenditure on vocational education (%)	75	0.8
Share of students enrolled in secondary vocational programmes	127	3.2
Share of students enrolled in postsecondary vocational programmes	106	106
TVET quality and infrastructure	88	42.3
Extent of staff training	101	37.6
Quality of vocational training	80	47
Ratio of high-skil TVET occupations earnings to average wage	106	106
Ratio of medium-skill TVET occupations earnings to average wage	106	106
<b>TVET labour market</b>	<b>108</b>	<b>82.3</b>
Efficiency of the labour market	104	81
Firms considered well-integrated educated workforce (%)	80	81
Employment educational mismatch (%)	108	108
Proportion of skilled production workers	88	88
Unemployment rate with vocational education	108	108
Real TVET unemployment	108	81.8
Share of TVET occupations	100	42.9
Manufacturing employment (%)	108	29.8
Quality and infrastructure	88	42.3
Enrollment in vocational education, gender parity	20	84.1
Useable employment rate	113	45.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>88</b>	<b>33.7</b>
Expenditure	88	14.7
Government expenditure per tertiary student	105	9
Teaching staff compensation (% tertiary expenditure)	87	28.8
Enrollment	88	11.8
Enrollment in bachelor's or equivalent level (%)	94	11.7
Enrollment in masters, doctoral or equivalent (%)	84	14.8
Resources	88	88.2
Pupil-teacher ratio in tertiary education	88	88.2
Researchers in higher education (%)	106	106
<b>Learning environment</b>	<b>44</b>	<b>81.7</b>
<b>Quality and academic freedom</b>	<b>20</b>	<b>73.4</b>
Teachers in tertiary education, gender parity	87	88.2
Labour mobility rate	106	106
Academic freedom	13	84.8
<b>Quality and infrastructure</b>	<b>17</b>	<b>83.8</b>
Class attendance rate in tertiary education, gender parity	14	82.8
Class attendance rate in tertiary education, wealth parity	35	37.9
Class attendance rate in tertiary education, location parity	23	21.7
<b>Outputs</b>	<b>88</b>	<b>49.3</b>
Efficiency	20	45
Educational attainment rate, bachelor's or equivalent	106	106
Educational attainment rate, master's or equivalent	27	45
Educational attainment rate, doctoral or equivalent	106	106
Employment	11	81
Labour force participation rate with advanced education	74	71.3
Unemployment rate with advanced education	88	72.8
Impact	88	33.8
University tertiary enrollment in FTE	114	38.8
UNITE indicators per FTE personnel in higher education	106	106
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>88</b>	<b>33.7</b>
Access to FDI resources	88	33.7
GDP (% GDP)	100	2.4
GERD per researcher	106	106
Researchers per thousand labour force	106	106
Tertiary graduates from STEM programmes (%)	21	84.8
<b>Quality and infrastructure</b>	<b>10</b>	<b>81.1</b>
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	18	47.1
<b>Quality and infrastructure</b>	<b>88</b>	<b>25.8</b>
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	88	19.8
State of cluster development	100	45.1
<b>Outputs</b>	<b>88</b>	<b>33.7</b>
Access to FDI resources	88	33.7
Average documents per researcher	106	106
Citations per document	122	12.8
Patent applications (per 100 billion GDP)	88	45.1
<b>Quality and infrastructure</b>	<b>10</b>	<b>81.1</b>
Intellectual property receipts (% total trade)	88	3.8
Research design applications (per 100 billion GDP)	96	7.4
PCT applications (per 100 billion GDP)	73	49.5
Firms producing new goods and services (%)	9	38

	Rank	Value
<b>Consumer Innovation Adoption</b>	91	65.9
Treatment applications (per 100 million GDP)	32	50.2
Cultural goods exports (% exports)	87	30.6
Printing and publishing output (% manufactured output)	95	52.5
<b>Health</b>	99	37
<b>Trade</b>	11	111.1
Access to institutions' provisions	87	12.6
Depth of innovative companies	80	44.1
ISO 9001 quality certificates (% GDP)	87	17.3
ISO 14001 environmental certificates (% GDP)	30	20.0
<b>Language</b>	91	99.9
CERD freedom from abuse (%)	96	116
Joint ventures per strategic industry deals (% GDP)	109	3.4
Computer software spending (% GDP)	49	22.0
<b>Government Services</b>	91	99.9
New business density per thousand population	30	10.0
Firms with web presence (%)	88	30.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>74</b>	<b>41.3</b>
<b>Infrastructure</b>	89	41.3
<b>Coverage</b>	100	11.0
3G/4G mobile network coverage (% population)	100	26.1
Secure Internet servers per 1 million population	82	3.8
Investment in telecommunication services (% GDP)	89	30
<b>Speed</b>	100	101.1
Mobile upload and download speeds	88	20.0
Fixed broadband upload and download speeds	71	6.8
Fixed broadband subscriptions (y speed) per hundred people	88	9.8
<b>Availability</b>	91	91
Fixed broadband latency (% QM per capita)	86	71.0
Mobile broadband basket (% QM per capita)	80	80
Internet and telephone competition	1	100
<b>Access</b>	<b>184</b>	<b>26.8</b>
<b>Subscribers</b>	100	111.1
Active mobile broadband subscriptions per hundred inhabitants	94	26.3
International Internet bandwidth per user	86	34.1
Households with Internet access at home (%)	100	38.0
<b>Skills and employment</b>	89	23.0
Individuals with standard ICT skills (%)	59	20.3
Tertiary graduates from ICT programmes (%)	32	41.0
ICT employment (%)	80	9.8
<b>Usage</b>	<b>47</b>	<b>23.7</b>
<b>Services</b>	99	101.1
Government online services	81	75.0
Fixed broadband internet traffic per subscription	104	19
Mobile broadband internet traffic per subscription	104	104
Internet users (%)	87	83.0
<b>Commerce</b>	90	111.1
ICT/FIT patent applications (per 100,000 GDP)	100	25.3
E-participation	94	36.2
Internet activities by individuals (%)	50	33.0
Trade in digitally deliverable services (% total trade)	80	35.0
<b>ECONOMY</b>	<b>34</b>	<b>37</b>
<b>Economic Competitiveness</b>	81	40.3
<b>Infrastructure Investment</b>	100	101.1
Overhead capital formation (% GDP)	100	41.0
Logistics performance	84	41.3
Transport productive capacity	74	26.2
Building quality control	20	86.7

	Rank	Value
<b>Business Agility</b>	91	44.0
Time of starting a business	114	82.1
Recovery recovery rate	89	34
Entrepreneurial employee activity rate	80	11.8
Growth of corporate transactions	50	21.4
<b>Corporate openness</b>	<b>38</b>	<b>67.3</b>
Trust and dissatisfaction	100	101.1
Trade (% GDP)	103	10.0
High-technology trade (% total trade)	85	42.0
Market concentration	81	88.0
Market concentration	80	87.0
Product diversity	11	81.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	81	44.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	<b>88</b>	<b>20.8</b>
<b>Financing and costs</b>	91	101.1
Domestic credit to private sector (% GDP)	71	20.4
IMRS financing gap (% GDP)	6	82.4
Tax and contribution rate (% profit)	79	70.7
Bank nonperforming loans (%)	87	82.1
Unmet loan demand	91	40.0
Medium- and high-tech activities value added	80	17.5
Industry and services value added (% GDP)	85	83.0
Labour underutilization rate	80	73.0
Output per worker	80	6.8
<b>ENABLING ENVIRONMENT</b>	<b>84</b>	<b>36.7</b>
<b>Governance</b>	<b>82</b>	<b>42.3</b>
Political environment	50	40.0
Peace and stability	87	36.7
View and accountability	80	34.0
Quality of institutions	91	30.1
Rule of law	87	41.0
Control of corruption	100	33.7
Government effectiveness	88	42.3
<b>Socio-economic</b>	<b>83</b>	<b>81</b>
Gender equity	20	76.0
Female-to-male ratio in parliament	22	86.7
Female-to-male labour force participation	86	81.1
Female-to-male ratio in internal wage	84	82
Gender inequality	80	82.1
Social protection coverage (% population)	82	27.0
Adult literacy rate	89	82.0
Youth not in employment, education or training (%)	71	85.3
Standard of living	91	80.0
Poverty headcount ratio (% population)	55	72
GDP per capita	89	8.8
<b>Health and environment</b>	<b>52</b>	<b>68.2</b>
Health	81	86
Universal health coverage	34	77
Healthy life expectancy (years)	22	84.0
Under-five mortality rate	80	80.2
Environmental performance	100	101.1
Renewable energy consumption (%)	80	20.0
Household footprint per capita	81	87.8
Natural hazard exposure	144	30

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# PHILIPPINES

**GKI RANK** 64/154

**GKI SCORE** 49.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Philippines is a moderate performer in terms of its knowledge infrastructure. It ranks 64th out of 154 countries in the Global Knowledge Index 2021 and 7th out of the 39 countries with high human development.

## KEY INDICATORS

**GDP US\$ billions** 871.562  
**Population** 109,581,085  
**HDI** 0.718

## AREAS OF STRENGTH

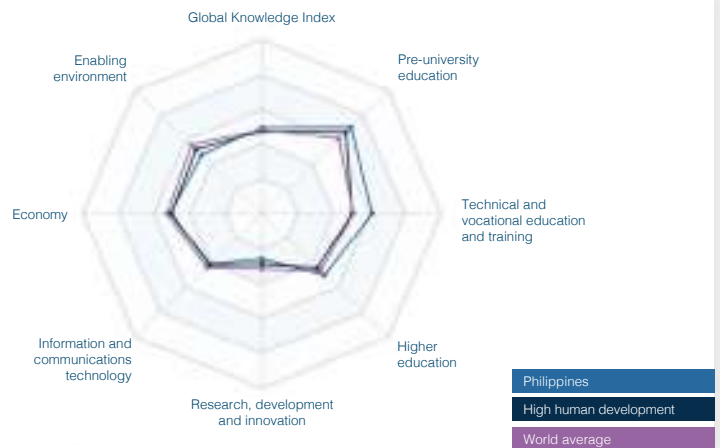
- + High-technology trade (% total trade)
- + Tertiary graduates from ICT programmes (%)
- + Gross enrolment ratio in early childhood education
- + Gross attendance ratio for tertiary education, wealth parity
- + Firms offering formal training (%)

## AREAS OF IMPROVEMENT

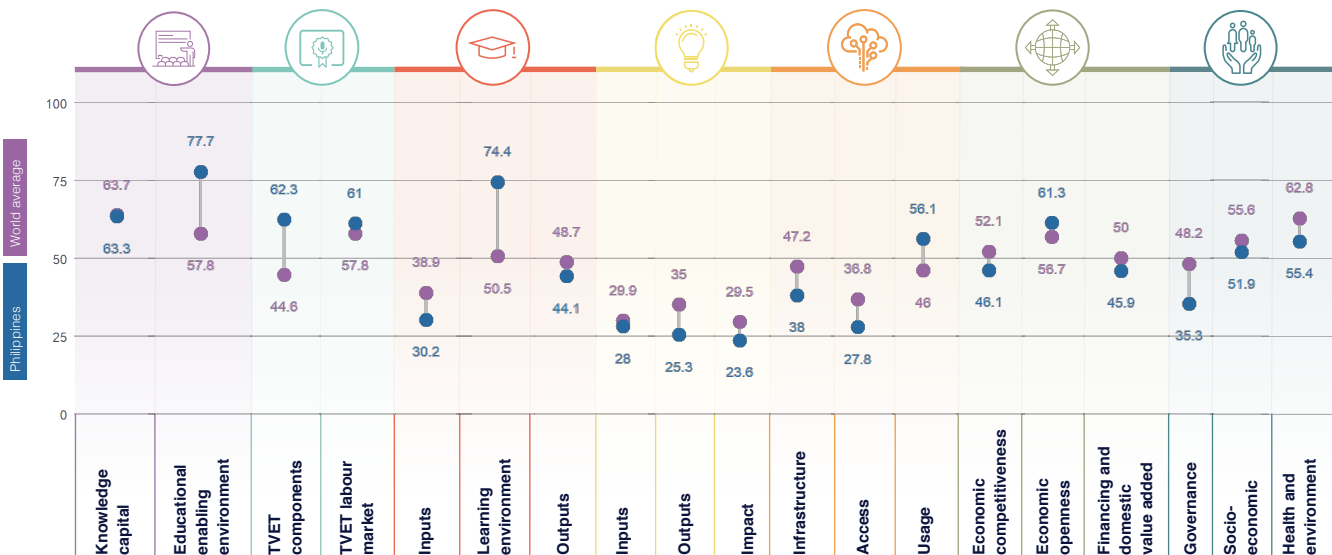
- ICT PCT patent applications (per 100 billion GDP)
- Individuals with standard ICT skills (%)
- Assessment of 15-year-old students in math, science and reading
- MSME financing gap (% GDP)
- Natural hazard exposure

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	60	70.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	35	61.6
HIGHER EDUCATION	52	49.6
RESEARCH, DEVELOPMENT AND INNOVATION	107	25.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	85	40.7
ECONOMY	74	51.1
ENABLING ENVIRONMENT	107	47.6



## GKI PILLARS







# PHILIPPINES

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	89	43.3
Enrollment	79	51.1
Net enrolment rate in primary education	70	80.7
Net enrolment rate in lower secondary education	88	85.5
Net enrolment rate in upper secondary education	75	76.3
Completion	80	77.5
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	80	73.7
Success rate rate in the last grade of lower secondary education	83	80.8
Completion	110	21.1
Assessment of Grade 6 students in math, science and reading	76	6.4
Learning-adjusted years of schooling	87	49.5
<b>Educational enabling environment</b>		
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	61	31.5
Full-time teacher ratio in primary education	80	80.5
Full-time teacher ratio in secondary education	81	80.8
Schools with access to computers in primary education (%)	52	70
Schools with access to computers in secondary education (%)	85	83.1
Early learning	22	31
Class attendance rate in early childhood education	9	83.8
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Full-time teacher ratio in preprimary education	59	74.2
Quality and infrastructure	81	75.2
Completion rate in upper secondary education, gender parity	72	80.6
Completion rate in upper secondary education, wealth parity	57	50.7
Completion rate in upper secondary education, location parity	57	89.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	11	74.5
Firms offering formal training (%)	9	76.9
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	22	11.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	75	15.2
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	22	54.5
Extent of staff training	88	81.7
Quality of vocational training	27	82.4
Ratio of high-skill TVET occupations earnings to average wage	32	40.2
Ratio of medium-skill TVET occupations earnings to average wage	40	46.0
<b>TVET labour market</b>		
Efficiency of the labour market	89	75.4
Firms considered with inappropriately educated workforce (%)	25	82.7
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	23	32.0
Unemployment rate with vocational education	116	116
Real TVET unemployment	105	81.6
Share of TVET occupations	115	35.1
Manufacturing employment (%)	88	25.4
Quality and infrastructure	71	71.0
Enrollment in vocational education, gender parity	43	80.6
Useable employment rate	80	64.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	71	112.5
Enrollment in bachelor's or equivalent level (%)	67	25.8
Enrollment in masters, doctoral or equivalent (%)	77	11.1
Resources	101	43.1
Right teacher ratio in tertiary education	88	58.2
Researcher in higher education (%)	85	28
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	88	82.3
Labour mobility rate	116	116
Academic freedom	81	72.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	27	89.0
Class attendance rate in tertiary education, wealth parity	5	80.7
Class attendance rate in tertiary education, location parity	13	28.9
<b>Outputs</b>		
Attainment	58	12.0
Educational attainment rate, bachelor's or equivalent	81	43.2
Educational attainment rate, master's or equivalent	88	±
Educational attainment rate, doctoral or equivalent	85	5.8
Employment	88	67.2
Labour force participation rate with advanced education	108	55.5
Unemployment rate with advanced education	77	38.0
Impact	88	41.0
University tertiary enrollment in R&D	88	87.5
OMER documents per 100 personnel in higher education	71	25.5
<b>Government's contribution to innovation and research</b>		
<b>Inputs</b>		
Share of R&D expenditure	81	10.1
GDP (% GDP)	87	3
GERD per researcher	81	21.3
Researchers per thousand labour force	87	1.4
Tertiary graduates from STEM programmes (%)	27	53.1
<b>Quality of research environment</b>		
GERD performed by business enterprises (%)	86	1.8
GERD financed by business enterprises (%)	47	41
Researchers in business enterprises (%)	18	65.1
Firms that spend on R&D (%)	27	44.0
Quality of research environment	16	100
High-skilled employment (%)	33	33.0
Intellectual property payments (% total trade)	78	14.5
State of cluster development	81	48.1
<b>Outputs</b>		
<b>Government's contribution to innovation and research</b>		
Average documents per researcher	88	43.5
Citations per document	102	13.8
Patent applications (per 100 billion GDP)	75	45.2
<b>Government's contribution to innovation and research</b>		
Intellectual property receipts (% total trade)	81	8
Research design applications (per 100 billion GDP)	73	4.8
PCT applications (per 100 billion GDP)	88	35.0
Firms producing new goods and services (%)	72	41.4



# PHILIPPINES

	Rank	Value
<b>Consumer Electronics</b>	100	10.0
Treatment applications per 100 million GDP	80	24.0
Cultural goods exports (% exports)	78	9.8
Printing and publishing output (% manufactured output)	83	0.8
<b>Energy</b>	100	10.0
<b>Finance</b>	75	10.1
Access to investors' protection	70	12.1
Depth of innovative companies	20	85.0
ISO 9001 quality certificates (% GDP)	70	16.4
ISO 14001 environmental certificates (% GDP)	80	10.0
<b>Logistics</b>	80	10.0
CERD freedom from abuse (%)	80	5.4
Cost volume per storage volume deals (% GDP)	88	15.0
Computer software spending (% GDP)	88	2.1
<b>Government Services</b>	100	10.0
New business density per thousand population	117	1.3
Firms with new products/services (%)	78	81.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>85</b>	<b>50.7</b>
<b>Infrastructure</b>	104	38
<b>Coverage</b>	80	40.0
30MHz mobile network coverage (% population)	24	84.7
Secure Internet servers per 1 million population	100	1.8
Investment in telecommunication services (% GDP)	83	22.0
<b>Quality</b>	80	39
Mobile speed and download speeds	88	5.4
Fixed broadband upload and download speeds	83	11.4
Fixed broadband subscriptions (y-over) per hundred people	106	10
<b>Availability</b>	100	10.0
Fixed broadband latency (% QM per user)	108	81.0
Mobile broadband basket (% QM per capita)	78	81
Internet and telephony competition	112	87.0
<b>Access</b>	104	27.0
<b>Subscribers</b>	110	25.0
Active mobile broadband subscriptions per fixed-line inhabitants	82	20.0
International Internet bandwidth per user	108	22.7
Households with Internet access at home (%)	107	17.0
<b>Skills and employment</b>	80	10.1
Individuals with standard ICT skills (%)	82	1.3
Tertiary graduates from ICT programmes (%)	4	89.0
ICT employment (%)	82	0.7
<b>Usage</b>	44	50.1
<b>Services</b>	80	50.0
Government online services	89	72.0
Fixed broadband Internet traffic per subscription	106	19
Mobile broadband Internet traffic per subscription	106	19
Internet users (%)	106	44
<b>Commerce</b>	80	10.0
ICT/FIT patent applications (per 100,000 GDP)	108	10.0
E-participation	80	70
Internet activities by individuals (%)	106	19
Trade in digitally deliverable services (% total trade)	90	87.0
<b>ECONOMY</b>	<b>74</b>	<b>81.1</b>
<b>Economic Competitiveness</b>	100	46.1
<b>Efficiency</b>	11	41.0
Overhead capital formation (% GDP)	80	45.0
Logistics performance	60	41.0
Transport productive capacity	114	10.0
Building quality control	20	80.7

	Rank	Value
<b>Business agility</b>	100	40.0
Cost of starting a business	143	21.0
Recovery recovery rate	118	22.0
Entrepreneurial employee activity rate	45	10.0
Growth of corporate transactions	79	57.1
<b>Customer experience</b>	88	81.0
Trust and dissatisfaction	30	67.1
<b>Tax</b>	86	22.4
Trade (% GDP)	3	88.1
High-technology trade (% total trade)	3	88.1
Market concentration	89	87.7
Market concentration	77	80.4
Product diversity	10	91.0
Climate financial openness	78	48.0
Foreign direct investment, net inflows (% GDP)	87	47.7
Cost dynamics	41	80
<b>Financing and domestic value added</b>	88	40.0
<b>Financing and costs</b>	101	42.0
Domestic credit to private sector (% GDP)	77	10.1
MSME financing gap (% GDP)	100	8
Tax and contribution rate (% profit)	102	84.0
Bank nonperforming loans (%)	87	83.7
Unmet loan demand	11	40.0
Medium- and high-tech activities value added	18	55.4
Industry and services value added (% GDP)	25	80.0
Labour underutilization rate	80	84.0
Output per worker	100	0.4
<b>ENABLING ENVIRONMENT</b>	<b>107</b>	<b>47.8</b>
<b>Governance</b>	108	35.0
Political environment	107	30
Peace and stability	102	10.0
Value and accountability	88	41.1
Quality of institutions	85	40.7
Rule of law	100	21.7
Control of corruption	80	34.1
Government effectiveness	84	38.3
<b>Socio-economic</b>	89	21.0
Gender equity	100	48.0
Female-to-male ratio in parliament	80	38.0
Female-to-male labour force participation	100	81
Female-to-male ratio in internal wage	100	100
Gender inequality	10	81.1
Social protection coverage (% population)	80	34.0
Adult literacy rate	41	80.0
Youth not in employment, education or training (%)	87	62.1
Standard of living	88	21.0
Poverty headcount ratio (% population)	40	37
GDP per capita	102	6.8
<b>Health and environment</b>	134	55.4
<b>Health</b>	100	80.0
Universal health coverage	100	81
Healthy life expectancy (years)	100	80.0
Under-five mortality rate	100	70
Environmental performance	107	41.7
Renewable energy consumption (%)	70	24.1
Household footprint per capita	81	80
Natural hazard exposure	100	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# POLAND

**GKI RANK** 33/154

**GKI SCORE** 59.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Poland is a strong performer in terms of its knowledge infrastructure. It ranks 33rd out of 154 countries in the Global Knowledge Index 2021 and 33rd out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Pupil-trained teacher ratio in primary education
- + Product concentration
- + Active mobile-broadband subscriptions per hundred inhabitants
- + Mobile broadband basket (% GNI per capita)
- + Educational attainment rate, master's or equivalent

### AREAS OF IMPROVEMENT

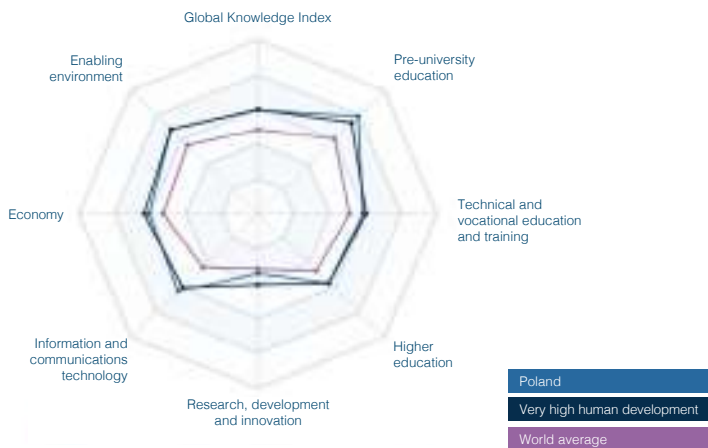
- Quality of vocational training
- Gross fixed capital formation (% GDP)
- Ratio of high-skill TVET occupations earnings to average wage
- Labour force with short-cycle tertiary education (%)
- Firms that spend on R&D (%)

### KEY INDICATORS

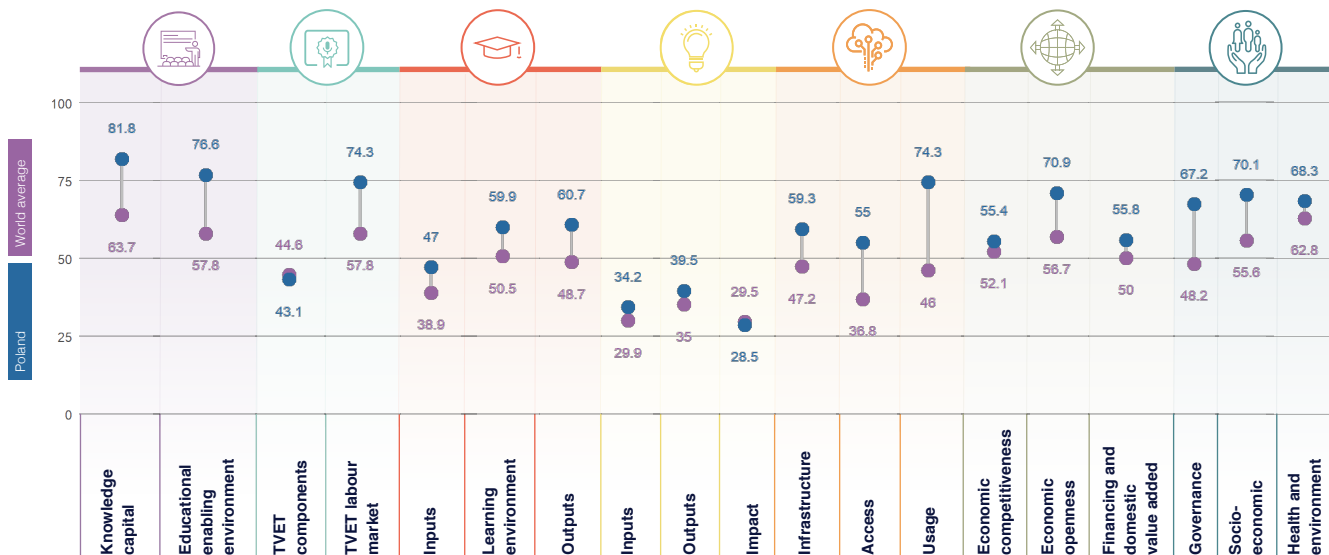
**GDP US\$ billions** 1,223.464  
**Population** 37,846,605  
**HDI** 0.88

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	16	79.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	42	58.7
HIGHER EDUCATION	33	55.9
RESEARCH, DEVELOPMENT AND INNOVATION	54	34
INFORMATION AND COMMUNICATIONS TECHNOLOGY	19	62.9
ECONOMY	45	60.7
ENABLING ENVIRONMENT	29	68.5



## GKI PILLARS





# POLAND

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	21	81.8
Enrolment	80	81.1
Net enrolment rate in primary education	104	72.2
Net enrolment rate in lower secondary education	79	86.6
Net enrolment rate in upper secondary education	36	81.7
Completion	39	81.7
Years of compulsory education in primary and secondary	67	83.9
Completion rate in upper secondary education	33	89
Success rate rate in the last grade of lower secondary education	15	86.8
Completion	9	70.7
Assessment of 15-year-old students in math, science and reading	8	79
Learning-adjusted years of schooling	12	86.4
<b>Educational enabling environment</b>	<b>18</b>	<b>78.8</b>
Enrolment	37	54.9
Government expenditure on primary education (% GDP)	89	22.6
Government expenditure on secondary education (% GDP)	75	24.7
Government funding per primary student (% GDP per capita)	37	49.1
Government funding per secondary student (% GDP per capita)	52	33
Resources	61	80.6
Pupil-based teacher ratio in primary education	2	89.4
Pupil-based teacher ratio in secondary education	6	88.8
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	33	83
Class attendance rate in early childhood education	20	88.6
Proportion of children who are developmentally on track	104	106
Proportion of children with stimulating home learning environments	104	106
Pupil-based teacher ratio in preprimary education	24	81.4
Quality and infrastructure	37	81.3
Completion rate in upper secondary education, gender parity	31	85.9
Completion rate in upper secondary education, wealth parity	19	84.6
Completion rate in upper secondary education, location parity	23	86.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>84</b>	<b>45.1</b>
Companies training apprentices	113	51.4
Firms offering formal training (%)	66	23.6
Labour force with short-cycle tertiary education (%)	87	25.2
Participation rate in formal and non-formal education and training	36	24.4
TVET enrolment	100	19.1
Government expenditure on vocational education (%)	20	47.7
Share of students enrolled in secondary vocational programmes	27	44.6
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	108	32.7
Extent of staff training	70	49.7
Quality of vocational training	106	42.9
Ratio of high-skil TVET occupations earnings to average wage	100	15.1
Ratio of medium-skil TVET occupations earnings to average wage	81	35.7
<b>TVET labour market</b>	<b>84</b>	<b>14.3</b>
Efficiency of the labour market	100	31
Firms considered with inappropriately educated workforce (%)	81	52.6
Employment educational mismatch (%)	12	80.2
Proportion of skilled production workers	82	84.6
Unemployment rate with vocational education	63	76.5
Real TVET unemployment	9	72.2
Share of TVET occupations	94	74.9
Manufacturing employment (%)	9	79.2
Quality and infrastructure	17	61.6
Enrolment in vocational education, gender parity	63	75.4
Useable employment rate	43	63.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>43</b>	<b>47</b>
Enrolment	66	39.9
Government expenditure per tertiary student	31	20.0
Teaching staff compensation (% tertiary expenditure)	104	104
Enrolment	100	49.6
Breadth of bachelor's or equivalent level (%)	27	36.4
Enrolment in masters, doctoral or equivalent (%)	21	62.5
Resources	79	83.7
Rp/teacher ratio in tertiary education	24	73
Researchers in higher education (%)	51	48.5
<b>Learning environment</b>	<b>49</b>	<b>52.8</b>
<b>Quality and academic freedom</b>	<b>100</b>	<b>100.0</b>
Teachers in tertiary education, gender parity	49	74.0
Labour mobility rate	63	13.6
Academic freedom	100	88.0
<b>Quality and infrastructure</b>	<b>104</b>	<b>104</b>
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>	<b>32</b>	<b>63.7</b>
<b>Attainment</b>	<b>71</b>	<b>62.3</b>
Educational attainment rate, bachelor's or equivalent	23	72.0
Educational attainment rate, master's or equivalent	3	88
Educational attainment rate, doctoral or equivalent	55	31.1
<b>Employment</b>	<b>100</b>	<b>61.6</b>
Labour force participation rate with advanced education	58	78.5
Unemployment rate with advanced education	6	86.8
<b>Impact</b>	<b>107</b>	<b>31.0</b>
University tertiary enrollment in R&D	86	37.2
OECD indicators per 1000 personnel in higher education	88	26.5
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>41</b>	<b>24.2</b>
Access to credit resources	100	31.2
GDP (% GDP)	36	24.3
GERD per researcher	63	29.6
Researchers per thousand labour force	26	41.3
Tertiary graduates from STEM programmes (%)	68	34.4
<b>Quality and infrastructure</b>	<b>100</b>	<b>100.0</b>
GERD performed by business enterprises (%)	28	33
GERD financed by business enterprises (%)	21	60
Researchers in business enterprises (%)	25	88.0
Firms that spend on R&D (%)	111	3
<b>Quality and infrastructure</b>	<b>100</b>	<b>100.0</b>
High-skilled employment (%)	104	104
Intellectual property payments (% total trade)	37	27.0
State of cluster development	88	46.0
<b>Outputs</b>	<b>56</b>	<b>19.8</b>
Access to credit resources	100	61.1
Average documents per researcher	89	83.4
Citations per document	80	18.0
Patent applications (per 100 billion GDP)	22	66.1
<b>Quality and infrastructure</b>	<b>100</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	31	21.7
Research design applications (per 100 billion GDP)	22	33.4
PCT applications (per 100 billion GDP)	47	65.1
Firms producing new goods and services (%)	86	23.7



# POLAND

	Rank	Value		Rank	Value
<b>Consumer Electronics</b>			<b>Business agility</b>		
Treatment applications per 100 million GDP	84	24.0	Ease of starting a business	111	82.0
Cultural goods exports (% exports)	36	36.8	Recovery recovery rate	34	85.1
Printing and publishing output (% manufactured output)	40	29.8	Entrepreneurial employee activity rate	84	70.7
<b>Energy</b>	19	76.3	Growth of corporate transactions	13	85.7
<b>Finance</b>	11	81.0	<b>Employee openness</b>	28	70.0
Access to venture capital	98	50.1	Trust and dissatisfaction	17	71.0
Depth of innovative companies	81	48.5	Taxs (% GDP)	34	43.0
ISO 9001 quality certificates (% GDP)	35	33.0	High-technology trade (% total trade)	34	57.8
ISO 14001 environmental certificates (% GDP)	42	19.2	Market concentration	8	85.7
<b>Industry</b>	19	77.0	Market concentration	30	81
CERD forecast from abroad (%)	60	11.5	Product ownership	41	70.2
Cost savings per strategic alliance deals (% GDP)	71	8.8	Private financial openness	62	70
Computer software spending (% GDP)	58	20.0	Foreign direct investment, net inflows (% GDP)	81	40.7
<b>Government efficiency</b>	106	60.0	Cost dynamics	1	100
New business density per thousand population	77	7.1	<b>Financing and domestic value added</b>	81	52.3
Firms with new products/services (%)	84	69.6	Financing and costs	14	76.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	19	62.3	Domestic credit to private sector (% GDP)	75	18.5
<b>Infrastructure</b>	44	66.3	IMR financing gap (% GDP)	81	57.2
<b>Connectivity</b>	46	60.0	Tax and contribution rate (% profit)	84	69.6
30MHz mobile network coverage (% population)	1	100	Bank nonperforming loans (%)	60	85
Secure Internet servers per 1 million population	27	30	Unmet needs index	10	84.0
Investment in telecommunication services (% GDP)	104	22.9	Medium- and high-tech activities value added	49	55.7
<b>Quality</b>	50	32	Industry and services value added (% GDP)	52	84.5
Mobile speed and download speeds	41	26.0	Labour underutilization rate	13	87.4
Fixed-broadband upload and download speeds	35	30.3	Output per worker	30	80.0
Fixed-broadband subscriptions (by speed) per hundred people	58	34.4	<b>ENABLING ENVIRONMENT</b>	29	66.5
<b>Accessibility</b>	4	94.1	<b>Governance</b>	44	67.2
Fixed broadband bandwidth (% GIG per capita)	39	66.3	Political environment	43	64.0
Mobile broadband basket (% GIG per capita)	2	97	Peace and stability	42	63.0
Internet and telephony competition	1	100	View and accountability	49	66.7
<b>Access</b>	24	88	Quality of institutions	45	65.0
<b>5G readiness</b>	11	85.1	Rule of law	44	66.0
Active mobile-broadband subscriptions per hundred inhabitants	9	87.0	Control of corruption	36	73.1
International Internet bandwidth per user	112	26.0	Government effectiveness	51	68.3
Households with Internet access at home (%)	31	80.0	<b>Socio-economic</b>	29	70.1
<b>Skills and employment</b>	41	60.0	Gender equity	58	63.0
Individuals with standard ICT skills (%)	33	46.3	Female-to-male ratio in parliament	59	39.5
Tertiary graduates from ICT programmes (%)	62	27.0	Female-to-male labour force participation	88	31.3
ICT employment (%)	23	45.8	Female-to-male ratio in internal wage	34	80.7
<b>Usage</b>	9	74.3	Government access	41	63.0
<b>Services</b>	5	88	Social protection coverage (% population)	34	84.5
Government online services	22	85.0	Adult literacy rate	106	100
Fixed broadband internet traffic per subscription	104	19	Youth not in employment, education or training (%)	22	87.0
Mobile broadband internet traffic per subscription	106	100	Standard of living	41	83.0
Internet users (%)	34	84.1	Poverty headcount ratio (% population)	37	75.0
<b>Commerce</b>	57	52.1	GDP per capita	37	28.8
ICT/FIT patent applications (per 100,000 GDP)	79	34.1	<b>Health and environment</b>	14	68.3
E-participation	9	80.4	Health	31	83.0
Internet activities by individuals (%)	35	84.8	Universal health coverage	53	75
Trade in digitally deliverable services (% total trade)	45	51.4	Healthy life expectancy (years)	38	81.8
<b>ECONOMY</b>	41	60.7	Under-five mortality rate	31	87.0
<b>Economic complexity index</b>	88	55.4	Government performance	88	61.7
Manufacture innovation	61	41.4	Renewable energy consumption (%)	100	11.7
Overhead capital formation (% GDP)	123	15.4	Household budget per capita	119	66.3
Logistics performance	25	63.5	Natural hazard exposure	30	77
Transport productive capacity	17	32.1			
Building quality control	60	66.7			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 27/154

**GKI SCORE** 61.8

**WORLD AVERAGE** 48.4

# PORTUGAL

## COUNTRY PERFORMANCE SUMMARY

Portugal is a leading performer in terms of its knowledge infrastructure. It ranks 27th out of 154 countries in the Global Knowledge Index 2021 and 27th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 331.612  
**Population** 10,196,707  
**HDI** 0.864

### AREAS OF STRENGTH

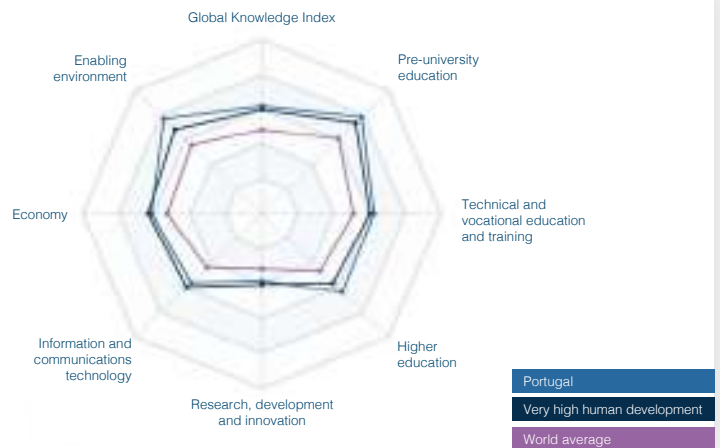
- + Net enrolment rate in upper secondary education
- + Product concentration
- + Enrolment in master's, doctoral or equivalent (%)
- + Computer software spending (% GDP)
- + Fixed-broadband subscriptions by speed per hundred people

### AREAS OF IMPROVEMENT

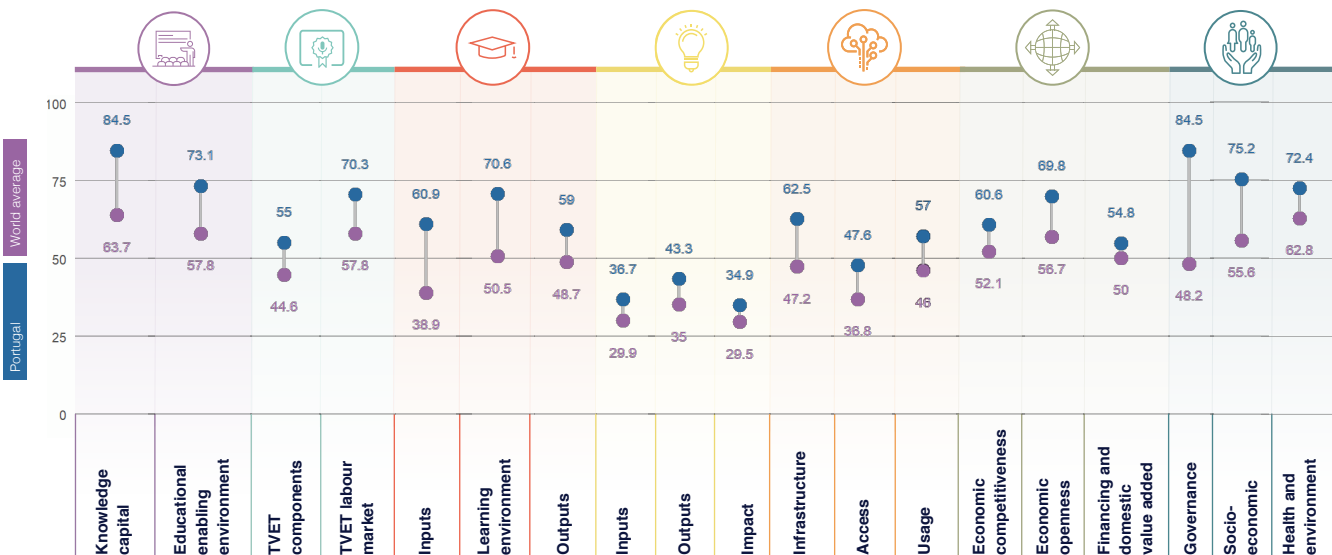
- Unemployment rate with vocational education
- Firms producing new goods and services (%)
- Tertiary graduates from ICT programmes (%)
- Firms that spend on R&D (%)
- Firms with new product/service (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	18	78.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	31	62.7
HIGHER EDUCATION	18	63.5
RESEARCH, DEVELOPMENT AND INNOVATION	35	38.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	41	55.7
ECONOMY	41	61.7
ENABLING ENVIRONMENT	14	77.4



## GKI PILLARS





# PORTUGAL

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	29	64.3
Enrollment	3	82.5
Net enrolment rate in primary education	20	80.0
Net enrolment rate in lower secondary education	9	89.6
Net enrolment rate in upper secondary education	2	89.0
Completion	10	70
Years of compulsory education in primary and secondary	9	82.5
Completion rate in upper secondary education	60	67.3
Success rate rate in the last grade of lower secondary education	28	77.3
Completion	22	75.1
Assessment of 15-year-old students in math, science and reading	29	64.5
Learning-adjusted years of schooling	16	85.8
<b>Educational spending environment</b>		
Expenditure	27	44
Government expenditure on primary education (% GDP)	20	30
Government expenditure on secondary education (% GDP)	28	41.2
Government funding per primary student (% GDP per capita)	15	36
Government funding per secondary student (% GDP per capita)	95	47.1
Resources	1	100
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
<b>Early learning</b>		
Class attendance rate in early childhood education	116	116
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
<b>Quality and inclusiveness</b>		
Completion rate in upper secondary education, gender parity	80	70
Completion rate in upper secondary education, wealth parity	55	45.5
Completion rate in upper secondary education, location parity	19	64.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Companies training apprentices	35	51.5
Firms offering formal training (%)	69	35.1
Labour force with short-cycle tertiary education (%)	60	69.5
Participation rate in formal and non-formal education and training	22	60.4
<b>TVET resources</b>		
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	33	37.2
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and inclusiveness</b>		
Extent of staff training	62	60.6
Quality of vocational training	51	55.5
Ratio of high-skill TVET occupations earnings to average wage	80	29.6
Ratio of medium-skill TVET occupations earnings to average wage	67	36.7
<b>TVET labour market</b>		
Efficiency of the labour market	46	51.7
Firms considered with inequality educated workforce (%)	21	61.7
Employment educational mismatch (%)	34	75.5
Proportion of skilled production workers	80	61.5
Unemployment rate with vocational education	60	63.0
Real TVET unemployment	21	51.7
Share of TVET occupations	36	66.1
Manufacturing employment (%)	29	66.4
<b>Quality and inclusiveness</b>		
Enrollment in vocational education, gender parity	65	67.7
Useable employment rate	40	67.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	11	49.1
Government expenditure per tertiary student	29	26.1
Teaching staff compensation (% tertiary expenditure)	7	73.1
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	49	29
Enrollment in masters, doctoral or equivalent (%)	9	64.2
<b>Resources</b>		
Rapit teacher ratio in tertiary education	20	67.9
Research staff in higher education (%)	37	62
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	26	62.0
Labour mobility rate	25	34.2
Academic freedom	92	65.5
<b>Quality and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	66	116
<b>Outputs</b>		
Retention	38	38
Educational attainment rate, bachelor's or equivalent	37	66.1
Educational attainment rate, master's or equivalent	11	61.4
Educational attainment rate, doctoral or equivalent	27	36.5
<b>Employment</b>		
Labour force participation rate with advanced education	25	61.9
Unemployment rate with advanced education	61	63.1
<b>Impact</b>		
University tertiary collaboration in R&D	32	65.0
OECD indicators per 100 personnel in higher education	60	32.2
<b>Government's contribution and performance</b>		
<b>Inputs</b>		
Share of GDP expenditure	37	35.1
GDP (% GDP)	28	27.1
OEFD per researcher	72	18.5
Researchers per thousand labour force	21	57.1
Tertiary graduates from STEM programmes (%)	32	61.7
<b>Quality and inclusiveness</b>		
OEFD performed by business enterprises (%)	39	18.0
OEFD financed by business enterprises (%)	33	57.5
Researchers in business enterprises (%)	35	41.4
Firms that spend on R&D (%)	60	6.6
<b>Quality and inclusiveness</b>		
High-skill employment (%)	66	116
Intellectual property payments (% total trade)	43	24.0
State of cluster development	35	54.0
<b>Outputs</b>		
<b>Quality and inclusiveness</b>		
Average documents per researcher	58	55.1
Citations per document	38	25.0
Patent applications (per 100 billion GDP)	28	63.4
<b>Quality and inclusiveness</b>		
Intellectual property receipts (% total trade)	47	15.4
Research design applications (per 100 billion GDP)	14	49
PCT applications (per 100 billion GDP)	32	71.5
Firms producing new goods and services (%)	105	17.0





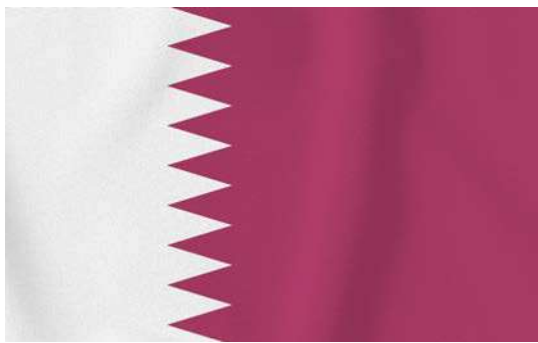
# PORTUGAL

	Rank	Value
<b>Consumer electronics</b>	95	97.9
Treatment applications per 100 million GDP	73	73.2
Cultural goods exports (% exports)	81	13.4
Printing and publishing output (% manufactured output)	49	26.2
<b>Energy</b>	35	59.9
<b>Finance</b>	35	47.2
Risks of institutions' insolvency	29	33.6
Depth of innovative companies	41	56.4
ISO 9001 quality certificates (% GDP)	22	58.4
ISO 14001 environmental certificates (% GDP)	30	25
<b>Industry</b>	95	97.9
CERD forecast from abroad (%)	95	13.0
Joint ventures per strategic alliance deals (% GDP)	86	5.8
Computer software spending (% GDP)	1	45.1
<b>International trade</b>	75	97.9
New business density per thousand population	23	32.2
Firms with new products/services (%)	112	49
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>41</b>	<b>55.7</b>
<b>Infrastructure</b>	86	60.8
<b>Coverage</b>	59	44.2
3G/4G mobile network coverage (% population)	17	80.0
Secure Internet servers per 1 million population	32	25.1
Investment in telecommunication services (% GDP)	112	19.0
<b>Quality</b>	29	54
Mobile upload and download speeds	20	35.4
Fixed broadband upload and download speeds	18	37.0
Fixed broadband subscriptions (by speed) per hundred people	10	80
<b>Accessibility</b>	44	54.1
Fixed broadband latency (% QM per capita)	49	53.1
Mobile broadband basket (% QM per capita)	22	69.2
Internet and telephony competition	1	100
<b>Access</b>	66	47.8
<b>Subscriptions</b>	77	32.1
Active mobile-broadband subscriptions per fixed-line inhabitants	79	34.4
International Internet bandwidth per user	45	45.4
Households with Internet access at home (%)	46	64.6
<b>Skills and employment</b>	77	41.1
Individuals with standard ICT skills (%)	25	53.2
Tertiary graduates from ICT programmes (%)	100	16.4
ICT employment (%)	25	56.7
<b>Usage</b>	29	37
<b>Services</b>	54	50.6
Government online services	34	63.0
Fixed broadband Internet traffic per subscription	25	30
Mobile broadband Internet traffic per subscription	81	15.1
Internet users (%)	59	77.1
<b>Commerce</b>	95	61.1
ICT/FIT patent applications (per 100,000 GDP)	34	54.7
E-participation	40	63.1
Internet activities by individuals (%)	25	71
Trade in digitally deliverable services (% total trade)	71	40.4
<b>ECONOMY</b>	<b>41</b>	<b>91.7</b>
<b>Economic competitiveness</b>	41	60.8
<b>Investment in innovation</b>	71	32.1
Overhead capital formation (% GDP)	100	40.2
Logistics performance	21	86.1
Transport productive capacity	89	23.2
Building quality control	75	73.2

	Rank	Value
<b>Business agility</b>	20	20.1
Ease of starting a business	97	80.0
Recovery recovery rate	35	30.4
Entrepreneurial employee activity rate	37	34.8
Growth of corporate transactions	13	65.7
<b>Corporate openness</b>	32	60.8
<b>Trade and investment</b>	20	40.0
Trade (% GDP)	67	30.4
High-technology trade (% total trade)	40	52.4
Market concentration	6	92.8
Market concentration	59	61.0
Product diversity	79	22.0
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	35	45.0
Cost dynamics	60	70
<b>Financing and domestic value added</b>	23	54.5
<b>Financing and costs</b>	20	61.0
Domestic credit to private sector (% GDP)	29	38
MSME financing gap (% GDP)	104	17.8
Tax and contribution rate (% profit)	81	87.7
Bank nonperforming loans (%)	75	80
Unsecured loans volume	91	47.7
Medium- and high-tech activities value added	81	29.8
Industry and services value added (% GDP)	60	63.0
Labour underutilization rate	79	67.8
Output per worker	37	25.0
<b>ENABLING ENVIRONMENT</b>	<b>14</b>	<b>77.4</b>
<b>Governance</b>	17	54.5
<b>Political environment</b>	11	87.0
Peace and stability	12	85.0
View and accountability	10	89.0
Quality of institutions	26	81.1
Rule of law	22	85.1
Control of corruption	34	75.0
Government effectiveness	23	81.3
<b>Socio-economic</b>	18	75.2
<b>Gender equity</b>	17	82.2
Female-to-male ratio in parliament	22	86.7
Female-to-male labour force participation	44	83.0
Female-to-male ratio in internal wage	62	80.4
Gender inequality	22	81
Social protection coverage (% population)	27	80.0
Adult literacy rate	48	96
Youth not in employment, education or training (%)	23	85.1
<b>Standard of living</b>	30	82.0
Poverty headcount ratio (% population)	44	76.2
GDP per capita	28	28.7
<b>Health and environment</b>	11	72.4
<b>Health</b>	19	80
Universal health coverage	17	82
Healthy life expectancy (years)	21	80.0
Under-five mortality rate	34	80.2
<b>Environmental performance</b>	10	83.0
Renewable energy consumption (%)	67	23.0
Household footprint per capita	110	88.8
Natural hazard exposure	45	67

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# QATAR

**GKI RANK** 38/154

**GKI SCORE** 58.7

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Qatar is a strong performer in terms of its knowledge infrastructure. It ranks 38th out of 154 countries in the Global Knowledge Index 2021 and 37th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Unemployment rate with vocational education
- + Share of TVET occupations
- + Vulnerable employment rate
- + Internet users (%)
- + Industry and services value added (% GDP)

### AREAS OF IMPROVEMENT

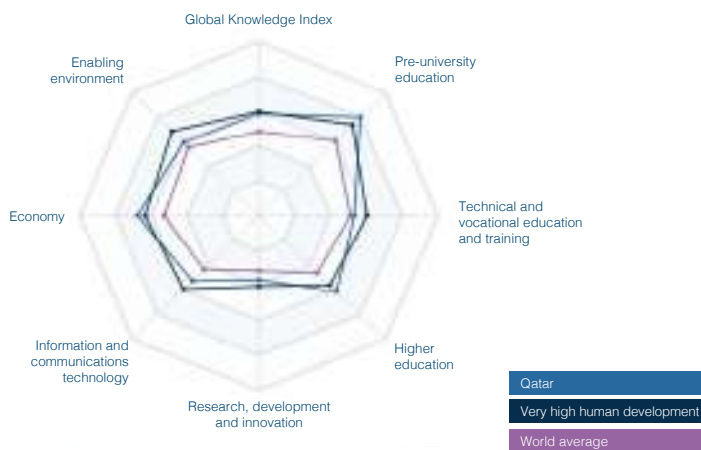
- Intellectual property payments (% total trade)
- Intellectual property receipts (% total trade)
- Cultural goods exports (% exports)
- Renewable energy consumption (%)
- Ecological footprint per capita

### KEY INDICATORS

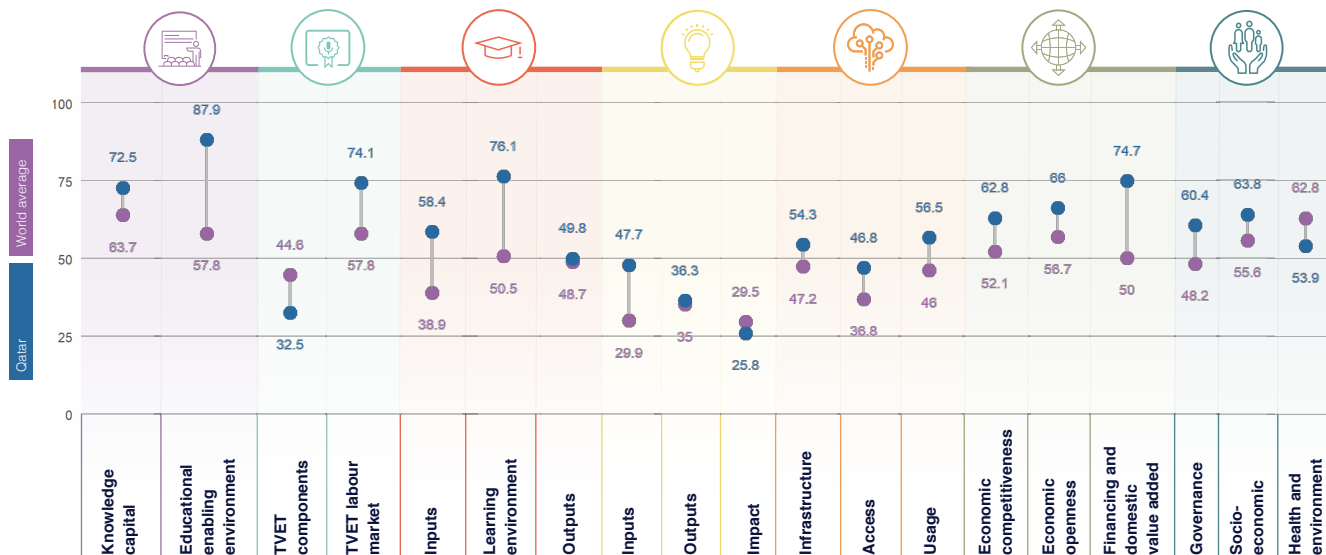
**GDP** US\$ billions ..... 245.657  
**Population** ..... 2,881,060  
**HDI** ..... 0.848

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	14	80.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	70	53.3
HIGHER EDUCATION	20	61.4
RESEARCH, DEVELOPMENT AND INNOVATION	41	36.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	51	52.5
ECONOMY	20	67.8
ENABLING ENVIRONMENT	55	59.4



## GKI PILLARS



	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	73.8
Enrollment	107	82.5
Net enrolment rate in primary education	82	94.4
Net enrolment rate in lower secondary education	71	90.3
Net enrolment rate in upper secondary education	106	106
Completion	117	77.0
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	30	87.1
Grade repeat rate in the last grade of lower secondary education	28	77.0
Completion	75	47.0
Assessment of 15-year-old students in math, science and reading	109	32.4
Learning-adjusted years of schooling	80	82
<b>Educational enabling environment</b>	<b>3</b>	<b>87.9</b>
Enrollment	106	106
Government expenditure on primary education (% GDP)	106	106
Government expenditure on secondary education (% GDP)	106	106
Government funding per primary student (% GDP per capita)	106	106
Government funding per secondary student (% GDP per capita)	106	106
Resources	21	87.3
Pupil-based teacher ratio in primary education	12	85.0
Pupil-based teacher ratio in secondary education	17	89.3
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	33	71.0
Class attendance rate in early childhood education	60	37
Proportion of children who are developmentally on track	69	36.0
Proportion of children with stimulating home learning environments	12	81
Pupil-based teacher ratio in preprimary education	69	82.5
Quality and infrastructure	9	81.0
Completion rate in upper secondary education, gender parity	30	84.0
Completion rate in upper secondary education, wealth parity	106	106
Completion rate in upper secondary education, location parity	106	106
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>127</b>	<b>82.8</b>
Enrollment in training and learning	106	106
Firms offering formal training (%)	106	106
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	106	106
TVET enrollment	110	1.1
Government expenditure on vocational education (%)	106	106
Share of students enrolled in secondary vocational programmes	129	1.8
Share of students enrolled in postsecondary vocational programmes	106	106
TVET quality and infrastructure	1	82.0
Extent of staff training	21	84.8
Quality of vocational training	25	87.0
Ratio of high-skill TVET occupations earnings to average wage	8	80.7
Ratio of medium-skill TVET occupations earnings to average wage	80	40.1
<b>TVET labour market</b>	<b>18</b>	<b>78.1</b>
Efficiency of the labour market	1	100
Firms considered well-integrated with labour (%)	106	106
Employment educational mismatch (%)	106	106
Proportion of skilled production workers	106	106
Unemployment rate with vocational education	1	100
High TVET unemployment	61	86.0
Share of TVET occupations	1	100
Manufacturing employment (%)	107	100
Quality and infrastructure	30	83.0
Enrollment in vocational education, gender parity	112	80.0
Useable employment rate	1	100

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>18</b>	<b>88.4</b>
Enrollment	106	106
Government expenditure per tertiary student	106	106
Teaching staff compensation (% tertiary expenditure)	106	106
Enrollment	40	31
Enrollment in bachelor's or equivalent level (%)	2	83.3
Enrollment in masters, doctoral or equivalent (%)	114	2.8
Resources	11	83.7
Rap teacher ratio in tertiary education	59	78.7
Researchers in higher education (%)	9	80.7
<b>Learning environment</b>	<b>9</b>	<b>78.1</b>
Timely and academic freedom	107	87.7
Teachers in tertiary education, gender parity	82	82
Labour mobility rate	1	100
Academic freedom	128	21
Quality and infrastructure	1	84.0
Class attendance rate in tertiary education, gender parity	13	84.0
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>	<b>88</b>	<b>49.8</b>
Attainment	47	91
Educational attainment rate, bachelor's or equivalent	20	75.0
Educational attainment rate, master's or equivalent	71	5.4
Educational attainment rate, doctoral or equivalent	59	21.1
Employment	106	106
Labour force participation rate with advanced education	106	106
Unemployment rate with advanced education	106	106
Impact	16	80.0
University tertiary enrollment in R&D	10	80.1
OECD indicators per 100 personnel in higher education	10	64.0
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>20</b>	<b>87.2</b>
Access to credit resources	1	100
GDP (% GDP)	82	18.1
GERD per researcher	1	100
Researchers per thousand labour force	9	80.4
Tertiary graduates from STEM programmes (%)	17	87.0
<b>Quality of innovation environment</b>		
GERD performed by business enterprises (%)	85	7.7
GERD financed by business enterprises (%)	20	80.0
Researchers in business enterprises (%)	25	90
Firms that spend on R&D (%)	106	106
Quality of financial environment	11	82.0
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	104	9
State of cluster development	18	85.0
<b>Outputs</b>	<b>20</b>	<b>87.2</b>
Access to credit resources	11	81.1
Average documents per researcher	4	80.4
Citations per document	31	30
Patent applications (per 100 billion GDP)	84	40.0
<b>Infrastructure and innovation ecosystem</b>		
Intellectual property receipts (% total trade)	117	9
Research and development expenditure (per 100 billion GDP)	106	106
PCT applications (per 100 billion GDP)	75	48.0
Firms producing new goods and services (%)	106	106

	Rank	Value
<b>Consumer Electronics</b>	99	2.2
Treatment applications per 100 million GDP	114	2.8
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	83	21.9
<b>Energy</b>	91	25.9
<b>Energy</b>	91	25.9
Renewable investment's proportion	25	10.3
Depth of innovative companies	11	65.0
ISO 9001 quality certificates (% GDP)	72	14.4
ISO 14001 environmental certificates (% GDP)	31	10.2
<b>Finance</b>	99	999
CERD raised from abroad (%)	71	9.8
Bank returns per strategic alliance deals (% GDP)	35	19.2
Computer software spending (% GDP)	34	25.0
<b>Government Services</b>	119	11.1
New business density per thousand population	25	31.1
Firms with new products/services (%)	146	198
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	81	22.3
<b>Infrastructure</b>	84	25.3
<b>Coverage</b>	100	22.2
3G/4G mobile network coverage (% population)	11	80.0
Secure Internet servers per 1 million population	82	3.7
Investment in telecommunication services (% GDP)	121	12.0
<b>Quality</b>	95	40.0
Mobile speed and download speeds	3	80.9
Fixed broadband upload and download speeds	23	31.5
Fixed broadband subscriptions (y-speed) per hundred people	70	22.4
<b>Availability</b>	79	24.0
Fixed broadband bandwidth (% Gbps per capita)	88	81.3
Mobile broadband basket (% Gbps per capita)	6	89.0
Internet and telephony competition	118	80
<b>Access</b>	81	46.8
<b>Connectivity</b>	11	80.0
Active mobile-broadband subscriptions per hundred inhabitants	17	83
International Internet bandwidth per user	28	83.2
Households with Internet access at home (%)	63	85.0
<b>Skills and employment</b>	75	29.0
Individuals with standard ICT skills (%)	43	40
Tertiary graduates from ICT programmes (%)	89	24.0
ICT employment (%)	80	14
<b>Usage</b>	81	56.0
<b>Services</b>	8	11.1
Government online services	79	85.0
Fixed broadband Internet traffic per subscription	1	100
Mobile broadband Internet traffic per subscription	12	35.8
Internet users (%)	2	80.6
<b>Commerce</b>	100	11.6
ICT/FIT patent applications (per 100,000 GDP)	86	42.1
E-participation	75	60.0
Internet activities by individuals (%)	62	31.4
Trade in digitally deliverable services (% total trade)	123	20.4
<b>ECONOMY</b>	33	47.9
<b>Economic Competitiveness</b>	34	52.3
<b>Infrastructure Investment</b>	8	11.1
Overhead capital formation (% GDP)	146	198
Logistics performance	27	61.9
Transport productive capacity	7	72.1
Building quality control	22	80.7

	Rank	Value
<b>Business Agility</b>	90	21
Time of starting a business	82	86.1
Recovery recovery time	87	32.6
Entrepreneurial employee activity rate	20	46.4
Growth of corporate transactions	89	42.0
<b>Business openness</b>	48	38
Trade and investment	70	20
Trade (% GDP)	43	31.3
High-technology trade (% total trade)	66	47.5
Market concentration	127	81.2
Market concentration	79	90
Product diversity	11	10.1
China's financial openness	1	108
Foreign direct investment, net inflows (% GDP)	145	24.0
Out dynamics	26	87.9
<b>Financing and domestic value added</b>	9	74.7
<b>Financing and credit</b>	17	34.0
Domestic credit to private sector (% GDP)	15	52.4
MSME financing gap (% GDP)	146	198
Tax and contribution rate (% profit)	3	88.8
Bank nonperforming loans (%)	146	198
Unsecured loans ratio	0	14.0
Medium- and high-tech activities value added	4	74.4
Industry and services value added (% GDP)	2	85.0
Labour underutilization rate	29	81.7
Output per worker	6	80.0
<b>ENABLING ENVIRONMENT</b>	53	69.4
<b>Governance</b>	81	60.4
Political environment	95	41.2
Peace and stability	35	88.4
View and accountability	128	16
Quality of institutions	29	78.0
Rule of law	27	82.7
Control of corruption	32	77.0
Government effectiveness	28	78.4
<b>Socio-economic</b>	59	65.8
Gender equity	111	53.4
Female-to-male ratio in parliament	138	10.0
Female-to-male labour force participation	128	98
Female-to-male ratio in internal wage	35	88.0
Gender inequality	88	82.0
Social protection coverage (% population)	127	1.8
Adult literacy rate	84	81.0
Youth not in employment, education or training (%)	34	85.0
Standard of living	8	11.2
Poverty headcount ratio (% population)	146	198
GDP per capita	4	71.2
<b>Health and environment</b>	138	53.9
Health	66	80.0
Universal health coverage	85	80
Healthy life expectancy (years)	81	76.4
Under-five mortality rate	45	86.1
Environmental performance	103	21.7
Renewable energy consumption (%)	102	9
Household footprint per capita	148	8
Natural hazard exposure	11	83

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 50/154

**GKI SCORE** 54.3  
**WORLD AVERAGE** 48.4

# ROMANIA

**COUNTRY PERFORMANCE SUMMARY**  
Romania is a strong performer in terms of its knowledge infrastructure. It ranks 50th out of 154 countries in the Global Knowledge Index 2021 and 47th out of the 61 countries with very high human development.

- AREAS OF STRENGTH**
- + Employment educational mismatch (%)
  - + Fixed-broadband upload and download speeds
  - + Fixed broadband basket (% GNI per capita)
  - + Unemployment rate with advanced education
  - + Teachers in tertiary education, gender parity

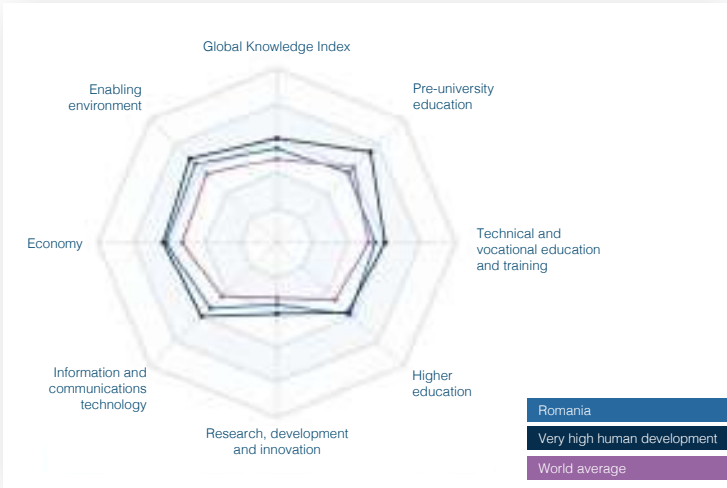
- AREAS OF IMPROVEMENT**
- Educational attainment rate, doctorate or equivalent
  - Government funding per primary student (% of GDP per capita)
  - Investment in telecommunication services (% GDP)
  - Firms constrained with inadequately educated workforce (%)
  - Government expenditure on primary education (% of GDP)

**KEY INDICATORS**

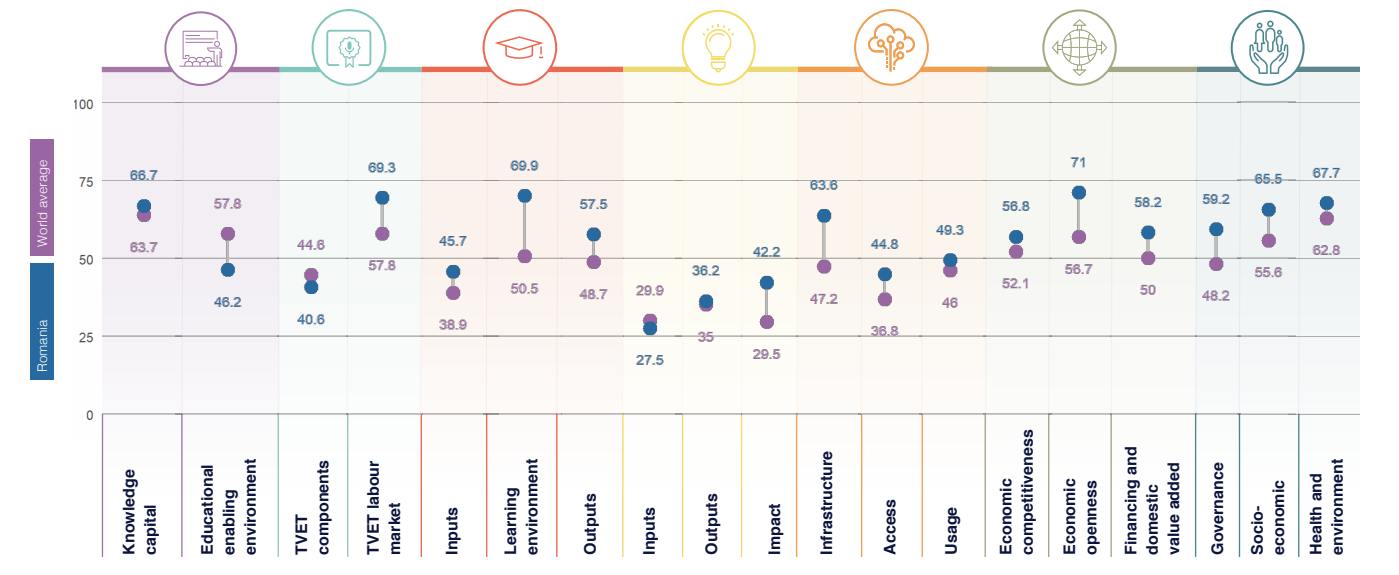
GDP US\$ billions	556.07
Population	19,237,682
HDI	0.828

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	100	56.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	57	55
HIGHER EDUCATION	29	57.7
RESEARCH, DEVELOPMENT AND INNOVATION	52	35.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	50	52.6
ECONOMY	40	62
ENABLING ENVIRONMENT	43	64.2



## GKI PILLARS





# ROMANIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	84	64.7
Enrollment	100	74.2
Net enrolment rate in primary education	117	61.4
Net enrolment rate in lower secondary education	89	83.3
Net enrolment rate in upper secondary education	74	70.7
Completion	109	77.9
Years of compulsory education in primary and secondary	42	79.0
Completion rate in upper secondary education	44	84.3
Success rate rate in the last grade of lower secondary education	70	72.3
Completion	71	60.2
Assessment of 15-year-old students in math, science and reading	47	38.9
Learning-adjusted years of schooling	73	66.1
<b>Educational spending environment</b>	113	60.9
Expenditure	112	10.0
Government expenditure on primary education (% GDP)	129	6.5
Government expenditure on secondary education (% GDP)	90	21.3
Government funding per primary student (% GDP per capita)	168	18.0
Government funding per secondary student (% GDP per capita)	70	26.1
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	110	30.0
Class attendance rate in early childhood education	73	88.0
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	87	81.3
Completion rate in upper secondary education, gender parity	8	30
Completion rate in upper secondary education, wealth parity	40	81.0
Completion rate in upper secondary education, location parity	45	83.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	87	60.9
Companies training apprentices	101	74.0
Firms offering formal training (%)	88	24.1
Labour force with short-cycle tertiary education (%)	50	70.0
Participation rate in formal and non-formal education and training	27	5.2
TVET resources	100	101.7
Government expenditure on vocational education (%)	67	10.6
Share of students enrolled in secondary vocational programmes	20	44.0
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	108	101.4
Extent of staff training	88	84.8
Quality of vocational training	110	42.0
Ratio of high-skil TVET occupations earnings to average wage	81	18.0
Ratio of medium-skill TVET occupations earnings to average wage	80	30
<b>TVET labour market</b>	88	60.3
Efficiency of the labour market	80	52.0
Firms considered well matched with workforce (%)	121	18.0
Employment educational mismatch (%)	1	109
Proportion of skilled production workers	80	84.0
Unemployment rate with vocational education	20	87
Real TVET unemployment	10	61.0
Share of TVET occupations	57	62.1
Manufacturing employment (%)	19	83.8
Quality and infrastructure	10	61.4
Enrollment in vocational education, gender parity	35	80.1
Useable employment rate	80	70.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	49	43.7
Expenditure	10	48.0
Government expenditure per tertiary student	37	28.0
Teaching staff compensation (% tertiary expenditure)	70	65.8
Enrollment	14	43.0
Enrollment in bachelor's or equivalent level (%)	88	28.0
Enrollment in masters, doctoral or equivalent (%)	28	55.8
Resources	113	44.7
Rap teacher ratio in tertiary education	87	60
Research in higher education (%)	78	33.8
<b>Learning environment</b>	22	68.8
<b>Quality and academic freedom</b>	21	61.0
Teachers in tertiary education, gender parity	7	94.0
Labour mobility rate	47	30
Academic freedom	25	60.0
<b>Quality and infrastructure</b>	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	43	57.0
<b>Attainment</b>	57	22.0
Educational attainment rate, bachelor's or equivalent	64	32.0
Educational attainment rate, master's or equivalent	37	55.1
Educational attainment rate, doctoral or equivalent	71	3.8
<b>Employment</b>	10	84
Labour force participation rate with advanced education	24	82.0
Unemployment rate with advanced education	7	85.0
<b>Impact</b>	18	60.8
University tertiary enrollment in R&D	72	43.0
OECD students per 100 personnel in higher education	10	78.0
<b>ENVIRONMENT, INFRASTRUCTURE AND SERVICES</b>		
<b>Energy</b>	10	17.2
Greenhouse gas emissions	10	100
GDP (% GDP)	60	9.8
GERD per researcher	62	21.1
Researchers per thousand labour force	57	12.1
Tertiary graduates from STEM programmes (%)	20	86.8
<b>Quality of infrastructure</b>	10	100
GERD performed by business enterprises (%)	47	8.2
GERD financed by business enterprises (%)	18	67.3
Researchers in business enterprises (%)	44	30.7
Firms that spend on R&D (%)	60	15.1
<b>Quality of business environment</b>	10	100
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	47	20.2
State of digital development	108	38.2
<b>Science</b>	10	100
Government R&D expenditure	10	41.0
Average documents per researcher	18	70.0
Citations per document	81	21
Patent applications (per 100 billion GDP)	48	55.0
<b>Quality of business environment</b>	10	100
Intellectual property receipts (% total trade)	52	14.1
Research design applications (per 100 billion GDP)	52	9.8
PCT applications (per 100 billion GDP)	61	45.0
Firms producing new goods and services (%)	60	21.0

# ROMANIA

	Rank	Value		Rank	Value
<b>Consumer Innovation Readiness</b>	91	22.2	<b>Business Agility</b>	90	22.0
Treatment applications per 100 million GDP	90	30.5	Ease of starting a business	91	27.7
Cultural goods exports (% exports)	75	9.9	Recovery recovery rate	85	17.4
Printing and publishing output (% manufactured output)	84	21.7	Entrepreneurial employee activity rate	85	28.3
<b>Health</b>	89	25.2	Growth of corporate transactions	80	21.4
Health	91	19.2	<b>Employee experience</b>	88	7.7
Access to institutions' provisions	39	11.5	Trust and dissatisfaction	91	27.0
Depth of innovative companies	80	22.0	Talent (% GDP)	81	22.1
ISO 9001 quality certificates (% GDP)	16	72.2	High-technology trade (% total trade)	32	28.0
ISO 14001 environmental certificates (% GDP)	9	80.0	Market concentration	27	26.8
<b>Industry</b>	91	19.0	Market concentration	80	20.0
CERD forecast from abroad (%)	50	15.1	Product ownership	19	10
Cost savings per strategic alliance deals (% GDP)	96	5.2	Climate financial openness	1	100
Computer software spending (% GDP)	37	21.2	Foreign direct investment, net inflows (% GDP)	81	42.0
<b>Government Innovation</b>	91	19.0	Gov dynamics	27	26.8
New business density per thousand population	30	30.4	<b>Financing and economic value added</b>	27	26.2
Firms with new products/services (%)	47	26.0	Financing and costs	91	26.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	88	22.2	Domestic credit to private sector (% GDP)	117	9
<b>Infrastructure</b>	88	22.2	MSME financing gap (% GDP)	80	21.4
Coverage	88	11.1	Tax and contribution rate (% profit)	15	27.0
30MHz mobile network coverage (% population)	39	29.5	Bank nonperforming loans (%)	62	26.8
Secure Internet servers per 1 million population	34	27.5	Unmet needs index	91	19.1
Investment in telecommunication services (% GDP)	107	7.0	Medium- and high-tech activities value added	90	26.1
<b>Quality</b>	88	22.2	Industry and services value added (% GDP)	88	25.2
Mobile speed and download speeds	29	26.9	Labour underutilization rate	15	29.0
Fixed-broadband upload and download speeds	4	25.0	Output per worker	41	27.1
Fixed-broadband subscriptions (by speed) per hundred people	31	23.5	<b>ENABLING ENVIRONMENT</b>	43	24.3
<b>Accessibility</b>	88	21.7	<b>Governance</b>	82	20.2
Fixed broadband access (% GNI per capita)	7	24.8	Political environment	47	24.4
Mobile broadband access (% GNI per capita)	21	29.0	Peace and stability	41	23.7
Internet and telephony competition	1	100	View and accountability	45	23.2
<b>Access</b>	88	24.3	Quality of institutions	85	24
<b>Subscriptions</b>	88	21.0	Rule of law	49	24.4
Active mobile-broadband subscriptions per fixed-line inhabitants	52	49.3	Control of corruption	63	24.0
International Internet bandwidth per user	82	28.2	Government effectiveness	86	22.9
Households with Internet access at home (%)	30	26.4	<b>Socio-economic</b>	42	25.5
<b>Skills and employment</b>	91	21.7	Gender equity	91	21.0
Individuals with standard ICT skills (%)	54	23.7	Female-to-male ratio in parliament	100	22.0
Tertiary graduates from ICT programmes (%)	29	49.0	Female-to-male labour force participation	100	22.0
ICT employment (%)	40	24.0	Female-to-male ratio in internal wage	72	25.0
<b>Usage</b>	72	25.2	Government access	21	22.0
<b>Services</b>	88	19	Social protection coverage (% population)	21	24.0
Government online services	67	21.4	Adult literacy rate	81	22.0
Fixed broadband internet traffic per subscription	46	23.4	Youth not in employment, education or training (%)	80	22
Mobile broadband internet traffic per subscription	84	14.8	Standard of living	54	22.0
Internet users (%)	88	27.0	Poverty headcount ratio (% population)	70	20.0
<b>Outcomes</b>	91	21.0	GDP per capita	47	23.7
ICTFUT patent applications (per 100,000 GDP)	86	24.8	<b>Health and environment</b>	38	27.7
E-participation	49	21	Health	91	21.0
Internet activities by individuals (%)	88	25.7	Universal health coverage	80	24
Trade in digitally deliverable services (% total trade)	34	20.0	Healthy life expectancy (years)	97	25.7
<b>ECONOMY</b>	43	22	Unemployment rate	47	25.7
<b>Economic Competitiveness</b>	88	20.0	Government performance	71	22.7
OECD innovation benchmark	41	14.0	Renewable energy consumption (%)	79	23.0
Overhead capital formation (% GDP)	49	24	Household budget per capita	80	27.1
Logistics performance	45	23	Netural fiscal exposure	65	20
Transport productive capacity	81	25.4			
Building quality control	20	26.7			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# RUSSIAN FEDERATION

## KEY INDICATORS

GDP US\$ billions	3,875.686
Population	145,934,460
HDI	0.824

**GKI RANK** 54/154

**GKI SCORE** 52.3

**WORLD AVERAGE** 48.4

**COUNTRY PERFORMANCE SUMMARY**

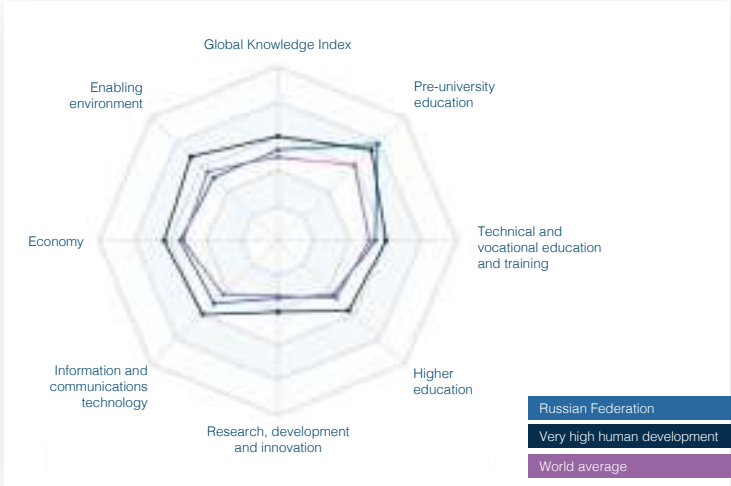
Russian Federation is a strong performer in terms of its knowledge infrastructure. It ranks 54th out of 154 countries in the Global Knowledge Index 2021 and 50th out of the 61 countries with very high human development.

- AREAS OF STRENGTH**
- + Completion rate in upper secondary education, gender parity
  - + High-skilled employment (%)
  - + Market concentration
  - + Fixed broadband basket (% GNI per capita)
  - + Research institutions prominence

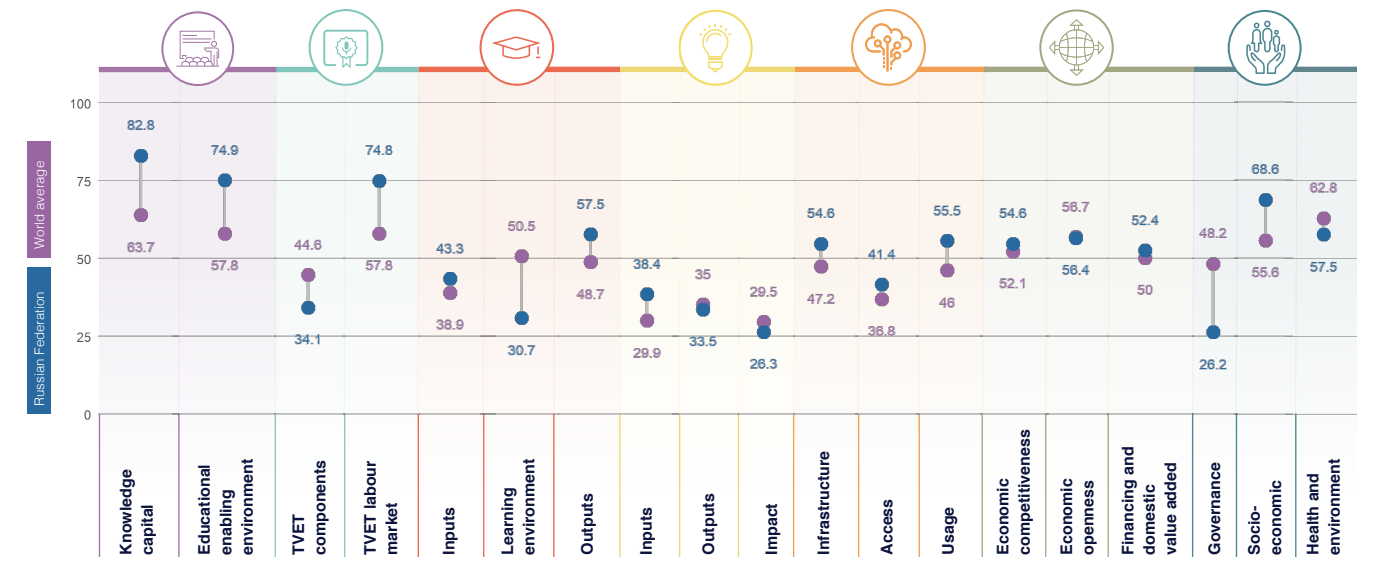
- AREAS OF IMPROVEMENT**
- Firms producing new goods and services (%)
  - Citations per document
  - Firms offering formal training (%)
  - Entrepreneurial employee activity rate
  - Researchers in higher education (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	19	78.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	60	54.5
HIGHER EDUCATION	83	43.8
RESEARCH, DEVELOPMENT AND INNOVATION	57	32.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	55	50.5
ECONOMY	65	54.5
ENABLING ENVIRONMENT	93	50.8



## GKI PILLARS





# RUSSIAN FEDERATION

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	27	62.8
Enrolment	55	83.7
Net enrolment rate in primary education	80	84.6
Net enrolment rate in lower secondary education	82	81.1
Net enrolment rate in upper secondary education	42	80.0
Completion	5	87.7
Years of compulsory education in primary and secondary	28	88.6
Completion rate in upper secondary education	25	90.0
Success rate rate in the last grade of lower secondary education	31	87.5
Completion	32	71
Assessment of 15-year-old students in math, science and reading	29	80.1
Learning-adjusted years of schooling	27	87.0
<b>Educational enabling environment</b>		
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	27	80.0
Pupil-based teacher ratio in primary education	35	89.5
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	100	112.2
Class attendance rate in early childhood education	57	88.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	33	80.9
Completion rate in upper secondary education, gender parity	2	80.0
Completion rate in upper secondary education, wealth parity	35	71.6
Completion rate in upper secondary education, location parity	98	88.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	116	116.4
Firms offering formal training (%)	118	11.8
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	41	26.1
TVET enrolment	116	116.2
Government expenditure on vocational education (%)	64	11.1
Share of students enrolled in secondary vocational programmes	55	23.1
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	100	90.1
Extent of staff training	116	88.7
Quality of vocational training	75	50.0
Ratio of high-skill TVET occupations earnings to average wage	107	14.2
Ratio of medium-skill TVET occupations earnings to average wage	75	50.0
<b>TVET labour market</b>		
Efficiency of the labour market	51	111.3
Firms considered with inappropriately educated workforce (%)	59	88.8
Employment educational mismatch (%)	23	77.1
Proportion of skilled production workers	18	88.6
Unemployment rate with vocational education	116	116
Real TVET unemployment	20	116.2
Share of TVET occupations	25	69.7
Manufacturing employment (%)	47	49.1
Quality and infrastructure	116	60.0
Enrolment in vocational education, gender parity	44	86.4
Useable employment rate	62	60.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	37	37.7
Government expenditure per tertiary student	52	18.0
Teaching staff compensation (% tertiary expenditure)	119	88.0
Enrolment	41	39
Enrolment in bachelor's or equivalent level (%)	38	32.4
Enrolment in masters, doctoral or equivalent (%)	38	45.0
Resources	100	111.1
Pupil-teacher ratio in tertiary education	28	87.9
Researchers in higher education (%)	100	18.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	100	27.1
Labour mobility rate	53	17.5
Academic freedom	128	37.4
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	98	116
<b>Outputs</b>		
Skilled labour	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	112.0
Labour force participation rate with advanced education	58	85.7
Unemployment rate with advanced education	58	86.0
Innovation	55	42.1
University tertiary enrolment in R&D	50	48.8
CRISPR patents per 100 personnel in higher education	48	37.4
<b>Government's contribution to economic growth</b>		
Output	22	16.4
Value added in R&D activities	116	116.2
GDP (% GDP)	36	16.7
GERD per researcher	62	12.1
Researchers per thousand labour force	20	26
Tertiary graduates from STEM programmes (%)	18	87.9
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	34	19
GERD financed by business enterprises (%)	58	28.0
Researchers in business enterprises (%)	27	83.7
Firms that spend on R&D (%)	72	18.0
Quality of research innovation	116	111.1
High-skilled employment (%)	3	60.4
Intellectual property payments (% total trade)	15	43.0
State of cluster development	100	43.0
<b>Outputs</b>		
<b>Government's contribution to innovation</b>		
Average documents per researcher	57	42.2
Citations per document	102	7.6
Patent applications (per 100 billion GDP)	17	71.0
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	33	23.8
Research design applications (per 100 billion GDP)	62	7.8
PCT applications (per 100 billion GDP)	45	61.1
Firms producing new goods and services (%)	111	11



# RUSSIAN FEDERATION

	Rank	Value		Rank	Value
<b>Business environment</b>			<b>Business agility</b>		
Treatment applications per 100 million GDP	79	82.0	Ease of starting a business	34	87.1
Cultural goods exports (% exports)	85	5.1	Recovery recovery rate	54	46.7
Printing and publishing output (% manufactured output)	83	14.5	Entrepreneurial employee activity rate	80	1.8
<b>Energy</b>	<b>91</b>	<b>26.1</b>	Growth of corporate transactions	13	85.7
Energy	91	26.1	<b>Corporate openness</b>	<b>71</b>	<b>26.4</b>
Access to institutions' provisions	9	83.7	Trust and dissatisfaction	77	20.5
Depth of innovative companies	37	43.0	Taxes (% GDP)	118	16.6
ISO 9001 quality certificates (% GDP)	113	4.1	High-technology trade (% total trade)	60	47.0
ISO 14001 environmental certificates (% GDP)	112	2.1	Market concentration	85	73.6
<b>Finance</b>	<b>87</b>	<b>22.2</b>	Market concentration	8	83.0
CERD received from abroad (%)	83	4.8	Product ownership	76	16.2
Joint ventures per strategic industry deals (% GDP)	78	7.8	Charitable financial openness	76	47.7
Computer software spending (% GDP)	42	24.5	Foreign direct investment, net inflows (% GDP)	114	35
<b>Government effectiveness</b>	<b>100</b>	<b>50.0</b>	Cost dynamics	41	80
New business density per thousand population	40	10.1	<b>Financing and domestic value added</b>	<b>82</b>	<b>22.4</b>
Firms with new products/services (%)	100	48.5	Financing and costs	77	21.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>88</b>	<b>22.5</b>	Domestic credit to private sector (% GDP)	65	22.5
<b>Infrastructure</b>	<b>80</b>	<b>20.8</b>	MSME financing gap (% GDP)	50	80.0
Coverage	79	41.2	Tax and contribution rate (% profit)	111	81.1
30MHz mobile network coverage (% population)	89	81.1	Bank nonperforming loans (%)	87	83
Secure Internet servers per 1 million population	41	21.5	Unmet needs index	41	81.1
Investment in telecommunication services (% GDP)	100	22.7	Medium- and high-tech activities value added	80	29.0
<b>Quality</b>	<b>79</b>	<b>51.1</b>	Industry and services value added (% GDP)	55	85.2
Mobile speed and download speeds	73	16.0	Labour underutilization rate	17	86.4
Fixed broadband upload and download speeds	22	32.5	Output per worker	40	27.0
Fixed broadband subscriptions (by speed) per hundred people	80	34	<b>ENABLING ENVIRONMENT</b>	<b>81</b>	<b>20.8</b>
<b>Availability</b>	<b>10</b>	<b>87.0</b>	<b>Governance</b>	<b>118</b>	<b>26.2</b>
Fixed broadband bandwidth (% GIG per capita)	9	88	Political environment	107	20.5
Mobile broadband basket (% GIG per capita)	00	80.0	Peace and stability	110	20.0
Internet and telephony competition	1	100	View and accountability	105	18.0
<b>Access</b>	<b>65</b>	<b>41.6</b>	Quality of institutions	100	22.0
<b>Connectivity</b>	<b>10</b>	<b>81</b>	Rule of law	101	21.0
Active mobile-broadband subscriptions per hundred inhabitants	33	44	Control of corruption	108	10.0
International Internet bandwidth per user	87	46.7	Government effectiveness	77	84.9
Households with Internet access at home (%)	57	80.4	<b>Socio-economic</b>	<b>33</b>	<b>60.6</b>
<b>Skills and employment</b>	<b>71</b>	<b>27.5</b>	Gender equity	80	84.0
Individuals with standard ICT skills (%)	81	18.3	Female-to-male ratio in parliament	100	10.7
Tertiary graduates from ICT programmes (%)	41	37.2	Female-to-male labour force participation	55	76.1
ICT employment (%)	44	20.1	Female-to-male ratio in internal wage	41	80.0
<b>Usage</b>	<b>49</b>	<b>22.3</b>	Government access	81	87.0
<b>Services</b>	<b>40</b>	<b>22.1</b>	Social protection coverage (% population)	28	80.0
Government online services	35	81.0	Adult literacy rate	11	86.7
Fixed broadband internet traffic per subscription	20	22	Youth not in employment, education or training (%)	50	72.0
Mobile broadband internet traffic per subscription	17	33.2	<b>Standard of living</b>	<b>48</b>	<b>83.0</b>
Internet users (%)	29	84.2	Poverty headcount ratio (% population)	21	83.0
<b>Outcomes</b>	<b>50</b>	<b>19.7</b>	GDP per capita	47	23.0
ICT FDI patent applications (per 100 million GDP)	38	46.6	<b>Health and environment</b>	<b>128</b>	<b>27.5</b>
E-participation	29	80.0	Health	60	76.0
Internet activities by individuals (%)	48	43.2	Universal health coverage	51	75
Trade in digitally deliverable services (% total trade)	55	47.0	Healthy life expectancy (years)	80	89.0
<b>ECONOMY</b>	<b>84</b>	<b>24.3</b>	Unemployment rate	59	85.7
<b>Economic complexity index</b>	<b>81</b>	<b>24.3</b>	Economic and performance	100	22.0
Manufacture innovation	11	11.4	Renewable energy consumption (%)	107	2.3
Overhead capital formation (% GDP)	81	47	Household budget per capita	100	80.1
Logistics performance	75	43.0	Natural hazard exposure	117	40
Transport productive capacity	78	25.0			
Building quality control	8	80.0			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 115/154

**GKI SCORE** 39.7

**WORLD AVERAGE** 48.4

# RWANDA

## COUNTRY PERFORMANCE SUMMARY

Rwanda is a modest performer in terms of its knowledge infrastructure. It ranks 115th out of 154 countries in the Global Knowledge Index 2021 and 2nd out of the 27 countries with low human development.

### KEY INDICATORS

**GDP US\$ billions** 27183  
**Population** 12,952,209  
**HDI** 0.543

### AREAS OF STRENGTH

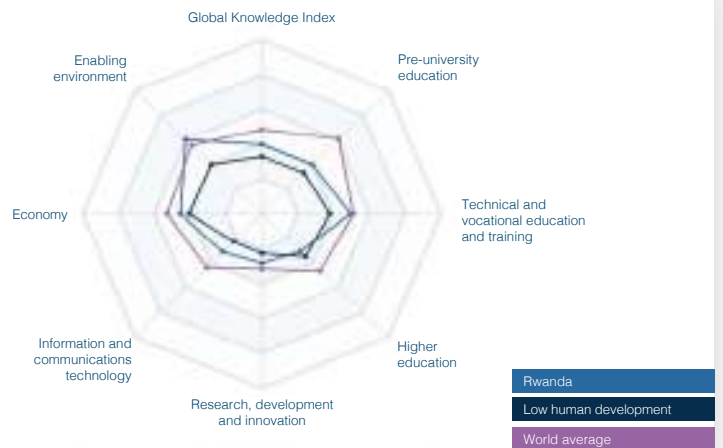
- + Female-to-male labour force participation
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Female-to-male ratio in parliament
- + Ecological footprint per capita
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

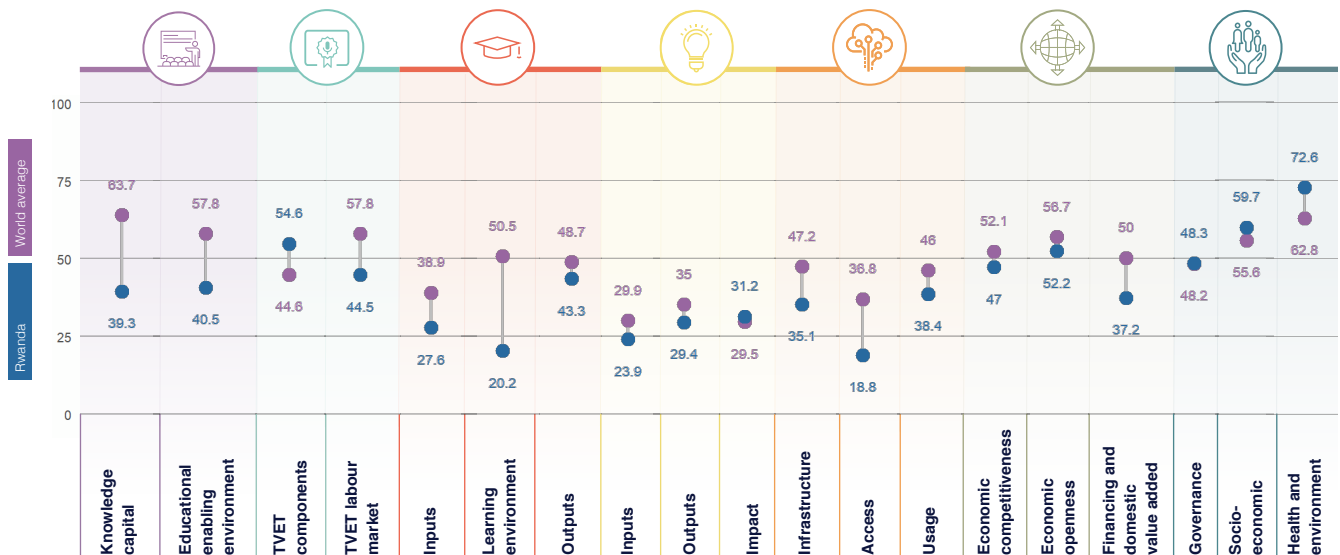
- Labour underutilization rate
- Government funding per primary student (% of GDP per capita)
- Share of TVET occupations
- Researchers per thousand labour force
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	129	39.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	83	49.5
HIGHER EDUCATION	144	30.4
RESEARCH, DEVELOPMENT AND INNOVATION	89	28.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	112	30.8
ECONOMY	112	45.5
ENABLING ENVIRONMENT	50	60.2



## GKI PILLARS





# RWANDA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	129	26.9
Enrollment	134	72.0
Net enrolment rate in primary education	89	80.7
Net enrolment rate in lower secondary education	89	84.8
Net enrolment rate in upper secondary education	111	42.3
Completion	141	20.2
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	119	14.0
Success rate rate in the last grade of lower secondary education	128	27
Completion	144	10.0
Assessment of 15-year-old students in math, science and reading	146	109
Learning-adjusted years of schooling	144	56.2
<b>Educational enabling environment</b>		
Expenditure	87	23.0
Government expenditure on primary education (% GDP)	100	26.2
Government expenditure on secondary education (% GDP)	85	27.0
Government funding per primary student (% GDP per capita)	128	9.8
Government funding per secondary student (% GDP per capita)	49	34.3
Resources	81	60
Pupil-based teacher ratio in primary education	89	41
Pupil-based teacher ratio in secondary education	72	46
Schools with access to computers in primary education (%)	87	63.4
Schools with access to computers in secondary education (%)	85	63.6
<b>Early learning</b>		
Class attendance rate in early childhood education	123	53.4
Proportion of children who are developmentally on track	39	54.3
Proportion of children with stimulating home learning environments	81	39
Pupil-based teacher ratio in preprimary education	79	24.0
<b>Quality and inclusiveness</b>		
Completion rate in upper secondary education, gender parity	82	84.4
Completion rate in upper secondary education, wealth parity	89	8.3
Completion rate in upper secondary education, location parity	100	29.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	107	10.0
Firms offering formal training (%)	48	46
Labour force with short-cycle tertiary education (%)	54	33.2
Participation rate in formal and non-formal education and training	70	3.2
<b>TVET resources</b>		
Government expenditure on vocational education (%)	8	67.3
Share of students enrolled in secondary vocational programmes	65	20.1
Share of students enrolled in postsecondary vocational programmes	1	109
<b>TVET quality and inclusiveness</b>		
Extent of staff training	82	47.5
Quality of vocational training	70	50.4
Ratio of high-skil TVET occupations earnings to average wage	1	100
Ratio of medium-skill TVET occupations earnings to average wage	1	109
<b>TVET labour market</b>		
Efficiency of the labour market	11	60.3
Firms considered with inappropriately educated workforce (%)	1	83.2
Employment educational mismatch (%)	59	87.0
Proportion of skilled production workers	42	87.6
Unemployment rate with vocational education	111	36.1
Real TVET unemployment	114	13.6
Share of TVET occupations	152	5.2
Manufacturing employment (%)	123	20
<b>Supply and inclusiveness</b>		
Enrollment in vocational education, gender parity	89	79.2
Useable employment rate	123	20.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	60	32.7
Government expenditure per tertiary student	60	6.8
Teaching staff compensation (% tertiary expenditure)	17	88.8
Enrollment	138	1.9
Enrollment in bachelor's or equivalent level (%)	122	2.8
Enrollment in masters, doctoral or equivalent (%)	123	0.8
Resources	117	48.4
Pupil-teacher ratio in tertiary education	84	61.7
Research in higher education (%)	71	35
<b>Learning environment</b>		
<b>Quality and inclusiveness</b>		
Teachers in tertiary education, gender parity	90	28.7
Labour mobility rate	66	12.0
Academic freedom	148	22
<b>Supply and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	76	62.4
Class attendance rate in tertiary education, wealth parity	75	6.8
Class attendance rate in tertiary education, location parity	72	1.2
<b>Outputs</b>		
Skilled labour	108	15
Educational attainment rate, bachelor's or equivalent	67	6.1
Educational attainment rate, master's or equivalent	62	1
Educational attainment rate, doctoral or equivalent	64	0.8
Skilled labour	112	67.4
Labour force participation rate with advanced education	87	60
Unemployment rate with advanced education	121	48.0
<b>Input</b>		
University tertiary enrollment in FTE	83	34.1
OSMR: Students per FTE personnel in higher education	1	600
<b>Efficiency of the labour market and productivity</b>		
Output	10	12.2
Value of FDI inflows	11	100
GDP (% GDP)	60	12.0
GERD per researcher	1	108
Researchers per thousand labour force	111	9
Tertiary graduates from STEM programmes (%)	106	23.9
<b>Quality of the business environment</b>		
GERD performed by business enterprises (%)	72	7.2
GERD financed by business enterprises (%)	68	0.8
Researchers in business enterprises (%)	67	6.6
Firms that spend on R&D (%)	77	15.0
Quality of business environment	100	27.0
High-skilled employment (%)	62	18.1
Intellectual property payments (% total trade)	128	0.2
State of digital development	68	47.2
<b>Output</b>		
Value of FDI inflows	11	100
Average documents per researcher	6	80.0
Citations per document	88	17.1
Patent applications (per 100 billion GDP)	63	36.1
<b>Quality of the business environment</b>		
Intellectual property receipts (% total trade)	106	3.1
Research and development expenditure (per 100 billion GDP)	68	1.2
PCT applications (per 100 billion GDP)	67	38.0
Firms producing new goods and services (%)	104	16





# RWANDA

	Rank	Value
<b>Business environment</b>		
Treatment applications (per 100 million GDP)	95	0.4
Cultural goods exports (% exports)	100	0.1
Printing and publishing output (% manufactured output)	106	1.9
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	100	0
Depth of innovative companies	40	55.0
ISO 9001 quality certificates (% GDP)	104	1.3
ISO 14001 environmental certificates (% GDP)	104	1.8
<b>Finance</b>		
CERD received from abroad (%)	0	84.2
Cost of raising per storage volume deals (% GDP)	27	25.4
Computer software spending (% GDP)	100	4
<b>Government services</b>		
New business density per thousand population	74	7.4
Firms with one or more employees (%)	0	85.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>112</b>	<b>30.0</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
30MHz mobile network coverage (% population)	29	87.0
Secure Internet servers per 1 million population	110	1.5
Investment in telecommunication services (% GDP)	40	26.2
<b>Quality</b>		
Mobile speed and download speeds	110	0.3
Fixed broadband upload and download speeds	77	7.2
Fixed broadband subscriptions (y speed) per hundred people	100	0.2
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	143	28.0
Mobile broadband basket (% QM per capita)	104	20.0
Internet and telephone competition	1	100
<b>Access</b>		
<b>Subscribers</b>		
Active mobile broadband subscriptions per fixed-line inhabitants	104	70
International Internet bandwidth per user	108	22.4
Households with Internet access at home (%)	108	0.1
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	40	20.0
ICT employment (%)	110	0.2
<b>Usage</b>		
<b>Services</b>		
Government online services	05	81.0
Fixed broadband Internet traffic per subscriber	4	30.2
Mobile broadband Internet traffic per subscriber	104	0.3
Internet users (%)	105	21.0
<b>Commerce</b>		
eTPUAT patent applications (per 100 million GDP)	01	44
E-participation	01	80.1
Internet activities by individuals (%)	106	19
Trade in digitally deliverable services (% total trade)	142	0.1
<b>ECONOMY</b>	<b>112</b>	<b>60.0</b>
<b>Economic complexity</b>		
Export diversification	41	10.0
Open fixed capital formation (% GDP)	44	05
Logistics performance	06	49.4
Transport productive capacity	111	10.0
Building quality control	1	100

	Rank	Value
<b>Business agility</b>		
Time of starting a business	32	83.2
Recovery recovery time	104	21
Entrepreneurial employee activity rate	106	1.9
Growth of corporate transactions	110	0
<b>Customer experience</b>		
Trust and dissatisfaction	107	41.0
Trade (% GDP)	100	20.0
High-technology trade (% total trade)	21	59.0
Market concentration	100	80.0
Market concentration	144	82.0
Product diversity	10	10.1
Climate financial openness	58	74.7
Foreign direct investment, net inflows (% GDP)	40	43.0
Cost dynamics	100	45.0
<b>Financing and domestic value added</b>		
Financing and costs	74	21.0
Domestic credit to private sector (% GDP)	101	0.4
IMRS financing gap (% GDP)	46	20.0
Tax and contribution rate (% profit)	94	24.8
Bank nonperforming loans (%)	71	82.1
Unmet loan demand	100	10.0
Medium- and high-tech activities value added	105	11.0
Industry and services value added (% GDP)	107	35.0
Labour underutilization rate	101	11.0
Output per worker	140	1.1
<b>ENABLING ENVIRONMENT</b>	<b>03</b>	<b>60.0</b>
<b>Governance</b>		
Political environment	00	20
Peace and stability	00	40.1
View and accountability	108	17.0
Quality of institutions	00	83.0
Rule of law	00	64.2
Control of corruption	40	80.2
Government effectiveness	00	81.8
<b>Socio-economic</b>		
Gender equity	1	100
Female-to-male ratio in parliament	1	100
Female-to-male labour force participation	1	100
Female-to-male ratio in internal wage	106	1.9
Gender inequality	107	02.1
Social protection coverage (% population)	105	0.8
Adult literacy rate	100	85.0
Youth not in employment, education or training (%)	12	83.0
Standard of living	101	23.0
Poverty headcount ratio (% population)	00	40.4
GDP per capita	141	1.2
<b>Health and environment</b>		
<b>Health</b>		
Universal health coverage	102	37
Healthy life expectancy (years)	110	83.0
Under-five mortality rate	112	71.0
Environmental performance	0	80.0
Renewable energy consumption (%)	0	80.0
Household footprint per capita	4	80.0
Natural hazard exposure	47	00

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# SAINT LUCIA

## KEY INDICATORS

GDP US\$ billions	2.253
Population	183,629
HDI	0.759

**GKI RANK** 91/154

**GKI SCORE** 44.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Saint Lucia is a moderate performer in terms of its knowledge infrastructure. It ranks 91st out of 154 countries in the Global Knowledge Index 2021 and 28th out of the 39 countries with high human development.

### AREAS OF STRENGTH

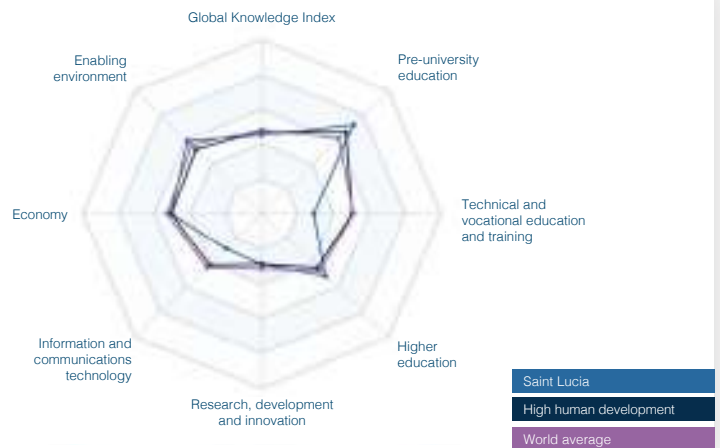
- + Cultural goods exports (% exports)
- + Gross attendance ratio for tertiary education, wealth parity
- + Citations per document
- + Proportion of children with stimulating home learning environment
- + Proportion of children who are developmentally on track

### AREAS OF IMPROVEMENT

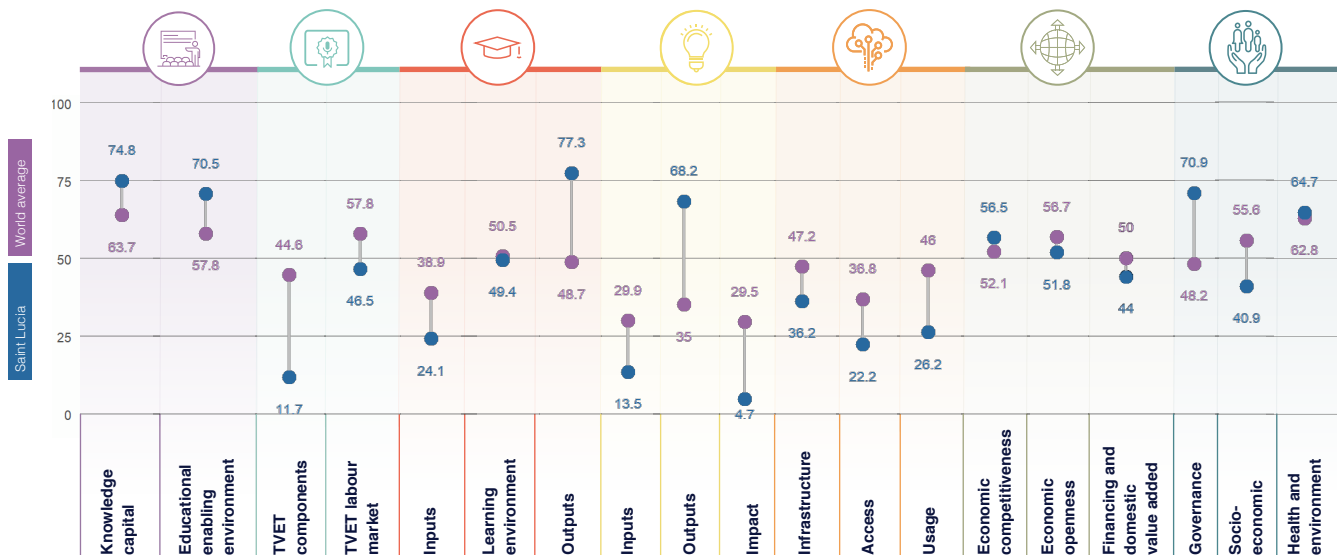
- Government expenditure on vocational education (%)
- Government expenditure per tertiary student
- Intellectual property receipts (% total trade)
- Firms with new product/service (%)
- Mobile broadband Internet traffic per subscription

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	50	72.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	151	29.1
HIGHER EDUCATION	46	50.3
RESEARCH, DEVELOPMENT AND INNOVATION	83	28.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	118	28.2
ECONOMY	76	50.8
ENABLING ENVIRONMENT	58	58.8



## GKI PILLARS





# SAINT LUCIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	72.8
Enrollment	77	80.1
Net enrolment rate in primary education	77	80.1
Net enrolment rate in lower secondary education	81	87.3
Net enrolment rate in upper secondary education	88	81
Completion	91	70
Years of compulsory education in primary and secondary	82	78.0
Completion rate in upper secondary education	93	84.3
Success rate rate in the last grade of lower secondary education	87	83.1
Completion	92	85.1
Assessment of Trinidad students in math, science and reading	108	108
Learning-adjusted years of schooling	89	89.1
<b>Educational enabling environment</b>	<b>41</b>	<b>70.8</b>
Expenditure	89	25.0
Government expenditure on primary education (% GDP)	89	25.4
Government expenditure on secondary education (% GDP)	88	23.1
Government funding per primary student (% GDP per capita)	77	31.3
Government funding per secondary student (% GDP per capita)	80	33.0
Resources	88	83.8
Pupil-based teacher ratio in primary education	35	87.4
Pupil-based teacher ratio in secondary education	23	83.7
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	93	80.1
Class attendance rate in early childhood education	87	43.9
Proportion of children who are developmentally on track	4	89.0
Proportion of children with stimulating home learning environments	5	80.7
Pupil-based teacher ratio in preprimary education	27	80.8
Quality and infrastructure	89	80.0
Completion rate in upper secondary education, gender parity	80	80.4
Completion rate in upper secondary education, wealth parity	49	81.3
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>188</b>	<b>91.7</b>
Commence training and learning	100	91.1
Firms offering formal training (%)	115	15.1
Labour force with short-cycle tertiary education (%)	108	108
Participation rate in formal and non-formal education and training	108	108
TVET resources	108	3.0
Government expenditure on vocational education (%)	78	8
Share of students enrolled in secondary vocational programmes	122	3.1
Share of students enrolled in postsecondary vocational programmes	89	21.0
TVET quality and infrastructure	108	108
Extent of staff training	108	108
Quality of vocational training	108	108
Ratio of high-skill TVET occupations earnings to average wage	108	108
Ratio of median-skill TVET occupations earnings to average wage	108	108
<b>TVET labour market</b>	<b>119</b>	<b>80.8</b>
Efficiency of the labour market	100	81.3
Firms considered well-integrated educated workforce (%)	70	80
Employment educational mismatch (%)	88	38.5
Proportion of skilled production workers	108	108
Unemployment rate with vocational education	108	108
Real TVET unemployment	100	80
Share of TVET occupations	82	48.0
Manufacturing employment (%)	138	13.5
Quality and infrastructure	108	83.3
Enrollment in vocational education, gender parity	100	41.0
Useable employment rate	88	74.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>138</b>	<b>24.1</b>
Expenditure	138	0
Government expenditure per tertiary student	124	0
Teaching staff compensation (% tertiary expenditure)	108	108
Enrollment	127	0
Enrollment in bachelor's or equivalent level (%)	118	3.8
Enrollment in masters, doctoral or equivalent (%)	108	0.5
Resources	88	103.0
Ratios/teacher ratio in tertiary education	78	38.3
Researchers in higher education (%)	108	108
<b>Learning environment</b>	<b>81</b>	<b>83.4</b>
Directly and indirectly funded	100	41.1
Teachers in tertiary education, gender parity	98	88.0
Labour mobility rate	82	13.0
Academic freedom	108	108
Quality and infrastructure	17	97.7
Class attendance rate in tertiary education, gender parity	73	85.0
Class attendance rate in tertiary education, wealth parity	1	100
Class attendance rate in tertiary education, location parity	48	7.3
<b>Outputs</b>	<b>4</b>	<b>77.3</b>
Efficiency	108	108
Educational attainment rate, bachelor's or equivalent	108	108
Educational attainment rate, master's or equivalent	108	108
Educational attainment rate, doctoral or equivalent	108	108
Employment	10	11.0
Labour force participation rate with advanced education	28	81.0
Unemployment rate with advanced education	88	33
Impact	108	108
University tertiary enrollment in FTE	108	108
UNITE indicators per FTE personnel in higher education	108	108
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>188</b>	<b>12.3</b>
Commence innovation	108	108
GDP (% GDP)	108	108
GERD per researcher	108	108
Researchers per thousand labour force	108	108
Tertiary graduates from STEM programmes (%)	108	108
Quality and infrastructure	108	83.3
GERD performed by business enterprises (%)	108	108
GERD financed by business enterprises (%)	108	108
Researchers in business enterprises (%)	108	108
Firms that spend on R&D (%)	100	8.4
Quality and infrastructure	108	83.3
High-skill employment (%)	89	18.0
Intellectual property payments (% total trade)	81	85.0
State of cluster development	108	108
Outputs	1	100.0
Commence innovation	108	108
Average documents per researcher	108	108
Citations per document	4	38
Patent applications (per 100 billion GDP)	108	108
Quality and infrastructure	108	83.3
Intellectual property receipts (% total trade)	117	0
Research design applications (per 100 billion GDP)	108	108
PCT applications (per 100 billion GDP)	40	84.0
Firms producing new goods and services (%)	112	9.8



# SAINT LUCIA

	Rank	Value
<b>Business environment</b>		
Treatment applications per 100 million GDP	116	116
Cultural goods exports (% exports)	1	100
Printing and publishing output (% manufactured output)	116	116
<b>Energy</b>	100	11.7
<b>Finance</b>	111	11.1
Ratio of institutions' provisions	116	116
Depth of innovative companies	116	116
ISO 9001 quality certificates (% GDP)	125	2.8
ISO 14001 environmental certificates (% GDP)	75	7.7
<b>Infrastructure</b>	116	11.6
CERD forecast from abroad (%)	116	116
Cost of internet per storage volume deals (% GDP)	116	116
Computer software spending (% GDP)	116	116
<b>Government services</b>	116	11.6
New business density per thousand population	65	6.3
Firms with web presence (relative %)	125	8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	111	22.2
<b>Infrastructure</b>	111	22.2
<b>Coverage</b>	111	22.2
3G/4G mobile network coverage (% population)	102	9.4
Secure Internet servers per 1 million population	89	3.5
Investment in telecommunication services (% GDP)	37	42.0
<b>Speed</b>	75	18.0
Mobile internet and download speeds	116	116
Fixed broadband upload and download speeds	116	116
Fixed broadband subscriptions (by speed) per hundred people	75	18.0
<b>Availability</b>	85	71.1
Fixed broadband basket (% GNI per capita)	81	70.2
Mobile broadband basket (% GNI per capita)	116	44.3
Internet and telephone competition	1	100
<b>Access</b>	114	22.2
<b>Subscriptions</b>	111	22.2
Active mobile-broadband subscriptions per fixed-line inhabitants	125	17.0
International Internet bandwidth per user	108	17.1
Households with Internet access at home (%)	89	45.7
<b>Skills and employment</b>	116	11.6
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	116	116
ICT employment (%)	85	17.0
<b>Usage</b>	110	22.2
<b>Services</b>	116	11.6
Government online services	125	35.0
Fixed broadband internet traffic per subscription	100	8
Mobile broadband internet traffic per subscription	127	8
Internet users (%)	105	46.1
<b>Commerce</b>	116	11.6
ICT FDI parent applications (per 100 million GDP)	116	116
E-participation	123	39.3
Internet activities by individuals (%)	116	116
Trade in digitally deliverable services (% total trade)	119	22.5
<b>ECONOMY</b>	74	22.2
<b>Economic competitiveness</b>	85	22.2
<b>Infrastructure investment</b>	11	31
Overhead capital formation (% GDP)	116	116
Logistics performance	116	116
Transport productive capacity	89	40
Building quality control	80	20

	Rank	Value
<b>Business agility</b>	11	22.1
Cost of starting a business	81	89.4
Recovery recovery rate	52	47.0
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	86	26.0
<b>Customer experience</b>	28	21.0
<b>Trade and investment</b>	17	62.0
Trade (% GDP)	116	116
High-technology trade (% total trade)	126	20.0
Market concentration	85	77.0
Market concentration	110	60.0
Product diversity	107	41.0
Climate financial openness	76	44.0
Foreign direct investment, net inflows (% GDP)	89	35.7
Open dynamics	116	116
<b>Financing and domestic value added</b>	100	14
<b>Financing and credit</b>	17	21.4
Domestic credit to private sector (% GDP)	54	25.0
IMRS financing gap (% GDP)	30	75.1
Tax and contribution rate (% profit)	84	72.0
Bank nonperforming loans (%)	108	50
<b>Unmet basic needs</b>	107	31.7
Medium- and high-tech activities value added	112	6.8
Industry and services value added (% GDP)	75	82.0
Labour underutilization rate	121	43.1
Output per worker	85	12.1
<b>ENABLING ENVIRONMENT</b>	58	22.2
<b>Governance</b>	28	70.0
<b>Political environment</b>	17	76.0
Peace and stability	22	75.0
View and accountability	24	73.0
Quality of institutions	44	60.0
Rule of law	89	71.1
Control of corruption	45	60.0
Government effectiveness	85	60.0
<b>Socio-economic</b>	126	40.0
<b>Gender equity</b>	121	50.0
Female-to-male ratio in parliament	124	12.5
Female-to-male labour force participation	28	88.0
Female-to-male ratio in internal wage	116	116
<b>Gender equality</b>	110	22.0
Social protection coverage (% population)	85	60.0
Adult literacy rate	116	116
Youth not in employment, education or training (%)	121	34.3
<b>Standard of living</b>	85	27.0
Poverty headcount ratio (% population)	70	60.0
GDP per capita	83	70.0
<b>Health and environment</b>	88	64.7
<b>Health</b>	81	35
Universal health coverage	85	60
Healthy life expectancy (years)	80	60.0
Under-five mortality rate	80	60.0
<b>Environmental performance</b>	80	60.0
Renewable energy consumption (%)	117	10.0
Household footprint per capita	75	60.0
Natural hazard exposure	27	74

\*All values are normalized to a scale from 0 (worst) to 100 (best).

الله أكبر  
رسول الله



# SAUDI ARABIA

## KEY INDICATORS

GDP US\$ billions	1,543.235
Population	34,813,867
HDI	0.854

**GKI RANK** 40/154

**GKI SCORE** 57.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Saudi Arabia is a strong performer in terms of its knowledge infrastructure. It ranks 40th out of 154 countries in the Global Knowledge Index 2021 and 39th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

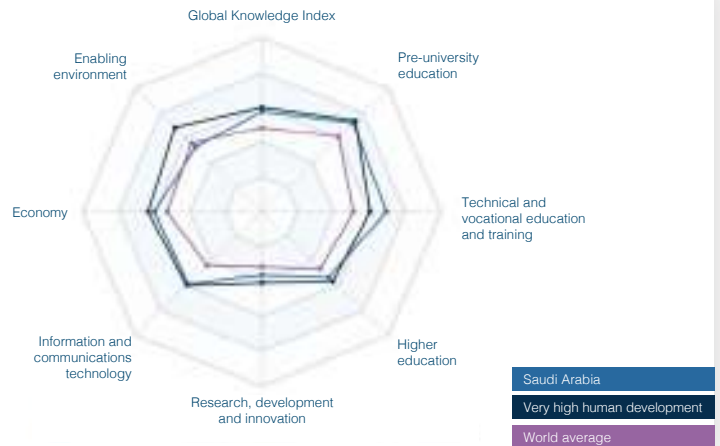
- + Cultural goods exports (% exports)
- + Mobile broadband Internet traffic per subscription
- + Households with Internet access at home (%)
- + Individuals with standard ICT skills (%)
- + Ratio of medium-skill TVET occupations earnings to average wage

### AREAS OF IMPROVEMENT

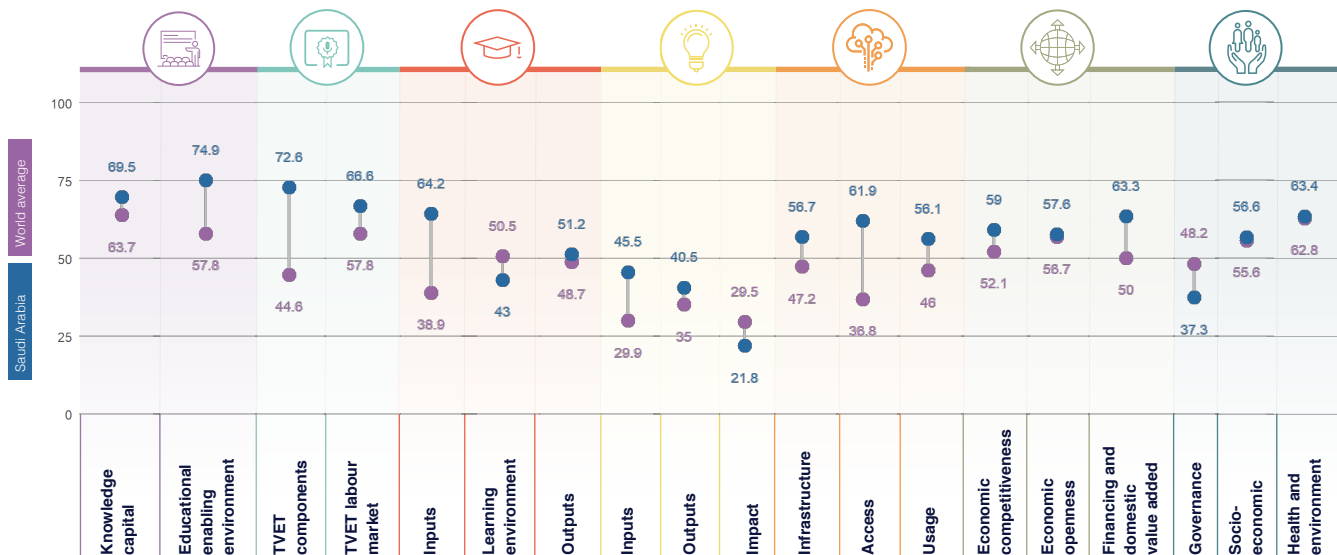
- Renewable energy consumption (%)
- Female-to-male labour force participation
- Enrolment in vocational education, gender parity
- Academic freedom
- Voice and accountability

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	52	72.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	9	69.6
HIGHER EDUCATION	42	52.8
RESEARCH, DEVELOPMENT AND INNOVATION	47	36
INFORMATION AND COMMUNICATIONS TECHNOLOGY	35	58.2
ECONOMY	48	60
ENABLING ENVIRONMENT	83	52.4



## GKI PILLARS





	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	82	65.3
Investment	81	51.7
Net enrolment rate in primary education	87	84.3
Net enrolment rate in lower secondary education	35	87.5
Net enrolment rate in upper secondary education	21	86.1
Completion	59	73.3
Years of compulsory education in primary and secondary	67	63.2
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	1	87.5
Completion	100	117.3
Assessment of 15-year-old students in math, science and reading	59	21.3
Learning-adjusted years of schooling	80	53.5
<b>Educational enabling environment</b>	<b>24</b>	<b>76.9</b>
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	81	80.3
Full-time teacher ratio in primary education	90	84.1
Full-time teacher ratio in secondary education	21	81.3
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	17	50.4
Class attendance rate in early childhood education	127	118.6
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Full-time teacher ratio in preprimary education	15	84.2
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>6</b>	<b>51.3</b>
Companies training apprentices	116	116
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	11	74.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	22	46.5
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	2	50.0
Extent of staff training	81	80.5
Quality of vocational training	30	50.2
Ratio of high-skil TVET occupations earnings to average wage	10	77.6
Ratio of medium-skill TVET occupations earnings to average wage	4	55.4
<b>TVET labour market</b>	<b>81</b>	<b>66.8</b>
Efficiency of the labour market	94	71.5
Firms considered with inappropriately educated workforce (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	57	79.0
Real TVET unemployment	35	59.7
Share of TVET occupations	84	52.1
Manufacturing employment (%)	11	87.2
Quality and infrastructure	116	61.3
Enrolment in vocational education, gender parity	115	25.0
Useable employment rate	6	87.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>6</b>	<b>84.3</b>
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	31	41.1
Enrolment in bachelor's or equivalent level (%)	45	28.5
Enrolment in masters, doctoral or equivalent (%)	31	52.0
Resources	9	87.3
Right teacher ratio in tertiary education	23	87.3
Researchers in higher education (%)	116	116
<b>Learning environment</b>	<b>100</b>	<b>61</b>
Directly paid academic freedom	110	40
Teachers in tertiary education, gender parity	55	71
Labour mobility rate	15	50.4
Academic freedom	143	7.6
Quality and infrastructure	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>82</b>	<b>51.2</b>
Attainment	30	43.1
Educational attainment rate, bachelor's or equivalent	20	64.0
Educational attainment rate, master's or equivalent	38	26.7
Educational attainment rate, doctoral or equivalent	93	50.1
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	22	52.0
University tertiary enrollment in R&D	55	52.5
UNRISD indicators per 100 personnel in higher education	116	116
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>22</b>	<b>44.3</b>
Access to R&D resources	11	50.0
GDP (% GDP)	41	16.5
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	24	84.2
Quality and infrastructure	116	116
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
Quality and infrastructure	11	50.1
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	116	116
State of cluster development	11	66.1
<b>Outputs</b>	<b>11</b>	<b>50.1</b>
Access to R&D resources	11	50.0
Average documents per researcher	116	116
Citations per document	41	22.0
Patent applications (per 100 billion GDP)	55	55.0
Quality and infrastructure	116	50.0
Intellectual property receipts (% total trade)	116	116
Research design applications (per 100 billion GDP)	88	2
PCT applications (per 100 billion GDP)	34	68.0
Firms producing new goods and services (%)	116	116

	Rank	Value
<b>Consumer Electronics</b>		
Treatment applications per 100 million GDP	93	6.4
Cultural goods exports (% exports)	2	22.5
Printing and publishing output (% manufactured output)	44	25.2
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations percentage	38	28.4
Depth of innovative companies	7	63.2
ISO 9001 quality certificates (% GDP)	21	33.4
ISO 14001 environmental certificates (% GDP)	104	2.8
<b>Industry</b>		
CERD forecast from abroad (%)	116	118
Joint ventures per strategic industry deals (% GDP)	73	8.1
Computer software spending (% GDP)	30	27.7
<b>Government Services</b>		
New business density per thousand population	55	12.4
Firms with new products/services (%)	116	118
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>41</b>	<b>52.2</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
3G/4G mobile network coverage (% population)	22	66.5
Secure Internet servers per 1 million population	57	2.7
Investment in telecommunication services (% GDP)	57	3.0
<b>Speed</b>		
Mobile spread and download speeds	6	62.3
Fixed broadband upload and download speeds	45	16.4
Fixed broadband subscriptions (by speed) per hundred people	47	47.5
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	75	24.7
Mobile broadband basket (% QM per capita)	30	73.3
Internet and telephony competition	1	100
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per hundred inhabitants	30	50.4
International Internet bandwidth per user	64	30
Households with Internet access at home (%)	4	96.7
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	3	92.8
Tertiary graduates from ICT programmes (%)	69	54.7
ICT employment (%)	75	13
<b>Usage</b>		
<b>Services</b>		
Government online services	70	65.8
Fixed broadband Internet traffic per subscription	27	19.0
Mobile broadband Internet traffic per subscription	3	74
Internet users (%)	1	97.7
<b>Commerce</b>		
ICT/FIT patent applications (per 100,000 GDP)	59	47.6
E-participation	69	71.4
Internet activities by individuals (%)	38	57.4
Trade in digitally deliverable services (% total trade)	136	12.3
<b>ECONOMY</b>	<b>48</b>	<b>60</b>
<b>Economic Competitiveness</b>		
<b>Efficiency</b>		
Overhead capital formation (% GDP)	69	49.4
Logistics performance	23	50.5
Transport productive capacity	77	25.3
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>		
Time of starting a business	34	63.1
Recovery time	108	118
Entrepreneurial employee activity rate	75	6.3
Growth of corporate transactions	1	100
<b>Corporate Governance</b>		
Trust and development	122	42.5
Tax (% GDP)	113	18.5
High-technology trade (% total trade)	100	34.2
Market concentration	108	49.8
Market concentration	62	81.5
Product diversity	42	61.5
Climate financial openness	62	76
Foreign direct investment, net inflows (% GDP)	100	30.2
Cost dynamics	1	100
<b>Financing and domestic value added</b>	<b>21</b>	<b>63.3</b>
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	75	19.5
MSME financing gap (% GDP)	116	118
Tax and contribution rate (% profit)	13	82.2
Bank nonperforming loans (%)	36	81.0
Unmet loan demand	10	11.7
Medium- and high-tech activities value added	42	46
Industry and services value added (% GDP)	6	79.0
Labour underutilization rate	89	61.1
Output per worker	15	45.0
<b>ENABLING ENVIRONMENT</b>	<b>81</b>	<b>62.4</b>
<b>Governance</b>		
<b>Political environment</b>		
Peace and stability	115	22.0
View and accountability	100	5.4
Quality of institutions	57	65.5
Rule of law	57	60.1
Control of corruption	51	63
Government effectiveness	84	68.7
<b>Socio-economic</b>		
<b>Gender equity</b>		
Female-to-male ratio in parliament	100	24.8
Female-to-male labour force participation	145	21.5
Female-to-male ratio in internal wage	1	100
<b>Healthcare</b>		
Social protection coverage (% population)	55	81.1
Adult literacy rate	35	96.0
Youth not in employment, education or training (%)	75	63.0
<b>Standard of living</b>		
Poverty headcount ratio (% population)	116	118
GDP per capita	21	29.6
<b>Health and environment</b>		
<b>Health</b>		
Universal health coverage	55	74
Healthy life expectancy (years)	86	75
Under-five mortality rate	34	87.7
<b>Environmental performance</b>		
Renewable energy consumption (%)	144	0.8
Household footprint per capita	117	86.8
Natural hazard exposure	37	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 134/154

**GKI SCORE** 34.2

**WORLD AVERAGE** 48.4

# SENEGAL

## KEY INDICATORS

**GDP US\$ billions** 55.256  
**Population** 16,743,930  
**HDI** 0.512

## COUNTRY PERFORMANCE SUMMARY

Senegal is a weak performer in terms of its knowledge infrastructure. It ranks 134th out of 154 countries in the Global Knowledge Index 2021 and 11th out of the 27 countries with low human development.

### AREAS OF STRENGTH

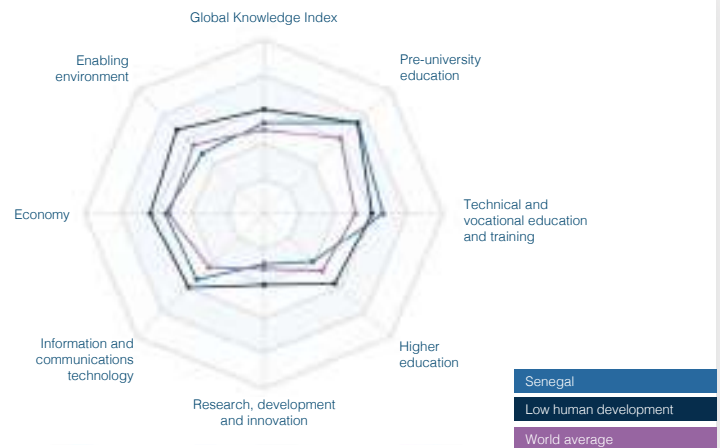
- + Researchers in higher education (%)
- + Ratio of high-skill TVET occupations earnings to average wage
- + Gross attendance ratio for tertiary education, gender parity
- + MSME financing gap (% GDP)
- + Female-to-male ratio in parliament

### AREAS OF IMPROVEMENT

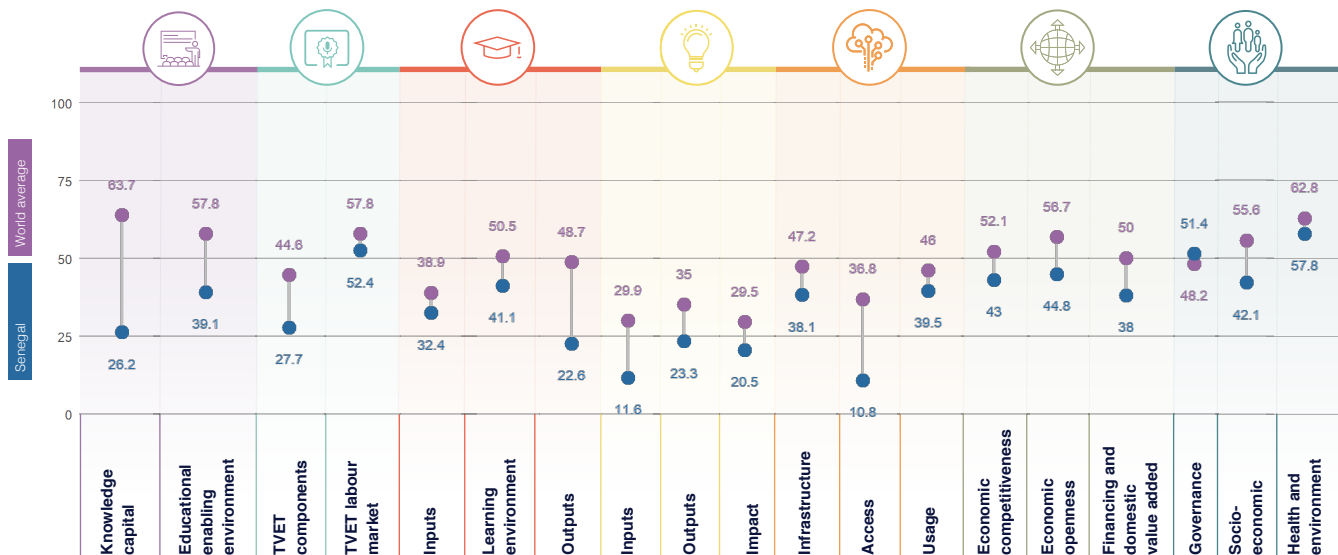
- Labour underutilization rate
- Citable documents per R&D personnel in higher education
- Average documents per researcher
- Net enrolment rate in upper secondary education
- Ratio of medium-skill TVET occupations earnings to average wage

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	142	32.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	127	40.1
HIGHER EDUCATION	140	32.1
RESEARCH, DEVELOPMENT AND INNOVATION	140	18.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	115	29.4
ECONOMY	129	41.9
ENABLING ENVIRONMENT	94	50.5



## GKI PILLARS







# SENEGAL

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	142	22.6
Enrollment	143	26.2
Net enrolment rate in primary education	144	95.1
Net enrolment rate in lower secondary education	128	75.1
Net enrolment rate in upper secondary education	122	7.1
Completion	121	37.2
Years of compulsory education in primary and secondary	28	66.6
Completion rate in upper secondary education	102	6.8
Success rate rate in the last grade of lower secondary education	128	21.7
Completion	127	24.2
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	128	24.6
<b>Educational enabling environment</b>	<b>138</b>	<b>26.5</b>
Expenditure	81	22.1
Government expenditure on primary education (% GDP)	47	37.4
Government expenditure on secondary education (% GDP)	89	17.2
Government funding per primary student (% GDP per capita)	75	22.8
Government funding per secondary student (% GDP per capita)	85	32.4
Resources	87	22.8
Pupil-based teacher ratio in primary education	80	55
Pupil-based teacher ratio in secondary education	88	65.6
Schools with access to computers in primary education (%)	72	26.5
Schools with access to computers in secondary education (%)	67	25.4
Early learning	133	22.4
Class attendance rate in early childhood education	119	12
Proportion of children who are developmentally on track	45	41.4
Proportion of children with stimulating home learning environments	62	36.3
Pupil-based teacher ratio in preprimary education	73	52
Quality and infrastructure	119	32
Completion rate in upper secondary education, gender parity	84	64.2
Completion rate in upper secondary education, wealth parity	102	6.8
Completion rate in upper secondary education, location parity	108	22.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>144</b>	<b>31.2</b>
Companies training apprentices	111	12.1
Firms offering formal training (%)	102	26.1
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	25	7.4
TVET resources	122	18.2
Government expenditure on vocational education (%)	62	22
Share of students enrolled in secondary vocational programmes	85	9.4
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	32	22.6
Extent of staff training	111	44.2
Quality of vocational training	32	60.4
Ratio of high-skil TVET occupations earnings to average wage	1	100
Ratio of medium-skil TVET occupations earnings to average wage	118	11.5
<b>TVET labour market</b>	<b>107</b>	<b>22.4</b>
Efficiency of the labour market	111	24.2
Firms considered with inappropriately educated workforce (%)	25	64.8
Employment educational mismatch (%)	105	36.6
Proportion of skilled production workers	82	42.7
Unemployment rate with vocational education	79	72.5
Real TVET unemployment	76	24.7
Share of TVET occupations	122	22.4
Manufacturing employment (%)	81	44.1
Quality and infrastructure	122	44.1
Enrollment in vocational education, gender parity	95	64.6
Useable employment rate	121	22.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>101</b>	<b>22.4</b>
Expenditure	87	18.6
Government expenditure per tertiary student	58	16.0
Teaching staff compensation (% tertiary expenditure)	74	26.2
Enrollment	121	12.2
Enrollment in bachelor's or equivalent level (%)	118	6.1
Enrollment in masters, doctoral or equivalent (%)	66	14.4
Resources	47	33.0
Rapit teacher ratio in tertiary education	128	41.1
Research staff in higher education (%)	1	300
<b>Learning environment</b>	<b>118</b>	<b>41.1</b>
<b>Quality and infrastructure</b>	<b>114</b>	<b>41.7</b>
Teachers in tertiary education, gender parity	112	14
Labour mobility rate	35	24.6
Academic freedom	28	62.2
Quality and infrastructure	122	22.5
Class attendance rate in tertiary education, gender parity	6	67.9
Class attendance rate in tertiary education, wealth parity	66	16.6
Class attendance rate in tertiary education, location parity	58	28
<b>Outputs</b>	<b>140</b>	<b>22.8</b>
Attainment	82	6.4
Educational attainment rate, bachelor's or equivalent	98	9
Educational attainment rate, master's or equivalent	67	5.1
Educational attainment rate, doctoral or equivalent	73	2.2
Employment	122	42.7
Labour force participation rate with advanced education	118	32.9
Unemployment rate with advanced education	125	48.6
Impact	118	18.0
University tertiary enrollment in FTE	85	37.9
CRIDE students per FTE personnel in higher education	93	1.2
<b>INNOVATION, SCIENCE AND TECHNOLOGY</b>		
<b>Inputs</b>	<b>108</b>	<b>12.2</b>
Government R&D expenditure	122	12.2
GDP (% GDP)	55	11.5
GERD per researcher	101	5.1
Researchers per thousand labour force	54	16
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality and infrastructure</b>	<b>122</b>	<b>12.2</b>
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	88	2.6
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	76	16.1
<b>Quality and infrastructure</b>	<b>122</b>	<b>12.2</b>
High-skilled employment (%)	81	4.2
Intellectual property payments (% total trade)	107	5.1
State of cluster development	89	42.4
<b>Outputs</b>	<b>122</b>	<b>12.2</b>
Government R&D expenditure	122	12.2
Average documents per researcher	103	17.7
Citations per document	96	27.2
Patent applications (per 100 billion GDP)	87	37
<b>Quality and infrastructure</b>	<b>122</b>	<b>12.2</b>
Intellectual property receipts (% total trade)	85	16.7
Research design applications (per 100 billion GDP)	87	38
PCT applications (per 100 billion GDP)	97	39
Firms producing new goods and services (%)	30	63.8





# SENEGAL

	Rank	Value
<b>Business environment</b>		
Trademark applications per 100 million GDP	105	5.8
Cultural goods exports (% exports)	112	3.8
Printing and publishing output (% manufactured output)	75	10.2
<b>Energy</b>	111	25.3
<b>Trade</b>	100	10.0
Access to investors' protection	108	4.8
Depth of innovative companies	85	50.0
ISO 9001 quality certificates (% GDP)	104	0.1
ISO 14001 environmental certificates (% GDP)	118	1.8
<b>Logistics</b>	80	11.1
CERD received from abroad (%)	85	10
Cost of letters per storage volume dealt (% GDP)	109	2.1
Computer software spending (% GDP)	70	17.1
<b>Government efficiency</b>	100	11.0
New business density per thousand population	106	2.2
Firms with new products/services (%)	85	86.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	111	26.8
<b>Infrastructure</b>	100	26.8
<b>Coverage</b>	80	44.0
30MHz mobile network coverage (% population)	106	76.0
Secure Internet servers per 1 million population	104	0.8
Investment in telecommunication services (% GDP)	10	8.5
<b>Quality</b>	108	11.2
Mobile speed and download speeds	75	18.0
Fixed broadband upload and download speeds	83	0.8
Fixed broadband subscriptions (y speed) per hundred people	118	0.8
<b>Availability</b>	114	22.0
Fixed broadband bandwidth (% Gbps per capita)	109	80.0
Mobile broadband basket (% Gbps per capita)	106	47.4
Internet and telephony competition	100	80
<b>Access</b>	140	10.0
<b>Subscribers</b>	100	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	83	20.0
International Internet bandwidth per user	108	17
Households with Internet access at home (%)	140	9.8
<b>Skills and employment</b>	100	0.2
Individuals with standard ICT skills (%)	108	19
Tertiary graduates from ICT programmes (%)	106	19
ICT employment (%)	112	3.8
<b>Usage</b>	84	26.0
<b>Services</b>	80	40.0
Government online services	111	40.4
Fixed broadband Internet traffic per subscriber	108	19
Mobile broadband Internet traffic per subscriber	106	19
Internet users (%)	112	36.0
<b>Commerce</b>	110	10.1
ICT/FIT patent applications (per 100 million GDP)	85	33.0
E-participation	117	44.1
Internet activities by individuals (%)	106	19
Trade in digitally deliverable services (% total trade)	100	20.0
<b>ECONOMY</b>	100	47.9
<b>Economic complexity/structure</b>	117	40
<b>Infrastructure investment</b>	111	43.0
Overhead capital formation (% GDP)	25	86.1
Logistics performance	104	31.0
Transport productive capacity	143	8.8
Building quality control	80	86.7

	Rank	Value
<b>Business agility</b>	111	43.0
Ease of starting a business	85	81.2
Recovery recovery rate	87	32.0
Entrepreneurial employee activity rate	45	18.0
Growth of corporate transactions	88	20.0
<b>Employee experience</b>	122	46.0
<b>Trade and investment</b>	10	23.0
Trade (% GDP)	86	22.0
High-technology trade (% total trade)	121	32.1
Market concentration	87	76
Market concentration	84	81.8
<b>Product innovation</b>	100	14
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	45	49.7
Cost dynamics	110	40
<b>Financing and domestic value added</b>	128	33
<b>Financing and costs</b>	100	11.0
Domestic credit to private sector (% GDP)	100	10.1
MSME financing gap (% GDP)	11	87.0
Tax and contribution rate (% profit)	100	82.0
Bank nonperforming loans (%)	108	19
<b>Unmet needs index</b>	140	11.0
Medium- and high-tech activities value added	76	25.2
Industry and services value added (% GDP)	102	40.0
Labour underutilization rate	100	12.0
Output per worker	119	0.1
<b>ENABLING ENVIRONMENT</b>	84	50.0
<b>Governance</b>	83	51.4
<b>Political environment</b>	81	51.1
Peace and stability	72	40.7
View and accountability	88	23.0
Quality of institutions	89	17.0
Rule of law	80	43.0
Control of corruption	80	57.2
Government effectiveness	76	83.8
<b>Socio-economic</b>	121	42.1
<b>Gender equity</b>	75	80.0
Female-to-male ratio in parliament	15	75.0
Female-to-male labour force participation	121	87.0
Female-to-male ratio in internal wage	108	19
<b>Gender equality</b>	141	24.0
Social protection coverage (% population)	108	19
Adult literacy rate	111	38.1
Youth not in employment, education or training (%)	138	30.0
<b>Standard of living</b>	110	21.8
Poverty headcount ratio (% population)	80	40.0
GDP per capita	128	2.4
<b>Health and environment</b>	119	57.8
<b>Health</b>	100	10.0
Universal health coverage	100	40
Healthy life expectancy (years)	119	60.7
Under-five mortality rate	100	62.4
<b>Environmental performance</b>	80	80.0
Renewable energy consumption (%)	52	30
Household footprint per capita	28	86.0
Natural hazard exposure	81	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 43/154

**GKI SCORE** 55.5

**WORLD AVERAGE** 48.4

# SERBIA

## KEY INDICATORS

**GDP US\$ billions** 125.799  
**Population** 8,737,370  
**HDI** 0.806

## COUNTRY PERFORMANCE SUMMARY

Serbia is a strong performer in terms of its knowledge infrastructure. It ranks 43rd out of 154 countries in the Global Knowledge Index 2021 and 42nd out of the 61 countries with very high human development.

### AREAS OF STRENGTH

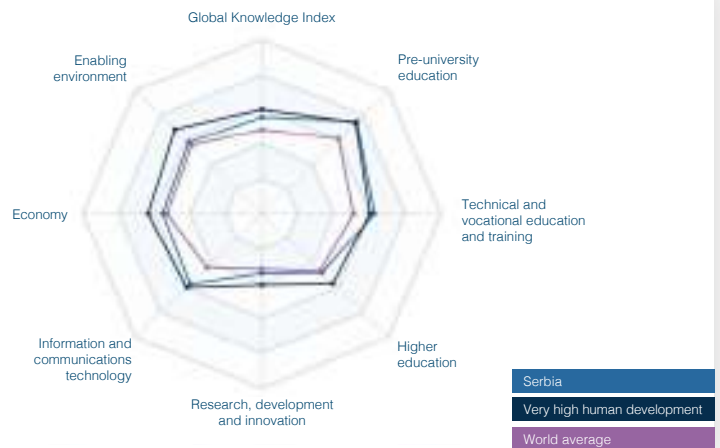
- + Proportion of children who are developmentally on track
- + Proportion of children with stimulating home learning environment
- + Government funding per primary student (% of GDP per capita)
- + ISO 9001 quality certificates (% GDP)
- + ISO 14001 environmental certificates (% GDP)

### AREAS OF IMPROVEMENT

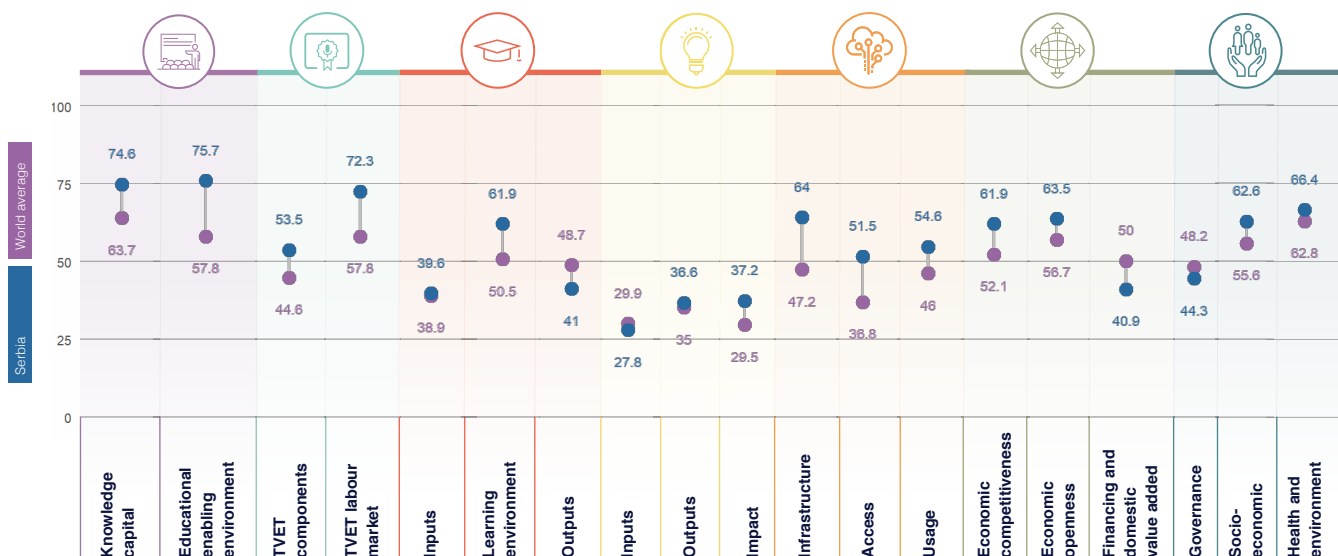
- Years of compulsory education in primary and secondary
- Computer software spending (% GDP)
- MSME financing gap (% GDP)
- Labour force with short-cycle tertiary education (%)
- Firms with new product/service (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	35	75.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	30	62.9
HIGHER EDUCATION	68	47.5
RESEARCH, DEVELOPMENT AND INNOVATION	55	33.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	40	56.7
ECONOMY	60	55.4
ENABLING ENVIRONMENT	61	57.8



## GKI PILLARS





# SERBIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	81	74.6
Enrollment	99	95.5
Net enrolment rate in primary education	75	81.2
Net enrolment rate in lower secondary education	80	86.1
Net enrolment rate in upper secondary education	99	83.4
Completion	99	75.6
Years of compulsory education in primary and secondary	119	81.5
Completion rate in upper secondary education	30	87
Success rate rate in the last grade of lower secondary education	45	79.9
Completion	99	97.7
Assessment of 15-year-old students in math, science and reading	49	44.3
Learning-adjusted years of schooling	42	71.1
<b>Educational enabling environment</b>	21	76.7
Expenditure	9	93.5
Government expenditure on primary education (% GDP)	39	42
Government expenditure on secondary education (% GDP)	51	32.3
Government funding per primary student (% GDP per capita)	1	109
Government funding per secondary student (% GDP per capita)	7	57.3
Resources	69	11.2
Pupil-based teacher ratio in primary education	57	77.6
Pupil-based teacher ratio in secondary education	47	76.9
Schools with access to computers in primary education (%)	119	119
Schools with access to computers in secondary education (%)	119	119
Early learning	8	93.9
Class attendance rate in early childhood education	69	45.8
Proportion of children who are developmentally on track	1	109
Proportion of children with stimulating home learning environments	1	109
Pupil-based teacher ratio in preprimary education	33	88.8
Quality and infrastructure	41	81.7
Completion rate in upper secondary education, gender parity	43	94
Completion rate in upper secondary education, wealth parity	42	84.3
Completion rate in upper secondary education, location parity	33	89.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communications training and learning	99	41.9
Firms offering formal training (%)	45	47.1
Labour force with short-cycle tertiary education (%)	75	57.7
Participation rate in formal and non-formal education and training	49	26.7
TVET resources	9	93.5
Government expenditure on vocational education (%)	3	77.7
Share of students enrolled in secondary vocational programmes	13	57.2
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	119	39.4
Extent of staff training	100	43.6
Quality of vocational training	63	45.7
Ratio of high-skill TVET occupations earnings to average wage	76	29.9
Ratio of median-skill TVET occupations earnings to average wage	69	40.5
<b>TVET labour market</b>		
Efficiency of the labour market	99	93.7
Firms considered with inappropriately educated workforce (%)	89	82.6
Employment educational mismatch (%)	27	75.9
Proportion of skilled production workers	70	57.4
Unemployment rate with vocational education	74	76.1
Real TVET unemployment	76	69.9
Share of TVET occupations	34	67.4
Manufacturing employment (%)	19	85.9
Quality and infrastructure	41	81.7
Enrollment in vocational education, gender parity	37	89
Useable employment rate	69	74.3

	Rank	Value
<b>HIGHER EDUCATION</b>		
Inputs	71	39.8
Expenditure	99	19.9
Government expenditure per tertiary student	49	19.3
Teaching staff compensation (% tertiary expenditure)	119	119
Enrollment	41	31.1
Enrollment in bachelor's or equivalent level (%)	67	28
Enrollment in masters, doctoral or equivalent (%)	45	36.2
Resources	97	69.3
Rapiteacher ratio in tertiary education	69	85.5
Researcher in higher education (%)	27	71.9
<b>Learning environment</b>	43	81.9
Timely and academic freedom	41	81.1
Teachers in tertiary education, gender parity	12	84.1
Labour mobility rate	96	19.9
Academic freedom	62	72.9
Quality and infrastructure	9	67.7
Class attendance rate in tertiary education, gender parity	32	85.9
Class attendance rate in tertiary education, wealth parity	11	83.9
Class attendance rate in tertiary education, location parity	4	94.9
<b>Outputs</b>	109	49
Attainment	19	18.9
Educational attainment rate, bachelor's or equivalent	96	39.9
Educational attainment rate, master's or equivalent	91	6.9
Educational attainment rate, doctoral or equivalent	97	12.4
Employment	19	71.9
Labour force participation rate with advanced education	88	83.9
Unemployment rate with advanced education	89	77.8
Impact	99	31.8
University tertiary enrollment in R&D	89	39.9
OECD students per 1000 personnel in higher education	73	92.9
<b>Government expenditure and economic data</b>		
Inputs	75	37.2
Quality and infrastructure	99	109
GDP (% GDP)	49	16.4
GERD per researcher	61	12.5
Researchers per thousand labour force	37	28.4
Tertiary graduate from RTOB programmes (%)	19	86.9
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	44	9.9
GERD financed by business enterprises (%)	77	12.4
Researchers in business enterprises (%)	62	9.7
Firms that spend on R&D (%)	59	28.9
Quality and infrastructure	99	109
High-skill employment (%)	29	45.9
Intellectual property payments (% total trade)	51	59.9
State of cluster development	109	49
<b>Outputs</b>	99	109
Quality and infrastructure	99	109
Average documents per researcher	92	89.4
Citations per document	79	21.9
Patent applications (per 100 billion GDP)	59	83.9
Quality and infrastructure	99	109
Intellectual property receipts (% total trade)	35	92
Research design applications (per 100 billion GDP)	67	7.8
PCT applications (per 100 billion GDP)	55	56.9
Firms producing new goods and services (%)	81	89.9





# SERBIA

	Rank	Value
<b>Business environment</b>	81	82.2
Treatment applications (per 100 million GDP)	72	82.5
Cultural goods exports (% exports)	57	14.2
Printing and publishing output (% manufactured output)	37	24.2
<b>Energy</b>	99	51.2
<b>Finance</b>	1	99.9
Access to venture capital	28	36.6
Depth of innovative companies	79	43.2
ISO 9001 quality certificates (% GDP)	1	100
ISO 14001 environmental certificates (% GDP)	1	100
<b>Infrastructure</b>	81	59.9
CERD received from abroad (%)	33	41
Cost savings per strategic alliance deals (% GDP)	83	6.3
Computer software spending (% GDP)	104	3.8
<b>Internationalization</b>	107	10.1
New business density per thousand population	84	9.3
Firms with new products/services (%)	100	47.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	41	58.7
<b>Infrastructure</b>	85	6.4
<b>Coverage</b>	11	3.1
30MHz mobile network coverage (% population)	23	88.2
Secure Internet servers per 1 million population	44	13.2
Investment in telecommunication services (% GDP)	15	66.5
<b>Speed</b>	17	10.4
Mobile internet and download speeds	116	119
Fixed broadband upload and download speeds	116	118
Fixed broadband subscriptions (by speed) per hundred people	42	51.4
<b>Availability</b>	65	77.2
Fixed broadband latency (% QM per capita)	73	25.2
Mobile broadband basket (% QM per capita)	60	64.4
Internet and telephony competition	89	87.5
<b>Access</b>	36	31.5
<b>Subscriptions</b>	10	10.1
Active mobile broadband subscriptions per hundred inhabitants	47	41.2
International Internet bandwidth per user	24	62.7
Households with Internet access at home (%)	34	81.1
<b>Skills and employment</b>	10	43.5
Individuals with standard ICT skills (%)	47	37.5
Tertiary graduates from ICT programmes (%)	19	53.7
ICT employment (%)	24	42.7
<b>Usage</b>	52	54.8
<b>Services</b>	57	41.7
Government online services	41	75.4
Fixed broadband internet traffic per subscription	67	17.8
Mobile broadband internet traffic per subscription	44	16.8
Internet users (%)	66	77.2
<b>Commerce</b>	10	71.5
ICT FDI patent applications (per 100 million GDP)	21	47.6
E-participation	40	83.1
Internet activities by individuals (%)	81	66.7
Trade in digitally deliverable services (% total trade)	57	49.5
<b>ECONOMY</b>	90	53.4
<b>Economic complexity/structure</b>	33	51.3
<b>Manufacturing innovation</b>	10	3.1
Overhead capital formation (% GDP)	84	46.2
Logistics performance	65	46
Transport productive capacity	72	26.4
Building quality control	6	83.0

	Rank	Value
<b>Business agility</b>	10	75.2
Ease of starting a business	84	83.3
Recovery recovery rate	84	37.5
Entrepreneurial employee activity rate	116	119
Growth of corporate transactions	13	65.7
<b>Corporate openness</b>	82	83.3
<b>Trade and investment</b>	10	39
Trade (% GDP)	35	44.1
High-technology trade (% total trade)	83	44.3
Market concentration	9	82.2
Market concentration	11	85.5
<b>Product openness</b>	10	87.0
Charitable financial openness	118	118
Foreign direct investment, net inflows (% GDP)	17	85.0
Cost dynamics	88	59
<b>Financing and domestic value added</b>	122	46.3
<b>Financing and costs</b>	107	43.2
Domestic credit to private sector (% GDP)	84	16.7
MSME financing gap (% GDP)	92	47.0
Tax and contribution rate (% profit)	75	70.0
Bank nonperforming loans (%)	118	118
Unmet loan demand	10	31.5
Medium- and high-tech activities value added	82	28.8
Industry and services value added (% GDP)	113	82.3
Labour underutilization rate	110	81.7
Output per worker	75	15.6
<b>ENABLING ENVIRONMENT</b>	81	57.8
<b>Governance</b>	83	44.3
Political environment	71	42.0
Peace and stability	77	45.0
View and accountability	88	46.8
Quality of institutions	75	46.5
Rule of law	77	47.6
Control of corruption	95	37.5
Government effectiveness	73	54.3
<b>Socio-economic</b>	53	62.8
Gender equity	31	77.1
Female-to-male ratio in parliament	31	84.5
Female-to-male labour force participation	88	73.8
Female-to-male ratio in internal wage	81	85
Gender inequality	10	68.7
Social protection coverage (% population)	74	37.2
Adult literacy rate	10	89.0
Youth not in employment, education or training (%)	84	80.0
Standard of living	88	81.0
Poverty headcount ratio (% population)	87	87.0
GDP per capita	62	76
<b>Health and environment</b>	53	68.4
Health	66	74.5
Universal health coverage	55	85
Healthy life expectancy (years)	88	75.8
Under-five mortality rate	37	87.1
Environmental performance	75	83.1
Renewable energy consumption (%)	84	21.0
Household footprint per capita	81	80.1
Natural hazard exposure	81	90

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# SEYCHELLES

**GKI RANK** 44/154

**GKI SCORE** 55

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Seychelles is a strong performer in terms of its knowledge infrastructure. It ranks 44th out of 154 countries in the Global Knowledge Index 2021 and 2nd out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Transport productive capacity
- + Gross fixed capital formation (% GDP)
- + Enrolment in vocational education, gender parity
- + Tertiary graduates from ICT programmes (%)
- + Foreign direct investment, net inflows (% GDP)

### AREAS OF IMPROVEMENT

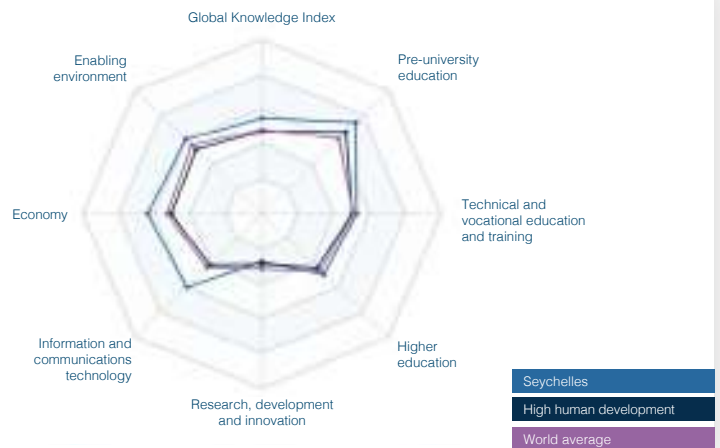
- Labour force participation rate with advanced education
- Government expenditure on vocational education (%)
- Inbound mobility rate
- Research institutions prominence
- Extent of corporate transparency

### KEY INDICATORS

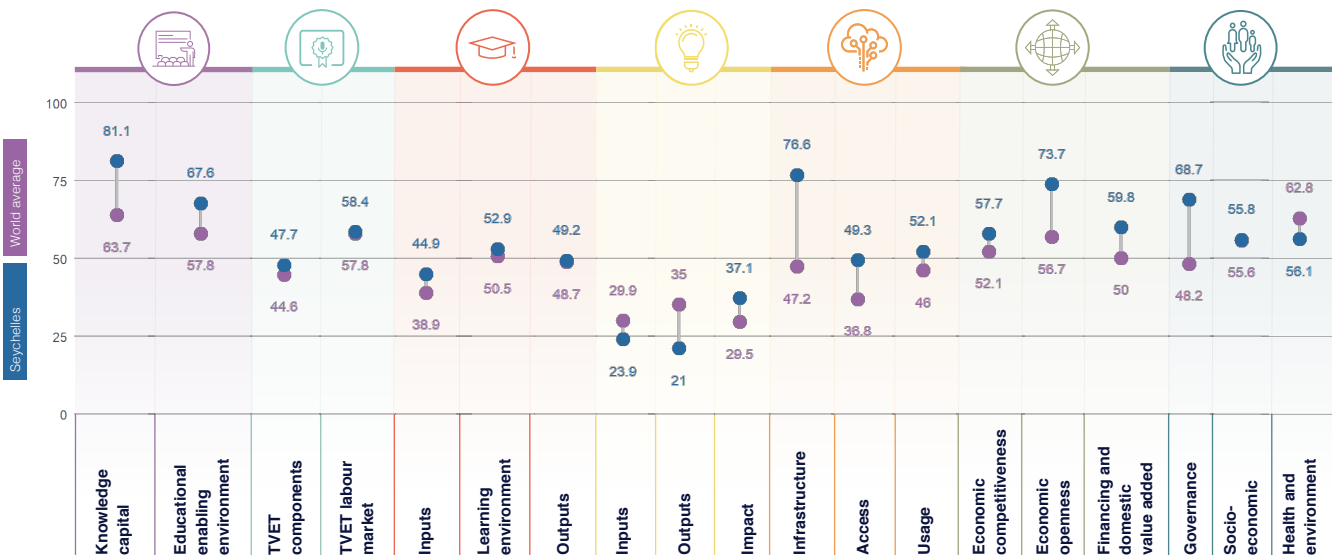
GDP US\$ billions	2.399
Population	98,340
HDI	0.796

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	42	74.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	71	53
HIGHER EDUCATION	56	49
RESEARCH, DEVELOPMENT AND INNOVATION	96	27.3
INFORMATION AND COMMUNICATIONS TECHNOLOGY	31	59.3
ECONOMY	34	63.7
ENABLING ENVIRONMENT	51	60.2



## GKI PILLARS





# SEYCHELLES

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	22	81.5
Enrolment	58	81.7
Net enrolment rate in primary education	24	85.8
Net enrolment rate in lower secondary education	85	86.0
Net enrolment rate in upper secondary education	83	83.4
Completion	41	81
Years of compulsory education in primary and secondary	42	78.0
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	20	82
Completion	31	70.7
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	43	70.7
<b>Educational enabling environment</b>	<b>88</b>	<b>87.8</b>
Expenditure	81	25.0
Government expenditure on primary education (% GDP)	75	20.7
Government expenditure on secondary education (% GDP)	80	21
Government funding per primary student (% GDP per capita)	70	23.8
Government funding per secondary student (% GDP per capita)	84	21.3
Resources	82	82.3
Pupil-based teacher ratio in primary education	28	88.7
Pupil-based teacher ratio in secondary education	38	84.3
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	17	80.0
Class attendance rate in early childhood education	92	80.9
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	45	84
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>81</b>	<b>87.7</b>
Companies training apprentices	116	116
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	81	81
Government expenditure on vocational education (%)	78	8
Share of students enrolled in secondary vocational programmes	84	20.1
Share of students enrolling in postsecondary vocational programmes	1	100
TVET quality and infrastructure	80	80.0
Extent of staff training	80	80.8
Quality of vocational training	82	85.4
Ratio of high-skil TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>	<b>82</b>	<b>86.4</b>
Efficiency of the labour market	116	116
Firms considered with inequality educated workforce (%)	116	116
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	116	116
Real TVET unemployment	116	10.0
Share of TVET occupations	116	116
Manufacturing employment (%)	128	18.0
Quality and infrastructure	2	84.3
Enrolment in vocational education, gender parity	8	86.4
Useable employment rate	116	116

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>81</b>	<b>84.8</b>
Expenditure	7	88.0
Government expenditure per tertiary student	11	88.0
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	111	81.1
Enrolment in bachelor's or equivalent level (%)	108	81.7
Enrolment in masters, doctoral or equivalent (%)	98	5.5
Resources	116	80.0
Ratio teacher ratio in tertiary education	97	88.0
Researcher in higher education (%)	116	116
<b>Learning environment</b>	<b>42</b>	<b>82.9</b>
<b>Quality and academic freedom</b>	<b>75</b>	<b>82.0</b>
Teachers in tertiary education, gender parity	47	95
Labour mobility rate	121	8
Academic freedom	80	82.0
<b>Quality and infrastructure</b>	<b>116</b>	<b>116</b>
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>79</b>	<b>88.2</b>
<b>Attainment</b>	<b>116</b>	<b>116</b>
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
<b>Employment</b>	<b>121</b>	<b>82.0</b>
Labour force participation rate with advanced education	151	14.4
Unemployment rate with advanced education	37	88.0
<b>Impact</b>	<b>81</b>	<b>88.0</b>
University tertiary enrollment in FTE	88	48.0
OECD students per FTE personnel in higher education	116	116
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>80</b>	<b>82.3</b>
Share of GDP expenditure	11	10.0
GDP (% GDP)	80	4.3
GDP per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	28	88.0
<b>Quality and infrastructure</b>	<b>116</b>	<b>116</b>
GDP performed by business enterprises (%)	116	116
GDP financed by business enterprises (%)	88	2.5
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	116	116
<b>Quality and infrastructure</b>	<b>80</b>	<b>80.0</b>
High-skilled employment (%)	32	80
Intellectual property payments (% total trade)	100	4
State of cluster development	38	83.4
<b>Outputs</b>	<b>111</b>	<b>85</b>
<b>Quality and infrastructure</b>	<b>116</b>	<b>116</b>
Average documents per researcher	116	116
Citations per document	88	19.2
Patent applications (per 100 billion GDP)	116	116
<b>Quality and infrastructure</b>	<b>11</b>	<b>80.0</b>
Intellectual property receipts (% total trade)	38	13
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	31	72.0
Firms producing new goods and services (%)	116	116



# SEYCHELLES

	Rank	Value
<b>Consumer Electronics</b>		
Treatment applications per 100 million GDP	106	106
Cultural goods exports (% exports)	107	2.8
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>		
<b>Renewable</b>		
Renewable installations productive	115	0
Depth of innovative companies	83	81.7
ISO 9001 quality certificates (% GDP)	89	10.1
ISO 14001 environmental certificates (% GDP)	37	21.0
<b>Intelligence</b>		
CERT threat from abroad (%)	1	84.0
Cost savings per strategic storage deals (% GDP)	104	104
Computer software spending (% GDP)	106	106
<b>Government Services</b>		
New business density per thousand population	30	25.7
Firms with new products/services (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>41</b>	<b>58.3</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
30MHz mobile network coverage (% population)	21	80.0
Secure Internet servers per 1 million population	14	48.0
Investment in telecommunication services (% GDP)	106	106
<b>Speed</b>		
Mobile internet and download speeds	106	106
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (y-speed) per hundred people	106	106
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	21	80
Mobile broadband basket (% QM per capita)	80	53.0
Internet and telephony competition	1	100
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	89	37.0
International Internet bandwidth per user	88	45.8
Households with Internet access at home (%)	89	57.0
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	106	106
Tertiary graduates from ICT programmes (%)	6	80.0
ICT employment (%)	80	24.4
<b>Usage</b>		
<b>Services</b>		
Government online services	85	81.0
Fixed broadband internet traffic per subscription	79	6.8
Mobile broadband internet traffic per subscription	80	15.4
Internet users (%)	80	77.0
<b>Commerce</b>		
ICT/FIT patent applications (per 100,000 GDP)	8	79.7
E-participation	80	57.1
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	30	50.0
<b>ECONOMY</b>	<b>34</b>	<b>63.7</b>
<b>Economic Competitiveness</b>		
<b>Efficiency</b>		
Overhead capital formation (% GDP)	4	81.7
Logistics performance	106	106
Transport productive capacity	3	52.4
Building quality control	140	40

	Rank	Value
<b>Business Agility</b>		
Time of starting a business	125	38.8
Recovery recovery rate	75	42.1
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	118	8
<b>Customer experience</b>		
Trust and dissatisfaction	10	84
<b>Trade (% GDP)</b>		
Trade (% GDP)	8	82.0
High-technology trade (% total trade)	104	28.0
Market concentration	108	85
Market concentration	80	81.7
<b>Product Innovation</b>		
Product innovation	10	81.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	1	100
Cost dynamics	80	80
<b>Financing and domestic value added</b>	<b>33</b>	<b>80.8</b>
<b>Financing and costs</b>		
Domestic credit to private sector (% GDP)	79	58.0
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	41	77.0
Bank nonperforming loans (%)	80	80.0
<b>Unmet needs index</b>		
Medium- and high-tech activities value added	106	106
Industry and services value added (% GDP)	89	50.0
Labour underutilization rate	106	106
Output per worker	106	106
<b>ENABLING ENVIRONMENT</b>	<b>81</b>	<b>60.3</b>
<b>Governance</b>		
Political environment	41	85.0
Peace and stability	30	70.0
View and accountability	80	80.4
Quality of institutions	41	71.0
Rule of law	68	68.7
Control of corruption	20	85.1
Government effectiveness	45	70.7
<b>Socio-economic</b>		
Gender equity	100	29.0
Female-to-male ratio in parliament	85	20.0
Female-to-male labour force participation	106	106
Female-to-male ratio in internal wage	106	106
<b>Government</b>		
Social protection coverage (% population)	106	106
Adult literacy rate	48	84.7
Youth not in employment, education or training (%)	106	106
<b>Standard of living</b>		
Poverty headcount ratio (% population)	77	84.0
GDP per capita	81	21.8
<b>Health and environment</b>	<b>138</b>	<b>56.1</b>
<b>Health</b>		
Universal health coverage	71	71
Healthy life expectancy (years)	81	85.7
Under-five mortality rate	77	80.0
<b>Environmental performance</b>		
Renewable energy consumption (%)	142	1.3
Household footprint per capita	106	106
Natural hazard exposure	30	70

\*All values are normalized to a scale from 0 (worst) to 100 (best).

**GKI RANK** 131/154

**GKI SCORE** 34.9

**WORLD AVERAGE** 48.4

# SIERRA LEONE

## KEY INDICATORS

**GDP US\$ billions** 13,146  
**Population** 7,976,985  
**HDI** 0.452

## COUNTRY PERFORMANCE SUMMARY

Sierra Leone is a weak performer in terms of its knowledge infrastructure. It ranks 131st out of 154 countries in the Global Knowledge Index 2021 and 8th out of the 27 countries with low human development.

### AREAS OF STRENGTH

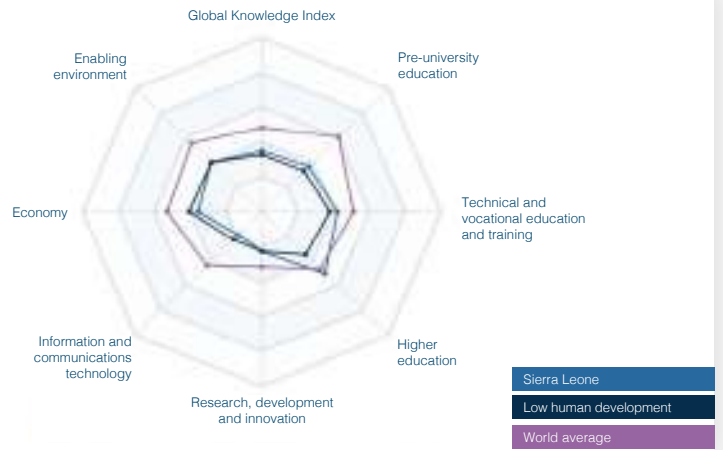
- + Female-to-male labour force participation
- + Government expenditure on primary education (% of GDP)
- + Firms with new product/service (%)
- + Foreign direct investment, net inflows (% GDP)
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

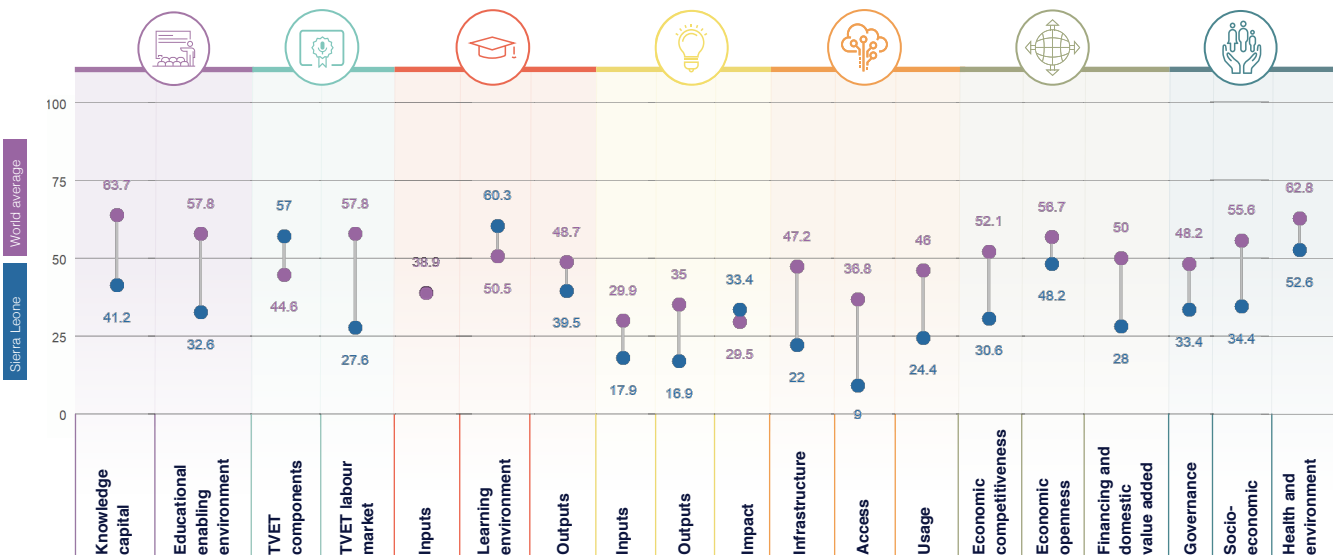
- Gross attendance ratio for tertiary education, location parity
- ISO 9001 quality certificates (% GDP)
- Mobile broadband Internet traffic per subscription
- Extent of corporate transparency
- Industry and services value added (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	136	36.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	122	42.3
HIGHER EDUCATION	48	49.9
RESEARCH, DEVELOPMENT AND INNOVATION	121	22.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	148	18.5
ECONOMY	146	35.6
ENABLING ENVIRONMENT	136	40.1



## GKI PILLARS





# SIERRA LEONE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	128	81.2
Enrollment	129	60.5
Net enrolment rate in primary education	57	85.1
Net enrolment rate in lower secondary education	106	81.7
Net enrolment rate in upper secondary education	109	26.1
Completion	117	65.5
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	123	14.2
Success rate rate in the last grade of lower secondary education	84	81.6
Completion	122	21
Assessment of 15-year-old students in math, science and reading	119	119
Learning-adjusted years of schooling	120	26
<b>Educational enabling environment</b>		
Expenditure	47	17.9
Government expenditure on primary education (% GDP)	6	63.6
Government expenditure on secondary education (% GDP)	72	26.4
Government funding per primary student (% GDP per capita)	59	40.2
Government funding per secondary student (% GDP per capita)	87	19.1
Resources	112	21.6
Pupil-based teacher ratio in primary education	65	41.5
Pupil-based teacher ratio in secondary education	73	30
Schools with access to computers in primary education (%)	84	1.6
Schools with access to computers in secondary education (%)	96	7.0
Early learning	127	23.2
Class attendance rate in early childhood education	113	36.5
Proportion of children who are developmentally on track	64	26.5
Proportion of children with stimulating home learning environments	87	3.3
Pupil-based teacher ratio in preprimary education	70	61.7
Quality and infrastructure	100	41.8
Completion rate in upper secondary education, gender parity	86	71.7
Completion rate in upper secondary education, wealth parity	87	9.7
Completion rate in upper secondary education, location parity	85	34.6
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	119	21.5
Firms offering formal training (%)	85	23.5
Labour force with short-cycle tertiary education (%)	52	20.4
Participation rate in formal and non-formal education and training	65	4
<b>TVET resources</b>		
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	119	119
Share of students enrolled in postsecondary vocational programmes	1	119
<b>TVET quality and infrastructure</b>		
Extent of staff training	128	34.6
Quality of vocational training	129	30.7
Ratio of high-skil TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	86	12.2
Firms considered with inappropriately educated workforce (%)	83	24.9
Employment educational mismatch (%)	47	71.2
Proportion of skilled production workers	82	32
Unemployment rate with vocational education	84	71.0
Real TVET unemployment	102	6.1
Share of TVET occupations	100	6.8
Manufacturing employment (%)	144	5.7
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	116	116
Useable employment rate	122	7.2

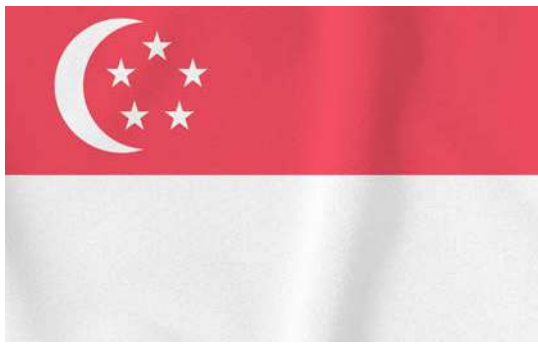
	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	119	119
Enrollment in masters, doctoral or equivalent (%)	116	116
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	116	116
Researcher in higher education (%)	116	116
<b>Learning environment</b>		
Directly paid academic freedom	5	33.0
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	116	116
Academic freedom	23	63.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	12	62.7
Class attendance rate in tertiary education, wealth parity	75	10.0
Class attendance rate in tertiary education, location parity	76	6
<b>Outputs</b>		
Skilled	118	28.5
Skilled	116	116
Educational attainment rate, bachelor's or equivalent	119	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Skilled	122	44.2
Labour force participation rate with advanced education	125	22.5
Unemployment rate with advanced education	88	60
<b>Input</b>		
University tertiary enrollment in FTE	104	34.0
OSSE documents per FTE personnel in higher education	116	116
<b>Government expenditure and financing</b>		
<b>Inputs</b>		
Government expenditure	122	17.2
Government expenditure	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Government expenditure and financing</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	82	21.7
<b>Quality and infrastructure</b>		
High-skilled employment (%)	79	6.3
Intellectual property payments (% total trade)	115	1.6
State of digital development	119	35
<b>Outputs</b>		
Government expenditure	122	17.2
Average documents per researcher	116	116
Citations per document	82	20.7
Patent applications (per 100 billion GDP)	116	116
<b>Government expenditure and financing</b>		
Intellectual property receipts (% total trade)	41	15.2
Research and development expenditure (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	87	32.8

# SIERRA LEONE

	Rank	Value
<b>Consumer electronics</b>	107	11.1
Treatment applications per 100 million GDP	116	116
Cultural goods exports (% exports)	135	0.1
Printing and publishing output (% manufactured output)	116	116
<b>Energy</b>	85	110.9
<b>Energy</b>	85	11.1
Risks of institutions' persistence	116	116
Depth of innovative companies	104	43.3
ISO 9001 quality certificates (% GDP)	103	8
ISO 14001 environmental certificates (% GDP)	116	116
<b>Environment</b>	116	116
CERO forecast from abroad (%)	116	116
Cost savings per strategic alliance deals (% GDP)	116	116
Computer software spending (% GDP)	116	116
<b>Government services</b>	116	11.1
New business density per thousand population	107	2.1
Firms with new products/services (%)	6	88.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	116	116.5
<b>Infrastructure</b>	149	32
<b>Coverage</b>	101	11.1
3G/LTE mobile network coverage (% population)	102	40
Secure Internet servers per 1 million population	145	0.1
Investment in telecommunication services (% GDP)	116	116
<b>Speed</b>	116	0.1
Mobile spread and download speeds	81	11.7
Fixed broadband upload and download speeds	106	3.8
Fixed broadband subscriptions (y speed) per hundred people	116	116
<b>Availability</b>	145	11.7
Fixed broadband latency (% QM per capita)	116	116
Mobile broadband basket (% QM per capita)	118	11
Internet and telephony competition	103	85.3
<b>Access</b>	147	8
<b>Subscribers</b>	101	11.1
Active mobile broadband subscriptions per hundred inhabitants	148	7.7
International Internet bandwidth per user	115	28.6
Households with Internet access at home (%)	101	13.6
<b>Skills and employment</b>	116	1.1
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	116	116
ICT employment (%)	101	1.1
<b>Usage</b>	116	116.4
<b>Services</b>	116	11.1
Government online services	107	30.6
Fixed broadband Internet traffic per subscription	116	116
Mobile broadband Internet traffic per subscription	108	8
Internet users (%)	144	12.0
<b>Commerce</b>	101	11.1
ICT FDI parent applications (per 100 million GDP)	116	116
E-participation	103	39.3
Internet activities by individuals (%)	116	116
Trade in digitally deliverable services (% total trade)	87	29.0
<b>ECONOMY</b>	116	116.6
<b>Economic complexity/structure</b>	101	10.0
RESEARCH AND INNOVATION	116	11.1
Overhead capital formation (% GDP)	108	22.4
Logistics performance	141	37
Transport productive capacity	108	11.3
Building quality control	108	46.7

	Rank	Value
<b>Business agility</b>	107	11.1
Cost of starting a business	84	87.5
Recovery recovery rate	107	12.1
Entrepreneurial employee activity rate	116	116
Growth of corporate transactions	118	8
<b>Corporate openness</b>	106	116.3
<b>Trade and investment</b>	112	21
Trade (% GDP)	116	116.7
High-technology trade (% total trade)	102	30
Market concentration	81	73.2
Market concentration	80	88.0
Product diversity	87	41.0
China's financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	15	70.1
Cost dynamics	116	116
<b>Financing and domestic value added</b>	101	32
<b>Financing and costs</b>	101	11.1
Domestic credit to private sector (% GDP)	100	1.2
MSME financing gap (% GDP)	116	116
Tax and contribution rate (% profit)	45	78.0
Bank nonperforming loans (%)	116	116
Unmet loan demand	101	11.1
Medium- and high-tech activities value added	116	116
Industry and services value added (% GDP)	103	8
Labour underutilization rate	111	46.0
Output per worker	142	1.4
<b>ENABLING ENVIRONMENT</b>	116	116.1
<b>Governance</b>	100	33.4
<b>Political environment</b>	81	40.0
Peace and stability	85	35.0
View and accountability	87	41.0
Quality of institutions	101	11.1
Rule of law	116	23.0
Control of corruption	87	41.0
Government effectiveness	140	11.0
<b>Socio-economic</b>	141	34.4
<b>Gender equity</b>	111	11.1
Female-to-male ratio in parliament	102	14.1
Female-to-male labour force participation	4	88.0
Female-to-male ratio in internal wage	116	116
<b>Gender equality</b>	101	11.1
Social protection coverage (% population)	100	1.8
Adult literacy rate	110	28.0
Youth not in employment, education or training (%)	40	80.0
<b>Standard of living</b>	116	11.1
Poverty headcount ratio (% population)	104	10.0
GDP per capita	143	11.8
<b>Health and environment</b>	142	116.6
<b>Health</b>	101	11.1
Universal health coverage	144	30
Healthy life expectancy (years)	116	29.1
Under-five mortality rate	100	0.8
<b>Environmental performance</b>	11	81.1
Renewable energy consumption (%)	15	82.0
Household footprint per capita	11	86.8
Natural hazard exposure	59	81

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 6/154

**GKI SCORE** 69.3

**WORLD AVERAGE** 48.4

# SINGAPORE

## COUNTRY PERFORMANCE SUMMARY

Singapore is a leading performer in terms of its knowledge infrastructure. It ranks 6th out of 154 countries in the Global Knowledge Index 2021 and 6th out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **528.757**  
**Population** ..... **5,850,343**  
**HDI** ..... **0.938**

### AREAS OF STRENGTH

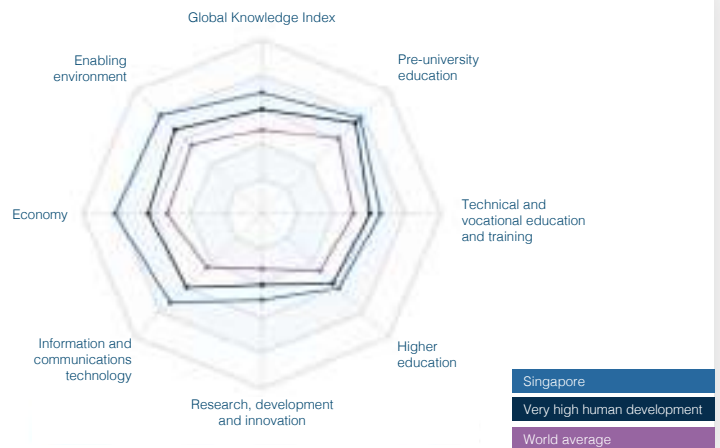
- + Learning-adjusted years of schooling
- + Fixed-broadband upload and download speeds
- + Medium- and high-tech activities value added
- + Government effectiveness
- + Peace and stability

### AREAS OF IMPROVEMENT

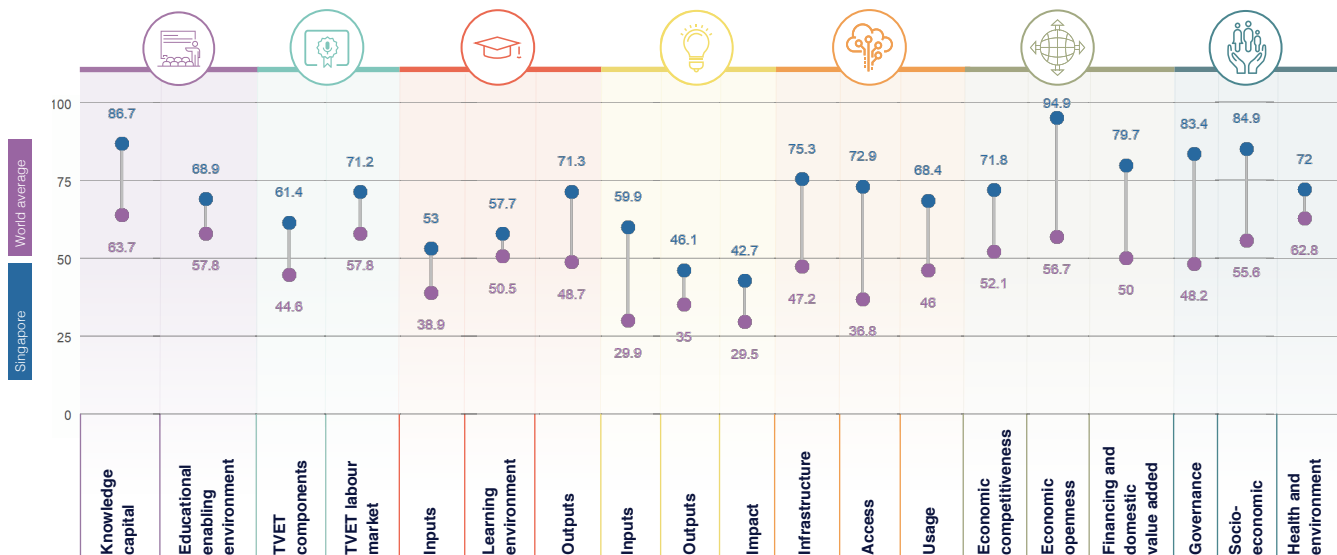
- Years of compulsory education in primary and secondary
- Renewable energy consumption (%)
- Ratio of high-skill TVET occupations earnings to average wage
- Ratio of medium-skill TVET occupations earnings to average wage
- Printing and publishing output (% manufactured output)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	27	77.8
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	17	66.3
HIGHER EDUCATION	23	60.7
RESEARCH, DEVELOPMENT AND INNOVATION	11	49.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	4	72.2
ECONOMY	1	82.1
ENABLING ENVIRONMENT	11	80.1



## GKI PILLARS







# SINGAPORE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	27	77.8
Enrolment	1	93.7
Net enrolment rate in primary education	9	90.7
Net enrolment rate in lower secondary education	13	90.6
Net enrolment rate in upper secondary education	3	90.0
Completion	39	84.0
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	106	70
Success rate rate in the last grade of lower secondary education	29	83.7
Completion	1	95.4
Assessment of 15-year-old students in math, science and reading	2	80.8
Learning-adjusted years of schooling	1	100
<b>Educational enabling environment</b>		
Expenditure	41	40
Government expenditure on primary education (% GDP)	25	40
Government expenditure on secondary education (% GDP)	45	35.1
Government funding per primary student (% GDP per capita)	25	89.6
Government funding per secondary student (% GDP per capita)	39	32.4
Resources	31	87.0
Pupil-based teacher ratio in primary education	43	85.0
Pupil-based teacher ratio in secondary education	11	89.8
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
<b>Early learning</b>		
Class attendance rate in early childhood education	104	104
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	104	104
Completion rate in upper secondary education, gender parity	104	104
Completion rate in upper secondary education, wealth parity	104	104
Completion rate in upper secondary education, location parity	104	104
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	10	81.1
Firms offering formal training (%)	104	104
Labour force with short-cycle tertiary education (%)	104	104
Participation rate in formal and non-formal education and training	9	76.7
TVET enrolment	31	65.4
Government expenditure on vocational education (%)	104	104
Share of students enrolled in secondary vocational programmes	104	104
Share of students enrolling in postsecondary vocational programmes	77	65.4
TVET quality and infrastructure	30	42.1
Extent of staff training	4	73.3
Quality of vocational training	6	73.3
Ratio of high-skill TVET occupations earnings to average wage	111	63
Ratio of medium-skill TVET occupations earnings to average wage	114	15.0
<b>TVET labour market</b>		
Efficiency of the labour market	104	104
Firms considered with inappropriately educated workforce (%)	104	104
Employment educational mismatch (%)	104	104
Proportion of skilled production workers	104	104
Unemployment rate with vocational education	104	104
Real TVET unemployment	10	81.1
Share of TVET occupations	21	70.0
Manufacturing employment (%)	89	37.9
Quality and infrastructure	10	81.1
Enrolment in vocational education, gender parity	24	81.0
Useable employment rate	29	80.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	5	73.8
Government expenditure per tertiary student	7	73.4
Teaching staff compensation (% tertiary expenditure)	104	104
Enrolment	17	10
Enrolment in bachelor's or equivalent level (%)	78	27.3
Enrolment in master's, doctoral or equivalent (%)	75	11.8
Resources	11	82.0
Pupil-teacher ratio in tertiary education	44	81.1
Researcher in higher education (%)	57	44
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	74	54.0
Labour mobility rate	6	67.0
Academic freedom	112	43.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	104	104
Class attendance rate in tertiary education, wealth parity	104	104
Class attendance rate in tertiary education, location parity	104	104
<b>Outputs</b>		
Skilled labour	2	80.0
Educational attainment rate, bachelor's or equivalent	14	65.0
Educational attainment rate, master's or equivalent	104	104
Educational attainment rate, doctoral or equivalent	104	104
Employment	104	104
Labour force participation rate with advanced education	104	104
Unemployment rate with advanced education	104	104
<b>Impact</b>		
University tertiary enrolment in R&D	9	71.0
OECD students per 1000 personnel in higher education	42	44.7
<b>Government's contribution to economic growth</b>		
Output	11	33.4
Government's contribution to economic growth	10	33.4
GDP (% GDP)	18	38.0
OEFD per researcher	13	64.0
Researchers per thousand labour force	9	33.4
Tertiary graduates from STEM programmes (%)	10	63.4
<b>Government's contribution to economic growth</b>		
OEFD performed by business enterprises (%)	20	31.0
OEFD financed by business enterprises (%)	23	64.0
Researchers in business enterprises (%)	20	63.7
Firms that spend on R&D (%)	104	104
Quality and infrastructure	10	33.4
High-skill employment (%)	104	104
Intellectual property payments (% total trade)	10	75.0
State of cluster development	9	80.2
<b>Outputs</b>		
Government's contribution to economic growth	10	33.4
Average documents per researcher	52	65.4
Citations per document	13	60
Patent applications (per 100 billion GDP)	24	65.1
<b>Government's contribution to economic growth</b>		
Intellectual property receipts (% total trade)	18	47.0
Research design applications (per 100 billion GDP)	13	64
PCT applications (per 100 billion GDP)	17	64.0
Firms producing new goods and services (%)	104	104





# SINGAPORE

	Rank	Value
<b>Business environment</b>	1	100
Treatment applications per 100 million GDP	85	16.5
Cultural goods exports (% exports)	19	42.6
Printing and publishing output (% manufactured output)	97	5.6
<b>Finance</b>	10	97.7
Access to venture capital	19	45.0
Depth of innovative companies	14	60.3
ISO 9001 quality certificates (% GDP)	50	24.0
ISO 14001 environmental certificates (% GDP)	52	12.4
<b>Energy</b>	10	97.9
CERO forecast from abroad (%)	99	13.5
Coal reserves per strategic storage deals (% GDP)	4	87.9
Computer software spending (% GDP)	35	22.7
<b>Government services</b>	10	98.0
New business density per thousand population	13	49.0
Firms with one or more patents (%)	106	19.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	4	100
<b>Infrastructure</b>	9	100
<b>Coverage</b>	9	100
3G/LTE mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	5	85
Investment in telecommunication services (% GDP)	104	16.0
<b>Quality</b>	9	100
Mobile internet and download speeds	31	69.0
Fixed broadband upload and download speeds	1	100
Fixed broadband subscriptions (by speed) per hundred people	61	65.5
<b>Accessibility</b>	7	100
Fixed broadband bandwidth (% Gbps per capita)	6	67.1
Mobile broadband basket (% Gbps per capita)	15	60.1
Internet and telephony competition	1	100
<b>Access</b>	2	100
<b>Subscriptions</b>	9	100
Active mobile-broadband subscriptions per fixed-line inhabitants	7	63.0
International Internet bandwidth per user	4	69.7
Households with Internet access at home (%)	6	69.6
<b>Skills and employment</b>	5	100
Individuals with standard ICT skills (%)	25	57.3
Tertiary graduates from ICT programmes (%)	9	80
ICT employment (%)	6	62.5
<b>Usage</b>	11	100
<b>Services</b>	10	100
Government online services	5	60.5
Fixed broadband internet traffic per subscriber	104	19.8
Mobile broadband internet traffic per subscriber	48	16.7
Internet users (%)	66	74.0
<b>Commerce</b>	10	100
ICT FDI parent applications (per 100 million GDP)	13	38.0
E-participation	6	97.0
Internet activities by individuals (%)	84	55.9
Trade in digitally deliverable services (% total trade)	17	65.0
<b>ECONOMY</b>	1	100
<b>Economic competitiveness</b>	15	71.8
<b>Infrastructure investment</b>	1	100
Overhead capital formation (% GDP)	65	40.3
Logistics performance	7	74.0
Transport productive capacity	10	69.0
Building quality control	22	60.7

	Rank	Value
<b>Business agility</b>	10	100
Time of starting a business	5	68.2
Recovery recovery time	6	60.5
Entrepreneurial employee activity rate	25	47.1
Growth of corporate transactions	50	21.4
<b>Corporate openness</b>	1	100
<b>Trade and investment</b>	2	100
Trade (% GDP)	1	100
High-technology trade (% total trade)	2	81
Market concentration	69	35.7
Market concentration	42	62.1
<b>Product openness</b>	3	69.0
China's financial openness	1	100
Foreign direct investment, net inflows (% GDP)	1	100
Cost dynamics	27	60.0
<b>Financing and domestic value added</b>	1	100
<b>Financing and costs</b>	1	100
Domestic credit to private sector (% GDP)	17	60.7
MSME financing gap (% GDP)	104	19.8
Tax and contribution rate (% profit)	17	60.6
Bank nonperforming loans (%)	14	65.4
<b>Unmet needs index</b>	1	61.0
Medium- and high-tech activities value added	1	100
Industry and services value added (% GDP)	13	70.0
Labour underutilization rate	21	64.7
Output per worker	9	65.0
<b>ENABLING ENVIRONMENT</b>	11	90.1
<b>Governance</b>	18	65.4
Political environment	35	67.7
Peace and stability	2	97.3
View and accountability	60	64.0
Quality of institutions	2	100
Rule of law	4	88.0
Control of corruption	3	90
Government effectiveness	1	100
<b>Socio-economic</b>	2	94.3
Gender equity	46	72.4
Female-to-male ratio in parliament	54	42.5
Female-to-male labour force participation	76	37.1
Female-to-male ratio in internal wage	54	67.0
<b>Government</b>	3	100
Social protection coverage (% population)	1	100
Adult literacy rate	97	94.0
Youth not in employment, education or training (%)	3	67.5
<b>Standard of living</b>	3	100
Poverty headcount ratio (% population)	104	19.8
GDP per capita	2	84.2
<b>Health and environment</b>	13	72
Health	1	100
Universal health coverage	5	85
Healthy life expectancy (years)	2	85.2
Under-five mortality rate	6	60.5
<b>Environmental performance</b>	107	16.0
Renewable energy consumption (%)	145	0.8
Household footprint per capita	101	14.0
Natural hazard exposure	4	81

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 32/154

**GKI SCORE** 59.8

**WORLD AVERAGE** 48.4

# SLOVAKIA

## COUNTRY PERFORMANCE SUMMARY

Slovakia is a strong performer in terms of its knowledge infrastructure. It ranks 32nd out of 154 countries in the Global Knowledge Index 2021 and 32nd out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 165.652  
**Population** 5,459,643  
**HDI** 0.86

### AREAS OF STRENGTH

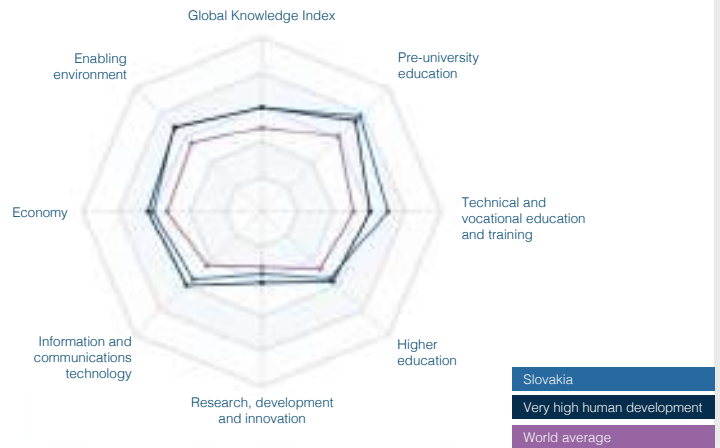
- + Share of TVET occupations
- + Manufacturing employment (%)
- + Government expenditure on vocational education (%)
- + ISO 14001 environmental certificates (% GDP)
- + Academic freedom

### AREAS OF IMPROVEMENT

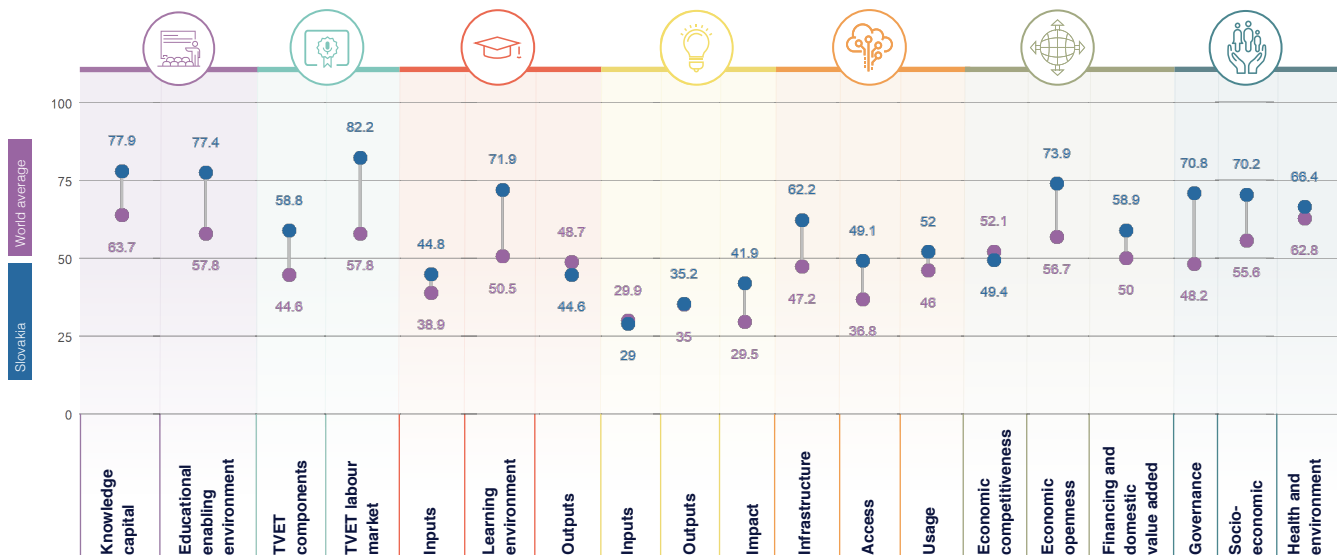
- Government expenditure on primary education (% of GDP)
- Firms producing new goods and services (%)
- Building quality control
- Labour force participation rate with advanced education
- Joint ventures per strategic alliance deals (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	28	77.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	7	70.5
HIGHER EDUCATION	38	53.8
RESEARCH, DEVELOPMENT AND INNOVATION	51	35.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	45	54.4
ECONOMY	44	60.7
ENABLING ENVIRONMENT	28	69.2



## GKI PILLARS





# SLOVAKIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	49	77.8
Enrolment	31	90.2
Net enrolment rate in primary education	79	90
Net enrolment rate in lower secondary education	84	90.6
Net enrolment rate in upper secondary education	57	87
Completion	45	92.1
Years of compulsory education in primary and secondary	42	79.9
Completion rate in upper secondary education	13	96.0
Success rate rate in the last grade of lower secondary education	87	87
Completion	45	92.1
Assessment of 15-year-old students in math, science and reading	36	55.9
Learning-adjusted years of schooling	40	71.6
<b>Educational enabling environment</b>		
Expenditure	59	22.1
Government expenditure on primary education (% GDP)	113	16.7
Government expenditure on secondary education (% GDP)	55	21.5
Government funding per primary student (% GDP per capita)	85	49.9
Government funding per secondary student (% GDP per capita)	57	32.4
Resources	11	88.3
Pupil-based teacher ratio in primary education	19	81.7
Pupil-based teacher ratio in secondary education	19	84
Schools with access to computers in primary education (%)	33	80.9
Schools with access to computers in secondary education (%)	45	89.6
Early learning	3	87.1
Class attendance rate in early childhood education	8	79.6
Proportion of children who are developmentally on track	104	106
Proportion of children with stimulating home learning environments	104	106
Pupil-based teacher ratio in preprimary education	64	84.4
Quality and infrastructure	19	81
Completion rate in upper secondary education, gender parity	10	80.0
Completion rate in upper secondary education, wealth parity	29	80.1
Completion rate in upper secondary education, location parity	1	169
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	35	84.1
Firms offering formal training (%)	39	83.6
Labour force with short-cycle tertiary education (%)	40	75.0
Participation rate in formal and non-formal education and training	22	82.4
TVET enrolment	11	82.0
Government expenditure on vocational education (%)	4	73.8
Share of students enrolled in secondary vocational programmes	24	46.5
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	109	36.1
Extent of staff training	97	81.7
Quality of vocational training	100	43.0
Ratio of high-skil TVET occupations earnings to average wage	85	29.0
Ratio of medium-skill TVET occupations earnings to average wage	67	40.1
<b>TVET labour market</b>		
Efficiency of the labour market	22	83.0
Firms considered with inequality educated workforce (%)	25	83.7
Employment educational mismatch (%)	104	106
Proportion of skilled production workers	87	87.6
Unemployment rate with vocational education	73	36.4
Real TVET unemployment	2	81.1
Share of TVET occupations	5	80.0
Manufacturing employment (%)	4	85.0
Quality and infrastructure	17	87
Enrolment in vocational education, gender parity	41	86.7
Useable employment rate	41	87.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	69	24.0
Government expenditure per tertiary student	29	32.3
Teaching staff compensation (% tertiary expenditure)	70	26.1
Enrolment	61	87.0
Enrolment in bachelor's or equivalent level (%)	80	78.2
Enrolment in masters, doctoral or equivalent (%)	29	55.0
Resources	61	71.1
Pupil-teacher ratio in tertiary education	30	85
Research in higher education (%)	40	57.1
<b>Learning environment</b>		
Timely and academic freedom	21	73.0
Teachers in tertiary education, gender parity	29	87.0
Labour mobility rate	32	31.0
Academic freedom	3	90.0
Quality and infrastructure	104	106
Class attendance rate in tertiary education, gender parity	104	106
Class attendance rate in tertiary education, wealth parity	104	106
Class attendance rate in tertiary education, location parity	104	106
<b>Outputs</b>		
Skilled labour	25	41.0
Educational attainment rate, bachelor's or equivalent	52	42.0
Educational attainment rate, master's or equivalent	15	54.0
Educational attainment rate, doctoral or equivalent	24	43.0
Employment	116	112.0
Labour force participation rate with advanced education	158	15
Unemployment rate with advanced education	26	87.0
Impact	31	34.0
University tertiary enrollment in FTE	68	36
OECD students per FTE personnel in higher education	53	33.7
<b>Government's contribution to the economy</b>		
<b>Output</b>		
Value added in FTE occupations	11	82.0
GDP (% GDP)	42	16.0
OEFD per researcher	74	16.1
Researchers per thousand labour force	21	38.1
Tertiary graduates from STEM programmes (%)	69	60.0
<b>Government's contribution to the economy</b>		
OEFD performed by business enterprises (%)	39	12.0
OEFD financed by business enterprises (%)	30	60.4
Researchers in business enterprises (%)	48	29
Firms that spend on R&D (%)	97	0.8
Quality of research innovation	10	82.0
High-skilled employment (%)	104	106
Intellectual property payments (% total trade)	65	17.0
State of cluster development	68	46.0
<b>Inputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	57	55.0
Citations per document	87	18.0
Patent applications (per 100 billion GDP)	47	55.0
<b>Government's contribution to the economy</b>		
Intellectual property receipts (% total trade)	72	0.9
Research design applications (per 100 billion GDP)	37	17.4
PCT applications (per 100 billion GDP)	45	61.5
Firms producing new goods and services (%)	108	15.0





# SLOVAKIA

	Rank	Value
<b>Business environment</b>	37	65.3
Treatment applications (per 100 million GDP)	35	43.3
Cultural goods exports (% exports)	45	19.2
Printing and publishing output (% manufactured output)	87	13.4
<b>Energy</b>	39	67.0
<b>Finance</b>	7	81.2
Ratio of institutions' provisions	89	21.3
Depth of innovative companies	80	52.5
ISO 9001 quality certificates (% GDP)	11	82.5
ISO 14001 environmental certificates (% GDP)	7	86.0
<b>Infrastructure</b>	95	19.9
CERD freedom from abuse (%)	39	21.4
Cost volume per storage volume deals (% GDP)	112	8
Computer software spending (% GDP)	40	24.8
<b>Government services</b>	95	19.9
New business density per thousand population	20	26.1
Firms with new products/services (%)	67	66.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>45</b>	<b>54.4</b>
<b>Infrastructure</b>	27	62.2
<b>Coverage</b>	36	54.2
3G/LTE mobile network coverage (% population)	42	62.0
Secure Internet servers per 1 million population	25	50.4
Investment in telecommunication services (% GDP)	55	22.3
<b>Quality</b>	81	40.5
Mobile speed and download speeds	38	54.2
Fixed-broadband upload and download speeds	30	25.1
Fixed-broadband subscriptions (by speed) per household (per sec)	32	62.2
<b>Accessibility</b>	0	51.5
Fixed broadband bandwidth (% GbM per capita)	11	81.6
Mobile broadband basket (% GbM per capita)	12	87.2
Internet and telephony competition	75	87.1
<b>Access</b>	64	66.5
<b>Subscriptions</b>	65	53.0
Active mobile-broadband subscriptions per fixed-line inhabitants	65	35.0
International Internet bandwidth per user	81	37
Households with Internet access at home (%)	41	65.0
<b>Skills and employment</b>	95	19.9
Individuals with standard ICT skills (%)	37	46
Tertiary graduates from ICT programmes (%)	81	26
ICT employment (%)	15	56.0
<b>Usage</b>	21	32
<b>Services</b>	75	44.4
Government online services	52	71.8
Fixed broadband Internet traffic per subscription	74	10.2
Mobile broadband Internet traffic per subscription	80	6.3
Internet users (%)	25	60.4
<b>Commerce</b>	95	19.9
ICT FDI patent applications (per 100 million GDP)	44	51.7
E-participation	69	70.2
Internet activities by individuals (%)	29	64.6
Trade in digitally deliverable services (% total trade)	57	45.7
<b>ECONOMY</b>	<b>44</b>	<b>60.7</b>
<b>Economic complexity indexes</b>	81	46.4
<b>Infrastructure investment</b>	112	41.6
Overhead capital formation (% GDP)	100	41.4
Logistics performance	21	50.7
Transport productive capacity	95	25.0
Building quality control	126	22.0

	Rank	Value
<b>Business agility</b>	91	22.1
Cost of starting a business	100	84.6
Recovery recovery rate	48	50.1
Entrepreneurial employee activity rate	35	25.0
Growth of corporate transactions	79	57.1
<b>Corporate openness</b>	18	73.0
<b>Trade and investment</b>	14	72.4
Trade (% GDP)	9	74.6
High-technology trade (% total trade)	26	60.4
Market concentration	79	34.8
Market concentration	55	62.0
Product diversity	41	72.4
China's financial openness	58	74.7
Foreign direct investment, net inflows (% GDP)	62	42.5
Cost dynamics	1	109
<b>Financing and domestic value added</b>	<b>24</b>	<b>60.8</b>
<b>Financing and costs</b>	70	21.2
Domestic credit to private sector (% GDP)	97	25.2
MSME financing gap (% GDP)	76	60.0
Tax and contribution rate (% profit)	128	87.6
Bank nonperforming loans (%)	42	60.1
Unsecured loans ratio	95	19.9
Medium- and high-tech activities value added	15	59.5
Industry and services value added (% GDP)	47	65.7
Labour underutilization rate	27	63.4
Output per worker	81	26
<b>ENABLING ENVIRONMENT</b>	<b>29</b>	<b>66.2</b>
<b>Governance</b>	43	70.8
Political environment	30	71.2
Peace and stability	37	67.5
View and accountability	22	74.9
Quality of institutions	41	70.5
Rule of law	27	73.0
Control of corruption	47	66.2
Government effectiveness	42	71.6
<b>Socio-economic</b>	28	70.2
Gender equity	86	33.1
Female-to-male ratio in parliament	65	29.5
Female-to-male labour force participation	76	75.4
Female-to-male ratio in internal wage	35	69.0
Gender inequality	21	81.2
Social protection coverage (% population)	25	81.0
Adult literacy rate	106	109
Youth not in employment, education or training (%)	36	62.0
Standard of living	27	82.0
Poverty headcount ratio (% population)	19	82.0
GDP per capita	40	27
<b>Health and environment</b>	<b>43</b>	<b>66.4</b>
<b>Health</b>	91	22
Universal health coverage	34	77
Healthy life expectancy (years)	49	81.4
Under-five mortality rate	35	66.7
Environmental performance	108	47.0
Renewable energy consumption (%)	112	10.0
Household footprint per capita	122	60.6
Natural hazard exposure	32	72

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 22/154

**GKI SCORE** 63.7

**WORLD AVERAGE** 48.4

# SLOVENIA

## COUNTRY PERFORMANCE SUMMARY

Slovenia is a leading performer in terms of its knowledge infrastructure. It ranks 22nd out of 154 countries in the Global Knowledge Index 2021 and 22nd out of the 61 countries with very high human development.

### KEY INDICATORS

**GDP US\$ billions** 77.892  
**Population** 2,078,932  
**HDI** 0.917

### AREAS OF STRENGTH

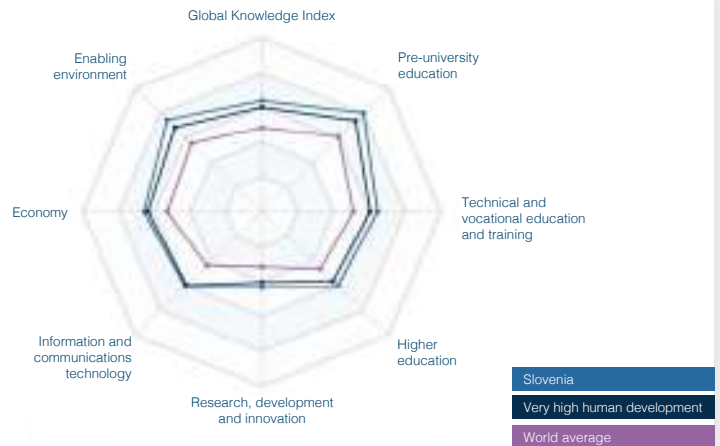
- + Under-five mortality rate
- + Manufacturing employment (%)
- + Share of students enrolled in secondary vocational programmes
- + Insolvency recovery rate
- + Educational attainment rate, doctorate or equivalent

### AREAS OF IMPROVEMENT

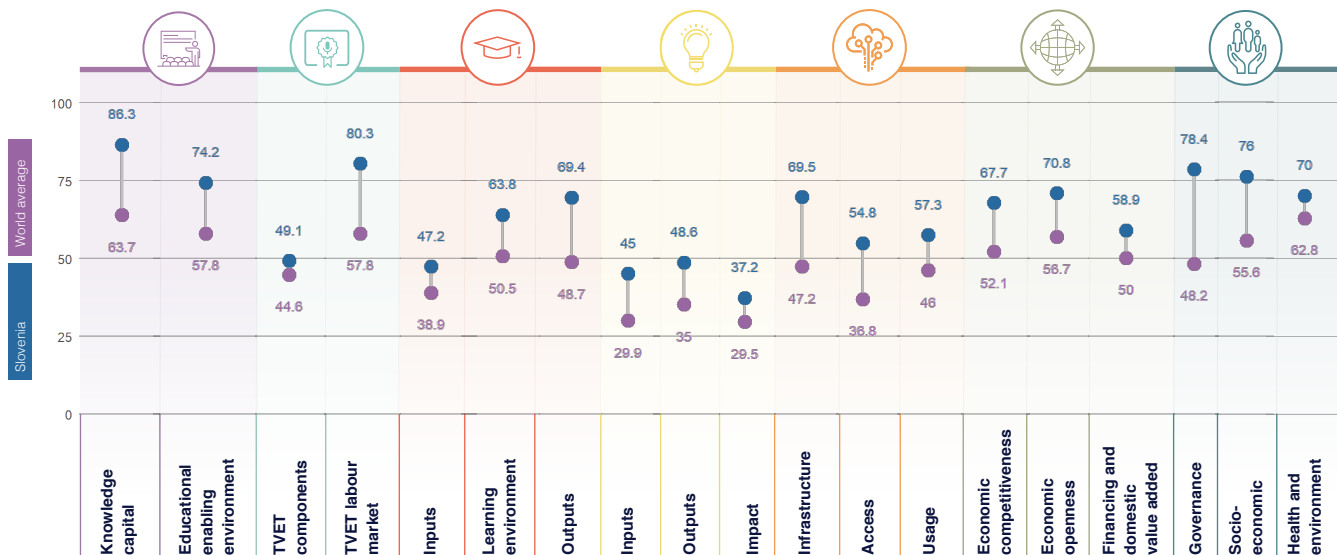
- Ratio of medium-skill TVET occupations earnings to average wage
- Labour force participation rate with advanced education
- Researchers in higher education (%)
- Share of students enrolled in post-secondary vocational programmes
- Fixed broadband Internet traffic per subscription

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	13	80.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	24	64.7
HIGHER EDUCATION	26	60.1
RESEARCH, DEVELOPMENT AND INNOVATION	25	43.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	27	60.6
ECONOMY	27	65.8
ENABLING ENVIRONMENT	20	74.8



## GKI PILLARS





# SLOVENIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	11	86.3
Enrolment	7	81
Net enrolment rate in primary education	11	80.7
Net enrolment rate in lower secondary education	31	88.8
Net enrolment rate in upper secondary education	11	89.8
Completion	21	87.2
Years of compulsory education in primary and secondary	67	89.2
Completion rate in upper secondary education	7	87.0
Success rate rate in the last grade of lower secondary education	42	79.8
Completion	14	77.2
Assessment of 15-year-old students in math, science and reading	10	88.3
Learning-adjusted years of schooling	13	86.4
<b>Educational enabling environment</b>	<b>28</b>	<b>74.9</b>
Expenditure	61	55.0
Government expenditure on primary education (% GDP)	73	21.1
Government expenditure on secondary education (% GDP)	57	30.0
Government funding per primary student (% GDP per capita)	20	54.3
Government funding per secondary student (% GDP per capita)	37	34.7
Resources	1	100
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	88	82.1
Class attendance rate in early childhood education	81	85.1
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	11	81
Completion rate in upper secondary education, gender parity	20	86
Completion rate in upper secondary education, wealth parity	13	80
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>66</b>	<b>45.1</b>
Companies training apprentices	58	47.3
Firms offering formal training (%)	30	54.5
Labour force with short-cycle tertiary education (%)	83	87.1
Participation rate in formal and non-formal education and training	22	62.4
TVET enrolment	76	44.5
Government expenditure on vocational education (%)	17	60.8
Share of students enrolled in secondary vocational programmes	3	85.3
Share of students enrolling in postsecondary vocational programmes	89	13.8
TVET quality and infrastructure	100	41.0
Extent of staff training	35	54.8
Quality of vocational training	81	53.0
Ratio of high-skill TVET occupations earnings to average wage	87	78.2
Ratio of medium-skill TVET occupations earnings to average wage	60	34.0
<b>TVET labour market</b>	<b>9</b>	<b>80.3</b>
Efficiency of the labour market	31	72.0
Firms considered well-integrated with workforce (%)	69	84.0
Employment educational mismatch (%)	91	89.1
Proportion of skilled production workers	76	83.4
Unemployment rate with vocational education	33	86.4
High TVET unemployment	1	51.0
Share of TVET occupations	11	73.7
Manufacturing employment (%)	3	80.1
Quality and infrastructure	30	64.0
Enrolment in vocational education, gender parity	90	79.0
Useable employment rate	31	60.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>44</b>	<b>47.2</b>
Expenditure	16	38.0
Government expenditure per tertiary student	26	38.3
Teaching staff compensation (% tertiary expenditure)	116	116
Enrolment	21	44.7
Enrolment in bachelor's or equivalent level (%)	37	37.5
Enrolment in masters, doctoral or equivalent (%)	17	67
Resources	100	83.0
Rapit teacher ratio in tertiary education	25	67
Researchers in higher education (%)	58	88.2
<b>Learning environment</b>	<b>38</b>	<b>63.8</b>
<b>Quality and academic freedom</b>	<b>41</b>	<b>63.0</b>
Teachers in tertiary education, gender parity	48	74.0
Labour mobility rate	41	23.5
Academic freedom	28	62.0
<b>Quality and infrastructure</b>	<b>116</b>	<b>116</b>
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	<b>12</b>	<b>69.4</b>
<b>Attainment</b>	<b>5</b>	<b>32.0</b>
Educational attainment rate, bachelor's or equivalent	42	65.4
Educational attainment rate, master's or equivalent	13	61.5
Educational attainment rate, doctoral or equivalent	1	98
<b>Employment</b>	<b>100</b>	<b>64.7</b>
Labour force participation rate with advanced education	126	58.0
Unemployment rate with advanced education	22	80.0
<b>Impact</b>	<b>6</b>	<b>71.7</b>
University tertiary enrolment in R&D	42	68.1
OECD documents per 100 personnel in higher education	6	82.0
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>22</b>	<b>38</b>
Access to credit resources	11	61.1
GDP (% GDP)	17	38.0
GERD per researcher	48	28.7
Researchers per thousand labour force	18	62.5
Tertiary graduates from STEM programmes (%)	33	61.7
<b>Quality of innovation environment</b>	<b>100</b>	<b>100.0</b>
GERD performed by business enterprises (%)	14	56.0
GERD financed by business enterprises (%)	19	78.1
Researchers in business enterprises (%)	10	75.7
Firms that spend on R&D (%)	28	41.0
<b>Quality of business environment</b>	<b>100</b>	<b>100.0</b>
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	67	15.0
State of startup development	74	45.0
<b>Outputs</b>	<b>27</b>	<b>68.8</b>
<b>Access to credit resources</b>	<b>100</b>	<b>100.0</b>
Average documents per researcher	39	82.7
Citations per document	26	38.0
Patent applications (per 100 billion GDP)	20	68.3
<b>Quality of business environment</b>	<b>100</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	42	16.2
Research design applications (per 100 billion GDP)	41	18.8
PCT applications (per 100 billion GDP)	20	75.3
Firms producing new goods and services (%)	11	77.5



# SLOVENIA

	Rank	Value
<b>Consumer Innovation Indicators</b>	55	55.5
Treatment applications per 100 million GDP	34	49.7
Cultural goods exports (% exports)	58	16.1
Printing and publishing output (% manufactured output)	29	32.0
<b>Health</b>	55	55.5
<b>Trade</b>	55	55
Recess or insolvency provisions	22	19.2
Depth of innovative companies	43	53.0
ISO 9001 quality certificates (% GDP)	9	86.5
ISO 14001 environmental certificates (% GDP)	30	54.0
<b>Integrity</b>	55	55.5
CERD freedom from abuse (%)	34	34.0
Joint venture per strategic alliance deals (% GDP)	55	13.0
Computer software spending (% GDP)	88	7.8
<b>Government Indicators</b>	55	55.5
New business density per thousand population	40	15.3
Firms with new products/services (%)	70	86.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	27	60.8
<b>Infrastructure</b>	55	60.8
<b>Coverage</b>	55	30
30MHz mobile network coverage (% population)	17	80.0
Secure Internet servers per 1 million population	15	42
Investment in telecommunication services (% GDP)	52	11.1
<b>Speed</b>	55	55.5
Mobile upload and download speeds	114	114
Fixed broadband upload and download speeds	114	114
Fixed broadband subscriptions (by speed) per hundred people	29	63.0
<b>Availability</b>	43	54.4
Fixed broadband latency (% QM per user)	88	80.0
Mobile broadband latency (% QM per capita)	41	72.0
Internet and telephony competition	1	100
<b>Access</b>	33	54.8
<b>Subscriptions</b>	55	11.1
Active mobile broadband subscriptions per hundred inhabitants	60	38.4
International Internet bandwidth per user	85	87
Households with Internet access at home (%)	33	80.4
<b>Skills and employment</b>	55	43.0
Individuals with standard ICT skills (%)	31	51.4
Tertiary graduates from ICT programmes (%)	74	29.0
ICT employment (%)	12	62.0
<b>Usage</b>	29	57.3
<b>Services</b>	55	45.0
Government online services	24	85.0
Fixed broadband internet traffic per subscription	100	8
Mobile broadband internet traffic per subscription	29	24.1
Internet users (%)	30	83.0
<b>Commerce</b>	25	65.7
ICT FDI patent applications (per 100 million GDP)	26	80.0
E-participation	25	85.7
Internet activities by individuals (%)	20	34.0
Trade in digitally deliverable services (% total trade)	81	42.0
<b>ECONOMY</b>	37	60.8
<b>Economic Competitiveness</b>	15	57.7
<b>Productivity Indicators</b>	41	53.0
Overhead capital formation (% GDP)	100	47.0
Logistics performance	33	57.0
Transport productive capacity	44	36.3
Building quality control	20	86.7

	Rank	Value
<b>Business Agility</b>	55	55.5
Ease of starting a business	55	80
Recovery recovery rate	4	87.7
Entrepreneurial employee activity rate	19	56.0
Growth of corporate transactions	50	21.4
<b>Business openness</b>	31	70.0
<b>Trade and investment</b>	21	71
Trade (% GDP)	12	83.0
High-technology trade (% total trade)	80	47.0
Market concentration	89	78.0
Market concentration	45	82.0
<b>Product openness</b>	11	107
Charitable financial openness	60	70
Foreign direct investment, net inflows (% GDP)	85	42
Cost dynamics	1	100
<b>Financing and domestic value added</b>	33	50.0
<b>Financing and costs</b>	55	61.0
Domestic credit to private sector (% GDP)	87	15.0
MSME financing gap (% GDP)	60	64.0
Tax and contribution rate (% profit)	47	76.0
Bank nonperforming loans (%)	49	80
<b>Unmet needs index</b>	55	60.4
Medium- and high-tech activities value added	41	83.0
Industry and services value added (% GDP)	55	85.0
Labour underutilization rate	28	83.0
Output per worker	29	33.7
<b>ENABLING ENVIRONMENT</b>	23	74.4
<b>Governance</b>	25	75.4
<b>Political environment</b>	28	74
Peace and stability	32	80.0
View and accountability	20	76.0
Quality of institutions	25	82.0
Rule of law	25	83.7
Control of corruption	31	79.0
Government effectiveness	20	85.0
<b>Socio-economic</b>	18	70
<b>Gender equity</b>	47	73.0
Female-to-male ratio in parliament	85	36.4
Female-to-male labour force participation	48	83.0
Female-to-male ratio in internal wage	45	80.0
<b>Gender equality</b>	0	100
Social protection coverage (% population)	1	100
Adult literacy rate	12	89.0
Youth not in employment, education or training (%)	17	80.0
<b>Standard of living</b>	18	83.0
Poverty headcount ratio (% population)	20	83.7
GDP per capita	30	33.2
<b>Health and environment</b>	25	70
<b>Health</b>	25	83.0
Universal health coverage	25	70
Healthy life expectancy (years)	28	83.0
Under-five mortality rate	2	80.0
<b>Environmental performance</b>	80	83.0
Renewable energy consumption (%)	80	21.0
Household footprint per capita	118	88.8
Natural hazard exposure	45	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 84/154

**GKI SCORE** 47.1

**WORLD AVERAGE** 48.4

# SOUTH AFRICA

## COUNTRY PERFORMANCE SUMMARY

South Africa is a moderate performer in terms of its knowledge infrastructure. It ranks 84th out of 154 countries in the Global Knowledge Index 2021 and 22nd out of the 39 countries with high human development.

### KEY INDICATORS

**GDP US\$ billions** 680.045  
**Population** 59,308,690  
**HDI** 0.709

### AREAS OF STRENGTH

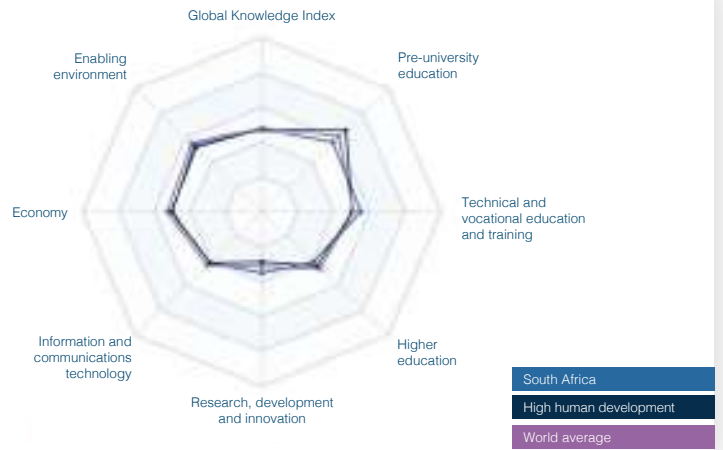
- + Firms constrained with inadequately educated workforce (%)
- + Proportion of skilled production workers
- + New business density per thousand population
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Female-to-male ratio in parliament

### AREAS OF IMPROVEMENT

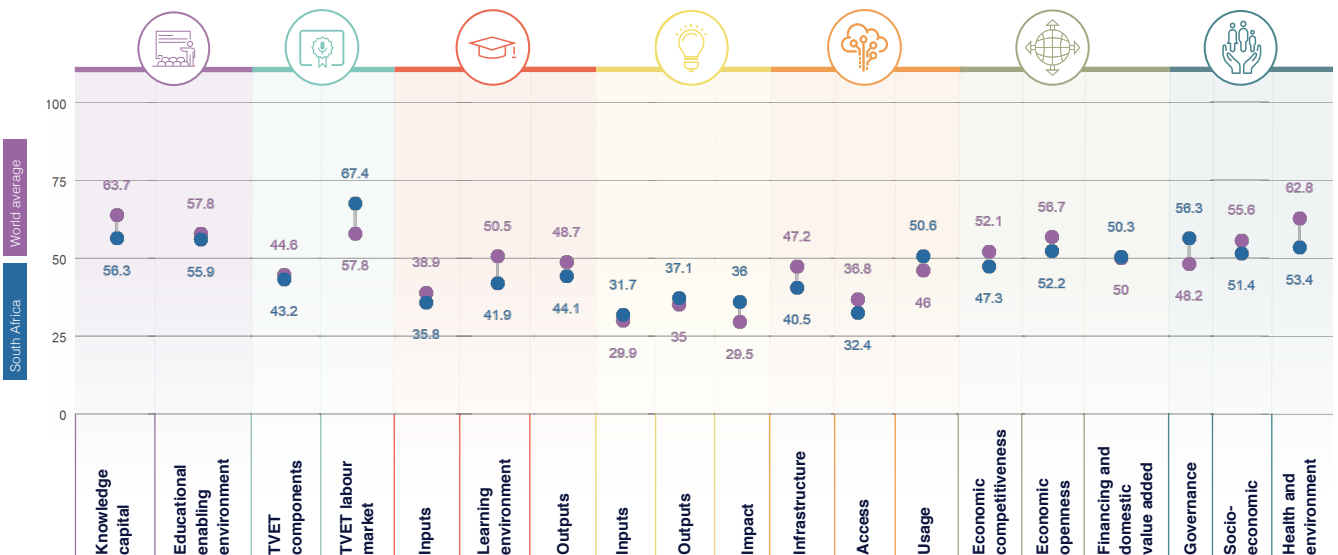
- Entrepreneurial employee activity rate
- Firms offering formal training (%)
- Firms producing new goods and services (%)
- Unemployment rate with vocational education
- Labour underutilization rate

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	103	56.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	53	55.3
HIGHER EDUCATION	103	40.6
RESEARCH, DEVELOPMENT AND INNOVATION	53	34.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	82	41.2
ECONOMY	84	49.9
ENABLING ENVIRONMENT	76	53.7



## GKI PILLARS







# SOUTH AFRICA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	163	56.1
Enrollment	166	34.3
Enrollment rate in primary education	88	93.2
Enrollment rate in lower secondary education	112	87.2
Enrollment rate in upper secondary education	87	85.8
Enrollment rate in tertiary education	77	33.8
Completion	100	80.7
Years of compulsory education in primary and secondary	67	83.2
Completion rate in upper secondary education	87	45.0
Completion rate in the last grade of lower secondary education	81	81.2
Completion	111	32
Assessment of 15-year-old students in math, science and reading	104	104
Learning-adjusted years of schooling	117	32
<b>Educational enabling environment</b>		
Enrollment	20	40.0
Government expenditure on primary education (% GDP)	15	57.6
Government expenditure on secondary education (% GDP)	28	29.3
Government funding per primary student (% GDP per capita)	27	52.3
Government funding per secondary student (% GDP per capita)	30	45.1
Resources	88	81.0
Pupil-based teacher ratio in primary education	104	104
Pupil-based teacher ratio in secondary education	87	86.8
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	80	86.8
<b>Early learning</b>		
Class attendance rate in early childhood education	104	104
Proportion of children who are developmentally on track	104	104
Proportion of children with stimulating home learning environments	104	104
Pupil-based teacher ratio in preprimary education	104	104
Quality and infrastructure	80	81.1
Completion rate in upper secondary education, gender parity	74	80.0
Completion rate in upper secondary education, wealth parity	70	36.2
Completion rate in upper secondary education, location parity	70	61.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and marketing	111	111
Firms offering formal training (%)	122	7.8
Labour force with short-cycle tertiary education (%)	25	80.0
Participation rate in formal and non-formal education and training	75	3.2
<b>TVET resources</b>		
Government expenditure on vocational education (%)	58	16.7
Share of students enrolled in secondary vocational programmes	25	11.1
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>		
Extent of staff training	38	38
Quality of vocational training	118	41
Ratio of high-skill TVET occupations earnings to average wage	17	58.2
Ratio of median-skill TVET occupations earnings to average wage	60	60.0
<b>TVET labour market</b>		
Efficiency of the labour market	41	71
Firms considered well-integrated with workforce (%)	1	100
Employment educational mismatch (%)	64	81.7
Proportion of skilled production workers	1	100
Unemployment rate with vocational education	119	22.3
Real TVET unemployment	60	60.0
Share of TVET occupations	50	60.0
Manufacturing employment (%)	80	24
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	80	76.6
Useable employment rate	30	60.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrollment	88	33.8
Enrollment	88	93.2
Government expenditure per tertiary student	42	25.3
Teaching staff compensation (% tertiary expenditure)	99	28.1
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	98	18.8
Enrollment in masters, doctoral or equivalent (%)	81	5.8
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	104	104
Researcher in higher education (%)	25	70
<b>Learning environment</b>		
<b>Quality and infrastructure</b>		
Teachers in tertiary education, gender parity	104	104
Labour mobility rate	70	72.2
Academic freedom	74	77.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	70	62.0
Class attendance rate in tertiary education, wealth parity	55	41.0
Class attendance rate in tertiary education, location parity	58	12.0
<b>Outputs</b>		
Enrollment	88	33
Educational attainment rate, bachelor's or equivalent	81	18.1
Educational attainment rate, master's or equivalent	52	8.1
Educational attainment rate, doctoral or equivalent	55	32.0
<b>Employment</b>		
Labour force participation rate with advanced education	55	78.0
Unemployment rate with advanced education	114	58.1
<b>Impact</b>		
University tertiary enrollment in R&D	30	63.7
OECD students per 1000 personnel in higher education	51	37
<b>Government expenditure and financing</b>		
<b>Inputs</b>		
Government expenditure	15	57.6
Government expenditure on tertiary education	15	57.6
GDP (% GDP)	43	16.7
OECD per researcher	24	48.0
Researchers per thousand labour force	62	0.2
Tertiary graduates from OECD programmes (%)	66	33.0
<b>Government expenditure and financing</b>		
GDP performed by business enterprises (%)	48	0.4
GDP financed by business enterprises (%)	43	51.3
Researchers in business enterprises (%)	80	22.4
Firms that spend on R&D (%)	23	46.0
<b>Quality and infrastructure</b>		
High-skill employment (%)	66	104
Intellectual property payments (% total trade)	28	34.2
State of cluster development	23	55.1
<b>Outputs</b>		
<b>Government expenditure and financing</b>		
Average documents per researcher	28	87.3
Citations per document	38	21.0
Patent applications (per 100 billion GDP)	60	43.5
<b>Government expenditure and financing</b>		
Intellectual property receipts (% total trade)	51	14.7
Research and development expenditure (per 100 billion GDP)	56	6.8
PCT applications (per 100 billion GDP)	42	83.0
Firms producing new goods and services (%)	119	5



# SOUTH AFRICA

	Rank	Value
<b>Consumer Electronics</b>		
Trademark applications (per 100 million GDP)	73	22.4
Cultural goods exports (% exports)	51	18.8
Printing and publishing output (% manufactured output)	90	83.8
<b>Design</b>	84	76
<b>Trade</b>	71	80.8
Recess or insolvency provisions	39	29.3
Depth of innovative companies	42	35
ISO 9001 quality certificates (% GDP)	84	18.2
ISO 14001 environmental certificates (% GDP)	80	11
<b>Integrity</b>	77	77.1
CERD freedom from abuse (%)	45	19.5
Joint ventures per strategic alliance deals (% GDP)	37	18.1
Computer software spending (% GDP)	23	32.8
<b>Government Services</b>	70	79.8
New business density per thousand population	11	50.8
Firms with new products/services (%)	83	80.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>44</b>	<b>41.2</b>
<b>Infrastructure</b>	88	40.8
<b>Coverage</b>	80	31
30MHz mobile network coverage (% population)	27	87.8
Secure Internet servers per 1 million population	39	22.5
Investment in telecommunication services (% GDP)	81	22.5
<b>Speed</b>	87	18.7
Mobile upload and download speeds	48	26.3
Fixed broadband upload and download speeds	50	12.1
Fixed broadband subscriptions (y speed) per hundred people	100	3.7
<b>Availability</b>	110	20.3
Fixed broadband bandwidth (% Gbps per capita)	86	88.8
Mobile broadband basket (% Gbps per capita)	100	40.1
Internet and telephony competition	105	30
<b>Access</b>	81	35.4
<b>Subscriptions</b>	70	43.2
Active mobile broadband subscriptions per fixed-line inhabitants	27	46.7
International Internet bandwidth per user	100	32.6
Households with Internet access at home (%)	84	83.2
<b>Skills and employment</b>	110	16.8
Individuals with standard ICT skills (%)	69	11.7
Tertiary graduates from ICT programmes (%)	89	21.8
ICT employment (%)	104	19
<b>Usage</b>	89	50.8
<b>Services</b>	76	41
Government online services	54	74.7
Fixed broadband Internet traffic per subscription	25	33.3
Mobile broadband Internet traffic per subscription	84	5.7
Internet users (%)	82	86.5
<b>Commerce</b>	71	81.1
eTPU/eT purchase applications (per 100 million GDP)	51	49.9
E-participation	80	76
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	55	45.1
<b>ECONOMY</b>	<b>44</b>	<b>49.3</b>
<b>Economic Competitiveness</b>	81	47.3
<b>Infrastructure Investment</b>	70	41.8
Overhead capital formation (% GDP)	107	25.8
Logistics performance	30	58.4
Transport productive capacity	89	23.4
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	80	48
Ease of starting a business	119	81.2
Recovery recovery rate	85	37.7
Entrepreneurial employee activity rate	80	1.8
Growth of corporate transactions	55	21.4
<b>Employee experience</b>	87	52.3
<b>Trust and development</b>	70	81.1
Trade (% GDP)	100	21.4
High-technology trade (% total trade)	79	45.7
Market concentration	40	84.8
Market concentration	48	82.7
<b>Product Innovation</b>	70	43.5
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	101	23.8
Cost dynamics	55	79.4
<b>Financing and domestic value added</b>	<b>73</b>	<b>80.3</b>
<b>Financing and costs</b>	12	10.1
Domestic credit to private sector (% GDP)	35	49.3
IMRS financing gap (% GDP)	21	82
Tax and contribution rate (% profit)	89	16.4
Bank nonperforming loans (%)	71	38.8
<b>Unmet needs index</b>	114	31.1
Medium- and high-tech activities value added	85	28.5
Industry and services value added (% GDP)	40	85.7
Labour underutilization rate	102	2.4
Output per worker	80	17.8
<b>ENABLING ENVIRONMENT</b>	<b>74</b>	<b>83.7</b>
<b>Governance</b>	88	56.3
<b>Political environment</b>	59	83.3
Peace and stability	85	40.8
View and accountability	38	76
Quality of institutions	88	57.2
Rule of law	79	49.6
Control of corruption	87	56.1
Government effectiveness	81	68
<b>Socio-economic</b>	83	81.4
<b>Gender equity</b>	81	81.8
Female-to-male ratio in parliament	8	86.4
Female-to-male labour force participation	79	76.8
Female-to-male ratio in internal wage	108	19
<b>Gender equality</b>	89	25.3
Social protection coverage (% population)	85	47.8
Adult literacy rate	86	83.8
Youth not in employment, education or training (%)	142	25.2
<b>Standard of living</b>	100	13.7
Poverty headcount ratio (% population)	102	21.7
GDP per capita	87	18
<b>Health and environment</b>	<b>148</b>	<b>53.4</b>
<b>Health</b>	112	81.2
Universal health coverage	79	89
Healthy life expectancy (years)	100	28.8
Under-five mortality rate	110	71.8
<b>Environmental performance</b>	110	66.8
Renewable energy consumption (%)	110	10.7
Household footprint per capita	88	78.1
Natural hazard exposure	100	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# SPAIN

**GKI RANK** 28/154

**GKI SCORE** 61

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Spain is a leading performer in terms of its knowledge infrastructure. It ranks 28th out of 154 countries in the Global Knowledge Index 2021 and 28th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Computer software spending (% GDP)
- + Net enrolment rate in upper secondary education
- + Healthy life expectancy (years)
- + Research institutions prominence
- + Fixed-broadband upload and download speeds

### AREAS OF IMPROVEMENT

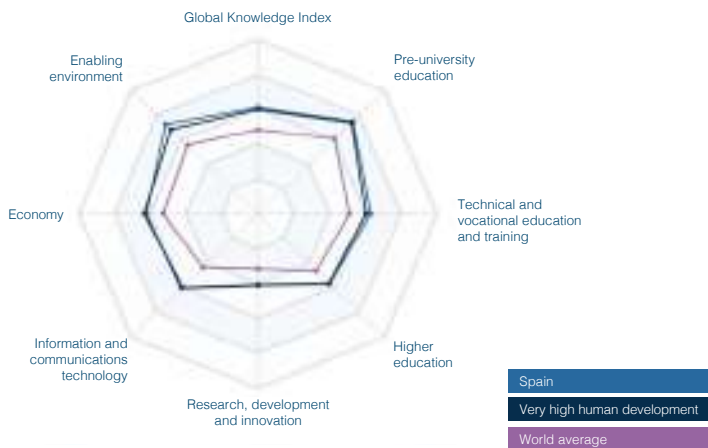
- Government expenditure on primary education (% of GDP)
- Share of students enrolled in post-secondary vocational programmes
- Tax and contribution rate (% profit)
- Labour underutilization rate
- Unemployment rate with vocational education

### KEY INDICATORS

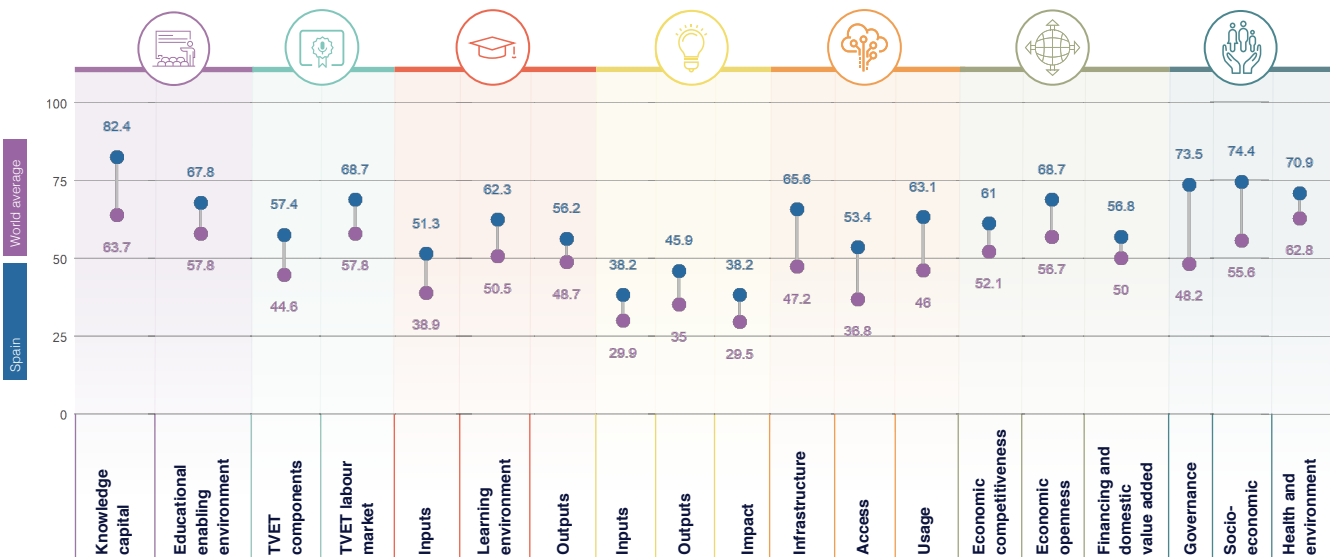
**GDP US\$ billions** 1,715.071  
**Population** 46,754,783  
**HDI** 0.904

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	36	75.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	28	63
HIGHER EDUCATION	32	56.6
RESEARCH, DEVELOPMENT AND INNOVATION	30	40.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	26	60.7
ECONOMY	39	62.2
ENABLING ENVIRONMENT	24	72.9



## GKI PILLARS







# SPAIN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	20	62.4
Enrollment	23	90.7
Net enrolment rate in primary education	74	91.0
Net enrolment rate in lower secondary education	79	90.0
Net enrolment rate in upper secondary education	9	90.0
Completion	32	70.1
Years of compulsory education in primary and secondary	12	70.0
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	20	81.0
Completion	20	71.0
Assessment of 15-year-old students in math, science and reading	20	84.0
Learning-adjusted years of schooling	32	70.0
<b>Educational spending environment</b>	67	67.8
Expenditure	77	50.7
Government expenditure on primary education (% GDP)	83	25.2
Government expenditure on secondary education (% GDP)	62	25.0
Government funding per primary student (% GDP per capita)	58	80.6
Government funding per secondary student (% GDP per capita)	64	26.4
Resources	80	67.0
Pupil-based teacher ratio in primary education	54	80.1
Pupil-based teacher ratio in secondary education	78	80.0
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	27	70.0
Class attendance rate in early childhood education	29	80.0
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	13	84.0
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET participation</b>	37	67.4
Companies training apprentices	11	60.1
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	13	85.0
Participation rate in formal and non-formal education and training	20	68.7
<b>TVET resources</b>	41	60
Government expenditure on vocational education (%)	20	34.0
Share of students enrolled in secondary vocational programmes	44	30.0
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>	10	60.1
Extent of staff training	76	44.1
Quality of vocational training	40	50.0
Ratio of high-skil TVET occupations earnings to average wage	50	29.7
Ratio of median-skil TVET occupations earnings to average wage	53	40
<b>TVET labour market</b>	40	60.7
Efficiency of the labour market	11	60
Firms considered with inequality educated workforce (%)	116	116
Employment educational mismatch (%)	35	77.0
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	85	60.1
Real TVET unemployment	41	60.0
Share of TVET occupations	40	65.0
Manufacturing employment (%)	85	43.4
Quality and infrastructure	11	60.0
Enrollment in vocational education, gender parity	80	70.0
Useable employment rate	37	60.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	31	61.3
Expenditure	31	40.1
Government expenditure per tertiary student	32	30.0
Teaching staff compensation (% tertiary expenditure)	28	48.0
Enrollment	31	41.7
Enrollment in bachelor's or equivalent level (%)	22	47.0
Enrollment in masters, doctoral or equivalent (%)	27	58.1
Resources	116	60.0
Pupil-teacher ratio in tertiary education	30	64.7
Researchers in higher education (%)	33	43.0
<b>Learning environment</b>	41	60.0
<b>Quality and academic freedom</b>	41	60.0
Teachers in tertiary education, gender parity	28	80
Labour mobility rate	60	13
Academic freedom	20	60.0
<b>Quality and infrastructure</b>	116	116
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	88	50.0
<b>Attainment</b>	37	60.0
Educational attainment rate, bachelor's or equivalent	34	60.0
Educational attainment rate, master's or equivalent	18	50.0
Educational attainment rate, doctoral or equivalent	21	42.0
<b>Employment</b>	10	60.0
Labour force participation rate with advanced education	40	77.0
Unemployment rate with advanced education	65	30.1
<b>Impact</b>	33	43.0
University tertiary enrollment in R&D	70	41
OECD students per 1000 personnel in higher education	41	44.1
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS CREATION</b>		
<b>Inputs</b>	14	60.0
Share of R&D expenditure	11	60.0
GDP (% GDP)	28	25
GERD per researcher	48	20
Researchers per thousand labour force	20	20.0
Tertiary graduates from STEM programmes (%)	61	41.1
<b>Quality and infrastructure</b>	11	60.0
GERD performed by business enterprises (%)	29	18.0
GERD financed by business enterprises (%)	31	58.1
Researchers in business enterprises (%)	32	47.1
Firms that spend on R&D (%)	116	116
<b>Quality of business environment</b>	11	60.1
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	29	30
State of startup development	30	60.0
<b>Outputs</b>	41	60.0
<b>Quality and infrastructure</b>	11	60.1
Average documents per researcher	37	60.0
Citations per document	67	20.0
Patent applications (per 100 billion GDP)	37	50.0
<b>Quality and infrastructure</b>	11	60.0
Intellectual property receipts (% total trade)	23	30.7
Research design applications (per 100 billion GDP)	11	80
PCT applications (per 100 billion GDP)	30	70.1
Firms producing new goods and services (%)	116	116



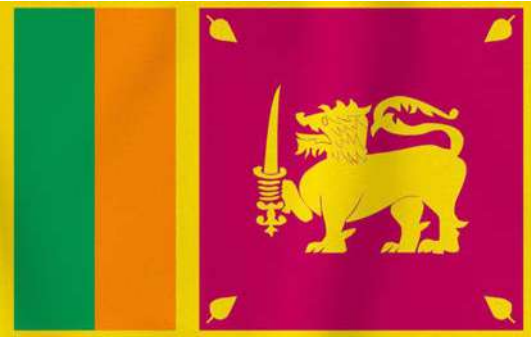


# SPAIN

	Rank	Value
<b>Consumer Electronics</b>	32	87.9
Treatment applications per 100 million GDP	41	33.0
Cultural goods exports (% exports)	38	22.6
Printing and publishing output (% manufactured output)	41	20.5
<b>Energy</b>	59	55.3
<b>Finance</b>	3	71.1
Access to venture capital	1	100
Depth of innovative companies	74	50.4
ISO 9001 quality certificates (% GDP)	17	30.0
ISO 14001 environmental certificates (% GDP)	12	63.2
<b>Industry</b>	59	55.3
CERD forecast from abroad (%)	49	15.6
Joint ventures per strategic alliance deals (% GDP)	33	12.6
Computer software spending (% GDP)	4	56.0
<b>Government Services</b>	70	70.2
New business density per thousand population	40	15.2
Firms with new products/services (%)	76	76
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	28	66.7
<b>Infrastructure</b>	28	66.8
<b>Coverage</b>	41	51.1
3G/LTE mobile network coverage (% population)	24	69.5
Secure Internet servers per 1 million population	31	27.5
Investment in telecommunication services (% GDP)	65	21.0
<b>Quality</b>	21	63.0
Mobile internet and download speeds	36	33.2
Fixed broadband upload and download speeds	1	60.0
Fixed broadband subscriptions (by speed) per hundred people	23	32.6
<b>Availability</b>	17	55.3
Fixed broadband bandwidth (% Gbps per capita)	39	61.3
Mobile broadband basket (% Gbps per capita)	6	69.0
Internet and telephone competition	1	100
<b>Access</b>	28	53.4
<b>Subscribers</b>	11	51.0
Active mobile broadband subscriptions per hundred inhabitants	34	46.3
International Internet bandwidth per user	105	21.6
Households with Internet access at home (%)	11	60.0
<b>Skills and employment</b>	55	45.5
Individuals with advanced ICT skills (%)	55	66.2
Tertiary graduates from ICT programmes (%)	75	26.5
ICT employment (%)	20	56.0
<b>Usage</b>	28	63.1
<b>Services</b>	36	56.5
Government online services	17	65.8
Fixed broadband internet traffic per subscription	20	37.9
Mobile broadband internet traffic per subscription	66	14.8
Internet users (%)	15	60.0
<b>Commerce</b>	21	61.1
ICT/FIT patent applications (per 100,000 GDP)	69	44.6
E-participation	35	64.0
Internet activities by individuals (%)	18	36.6
Trade in digitally deliverable services (% total trade)	20	60.1
<b>ECONOMY</b>	34	62.2
<b>Economic Competitiveness</b>	41	61
<b>Infrastructure Investment</b>	61	62.2
Overhead capital formation (% GDP)	100	47.2
Logistics performance	16	50.8
Transport productive capacity	40	30
Building quality control	25	73.3

	Rank	Value
<b>Business Agility</b>	61	60.0
Ease of starting a business	65	66.0
Recovery recovery rate	22	64.1
Entrepreneurial employee activity rate	66	9.8
Growth of corporate transactions	13	65.7
<b>Corporate Governance</b>	27	66.2
<b>Trade and Investment</b>	22	62.0
Trade (% GDP)	54	53.1
High-technology trade (% total trade)	61	40
Market concentration	21	60.1
Market concentration	26	64.3
<b>Product Innovation</b>	11	73.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	64	40.2
Cost dynamics	41	60
<b>Financing and Economic Value Added</b>	44	60.8
<b>Financing and Costs</b>	41	62.4
Domestic credit to private sector (% GDP)	25	47.5
MSME financing gap (% GDP)	69	79
Tax and contribution rate (% profit)	110	60.5
Bank nonperforming loans (%)	45	66.7
Unmet loan demand	44	51.2
Medium and high-tech activities value added	35	66.3
Industry and services value added (% GDP)	39	67.0
Labour underutilization rate	117	47.5
Output per worker	24	65.0
<b>ENABLING ENVIRONMENT</b>	34	70.8
<b>Governance</b>	31	73.5
<b>Political environment</b>	21	62.3
Peace and stability	50	56
View and accountability	23	63.7
Quality of institutions	34	77.5
Rule of law	36	70.4
Control of corruption	25	75.4
Government effectiveness	38	71.8
<b>Socio-economic</b>	19	74.4
<b>Gender equity</b>	71	61.7
Female-to-male ratio in parliament	14	76.8
Female-to-male labour force participation	59	60.4
Female-to-male ratio in internal wage	35	60.0
<b>Gender equality</b>	21	61.0
Social protection coverage (% population)	36	60.3
Adult literacy rate	27	66.2
Youth not in employment, education or training (%)	45	76.2
<b>Standard of living</b>	32	61.0
Poverty headcount ratio (% population)	56	71.5
GDP per capita	39	32.4
<b>Health and environment</b>	21	70.9
<b>Health</b>	6	61.8
Universal health coverage	12	65
Healthy life expectancy (years)	1	63.0
Under-five mortality rate	12	69
<b>Environmental performance</b>	61	60
Renewable energy consumption (%)	52	36
Household footprint per capita	100	73
Natural hazard exposure	65	60

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# SRI LANKA

## KEY INDICATORS

GDP US\$ billions	274.797
Population	21,413,250
HDI	0.782

**GKI RANK** 86/154

**GKI SCORE** 46.6

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Sri Lanka is a moderate performer in terms of its knowledge infrastructure. It ranks 86th out of 154 countries in the Global Knowledge Index 2021 and 23rd out of the 39 countries with high human development.

### AREAS OF STRENGTH

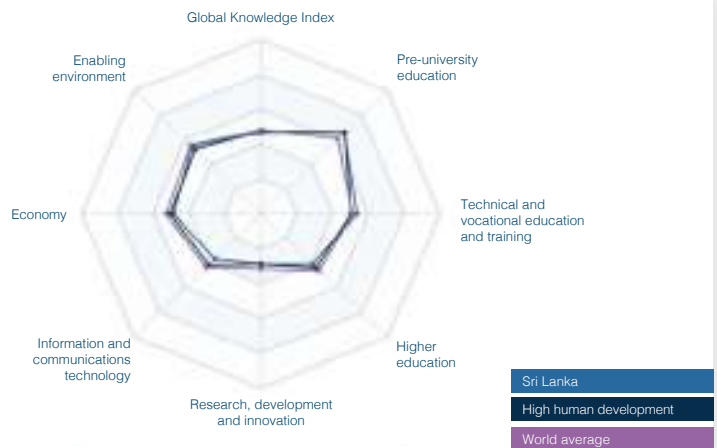
- + Poverty headcount ratio (% population)
- + Mobile broadband basket (% GNI per capita)
- + Labour force with short-cycle tertiary education (%)
- + Net enrolment rate in lower secondary education
- + Citable documents per R&D personnel in higher education

### AREAS OF IMPROVEMENT

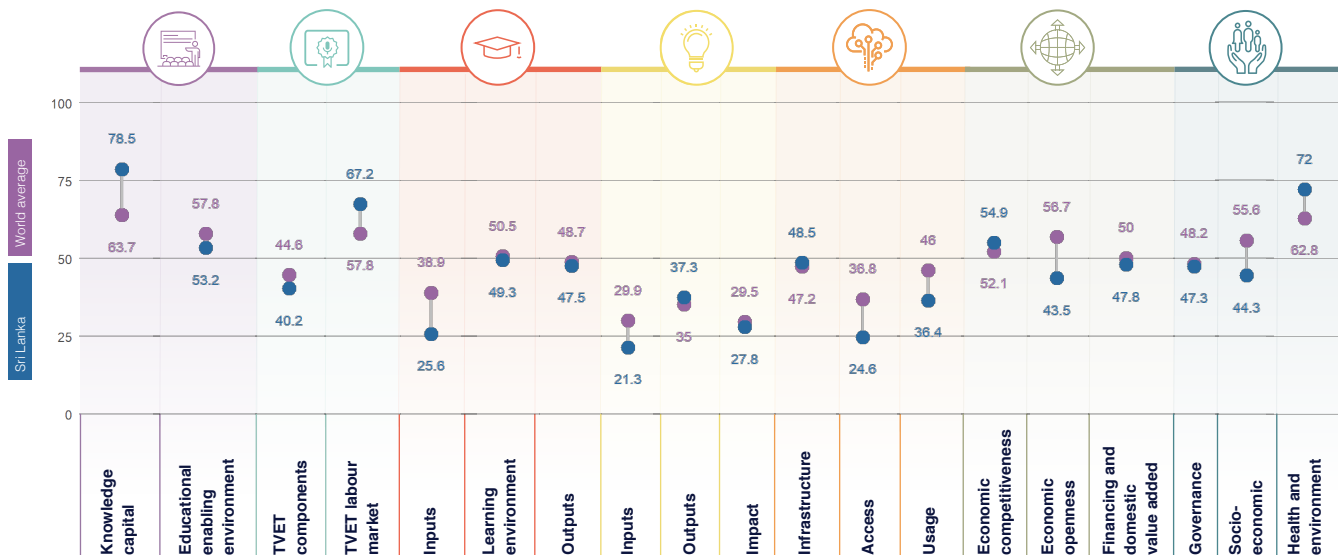
- Government expenditure on primary education (% of GDP)
- Building quality control
- Government funding per secondary student (% of GDP per capita)
- Female-to-male ratio in parliament
- Government expenditure on vocational education (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	81	65.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	65	53.7
HIGHER EDUCATION	101	40.8
RESEARCH, DEVELOPMENT AND INNOVATION	84	28.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	96	36.5
ECONOMY	93	48.7
ENABLING ENVIRONMENT	72	54.6



## GKI PILLARS





# SRI LANKA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	49	75.5
Enrollment	81	81.5
Net enrolment rate in primary education	20	99.4
Net enrolment rate in lower secondary education	4	99.6
Net enrolment rate in upper secondary education	63	81.0
Completion	25	91.1
Years of compulsory education in primary and secondary	25	88.6
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	29	81.5
Completion	54	81
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	71	80
<b>Educational enabling environment</b>		
Expenditure	124	11.1
Government expenditure on primary education (% GDP)	129	11.7
Government expenditure on secondary education (% GDP)	100	11.2
Government funding per primary student (% GDP per capita)	113	13.6
Government funding per secondary student (% GDP per capita)	116	12
Resources	71	11.3
Pupil-based teacher ratio in primary education	52	80
Pupil-based teacher ratio in secondary education	46	74.9
Schools with access to computers in primary education (%)	81	86.3
Schools with access to computers in secondary education (%)	69	76.2
Early learning	23	74.2
Class attendance rate in early childhood education	81	86.1
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	20	80.4
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Occupational training enrollment	11	11.1
Firms offering formal training (%)	109	21.3
Labour force with short-cycle tertiary education (%)	4	82.2
Participation rate in formal and non-formal education and training	85	0.8
TVET resources	11	11.4
Government expenditure on vocational education (%)	79	8
Share of students enrolled in secondary vocational programmes	105	0.2
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	11	49.0
Extent of staff training	79	43.2
Quality of vocational training	55	54.0
Ratio of high-skill TVET occupations earnings to average wage	30	56.4
Ratio of medium-skill TVET occupations earnings to average wage	43	46.5
<b>TVET labour market</b>		
Efficiency of the labour market	41	11.7
Firms considered with inappropriately educated workforce (%)	62	71.2
Employment educational mismatch (%)	68	50.9
Proportion of skilled production workers	22	74.0
Unemployment rate with vocational education	93	81.5
Real TVET unemployment	11	11.1
Share of TVET occupations	89	39
Manufacturing employment (%)	20	81.1
Quality and infrastructure	11	49.0
Enrollment in vocational education, gender parity	81	79
Useable employment rate	85	59.8

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	77	23.6
Government expenditure per tertiary student	62	15.1
Teaching staff compensation (% tertiary expenditure)	94	30
Enrollment	11	11.2
Enrollment in bachelor's or equivalent level (%)	97	11
Enrollment in masters, doctoral or equivalent (%)	73	12.8
Resources	124	41.7
Ratios/teacher ratio in tertiary education	113	21.5
Researcher in higher education (%)	60	31.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	19	60.3
Labour mobility rate	108	1.4
Academic freedom	97	56.1
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Attainment	88	6.2
Educational attainment rate, bachelor's or equivalent	88	0.7
Educational attainment rate, master's or equivalent	60	2.3
Educational attainment rate, doctoral or equivalent	116	116
Employment	11	11.0
Labour force participation rate with advanced education	19	84.5
Unemployment rate with advanced education	85	73.0
Impact	28	10.8
University tertiary enrollment in FTE	76	49.0
UNITE students per FTE person in higher education	11	72.7
<b>Environment of innovation and research and development</b>		
<b>Inputs</b>		
Government R&D expenditure	107	21.2
Government R&D expenditure	107	1.6
GDP (% GDP)	100	2.4
GERD per researcher	64	20
Researchers per thousand labour force	86	1.8
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	71	7.4
GERD financed by business enterprises (%)	44	49.0
Researchers in business enterprises (%)	93	24.1
Firms that spend on R&D (%)	81	16
Quality of research environment	11	11.0
High-skill employment (%)	32	33.0
Intellectual property payments (% total trade)	116	116
State of cluster development	57	48.7
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	21	73.4
Citations per document	118	15.1
Patent applications (per 100 billion GDP)	57	54.7
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	116	116
Research design applications (per 100 billion GDP)	71	3.4
PCT applications (per 100 billion GDP)	77	47.0
Firms producing new goods and services (%)	81	26.7





# SRI LANKA

	Rank	Value
<b>Consumer electronics</b>	15	85.9
Treatment applications per 100 million GDP	80	15.6
Cultural goods exports (% exports)	89	16.1
Printing and publishing output (% manufactured output)	13	59.2
<b>Media</b>	85	25.5
<b>Books</b>	75	12.4
Books or institutions' presence	88	12.1
Depth of innovative companies	80	51.1
ISO 9001 quality certificates (% GDP)	65	19.1
ISO 14001 environmental certificates (% GDP)	72	5.8
<b>Software</b>	91	26.4
CERD licensed from abroad (%)	56	19.6
Joint ventures per strategic industry deals (% GDP)	39	24.7
Computer software spending (% GDP)	21	34.5
<b>Government services</b>	91	26.4
New business density per thousand population	85	5.8
Firms with web presence (%)	62	89.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	86	26.5
<b>Infrastructure</b>	86	88.5
<b>Coverage</b>	66	11.1
30MHz mobile network coverage (% population)	77	94.3
Secure Internet servers per 1 million population	87	3.5
Investment in telecommunication services (% GDP)	77	28.9
<b>Speed</b>	69	11.9
Mobile upload and download speeds	81	14.8
Fixed broadband upload and download speeds	73	8.8
Fixed broadband subscriptions (by speed) per hundred people	86	11.8
<b>Availability</b>	9	81.7
Fixed broadband basket (% GNI per capita)	19	88.7
Mobile broadband basket (% GNI per capita)	8	81.2
Internet and telephone competition	85	53.8
<b>Access</b>	111	24.8
<b>Subscriptions</b>	95	49.5
Active mobile broadband subscriptions per hundred inhabitants	87	31.1
International Internet bandwidth per user	88	37.7
Households with Internet access at home (%)	94	52.9
<b>Skills and employment</b>	125	9.7
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	104	19
ICT employment (%)	80	8.7
<b>Usage</b>	188	36.4
<b>Services</b>	106	26.9
Government online services	62	71.8
Fixed broadband Internet traffic per subscription	69	3.8
Mobile broadband Internet traffic per subscription	84	12.6
Internet users (%)	117	31.4
<b>Commerce</b>	66	37
eTPU/eT purchase applications (per 100,000 GDP)	81	22.7
e-participation	69	71.4
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	118	24.5
<b>ECONOMY</b>	83	61.7
<b>Economic complexity</b>	57	54.3
<b>Investment</b>	111	41.1
Overhead capital formation (% GDP)	39	89.2
Logistics performance	63	39.6
Transport productive capacity	64	20.1
Building quality control	143	40

	Rank	Value
<b>Business agility</b>	91	63.8
Ease of starting a business	75	89.2
Recovery time	54	46.7
Entrepreneurial employee activity rate	106	19
Growth of corporate transactions	80	21.4
<b>Corporate openness</b>	128	43.8
<b>Trade and investment</b>	91	20.4
Trade (% GDP)	107	13.7
High-technology trade (% total trade)	104	38.8
Market concentration	49	87.8
Market concentration	81	81.8
<b>Product openness</b>	114	31.8
China's financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	111	35.2
Cost dynamics	110	40
<b>Financing and domestic value added</b>	87	47.3
<b>Financing and costs</b>	100	10.1
Domestic credit to private sector (% GDP)	80	18.5
IMRS financing gap (% GDP)	75	80.8
Tax and contribution rate (% profit)	104	82
Bank nonperforming loans (%)	36	29.7
Unsecured loans ratio	11	41.8
Medium- and high-tech activities value added	114	6.8
Industry and services value added (% GDP)	89	84.7
Labour underutilization rate	22	84.4
Output per worker	75	13.8
<b>ENABLING ENVIRONMENT</b>	72	94.4
<b>Governance</b>	71	47.3
<b>Political environment</b>	73	44.8
Peace and stability	75	45.5
View and accountability	80	44
Quality of institutions	75	61
Rule of law	66	63.4
Control of corruption	80	45.7
Government effectiveness	76	51
<b>Socio-economic</b>	118	44.3
<b>Gender equity</b>	120	23.1
Female-to-male ratio in parliament	140	5.7
Female-to-male labour force participation	126	60.4
Female-to-male ratio in internal wage	104	19
<b>Gender balance</b>	89	17.1
Social protection coverage (% population)	81	34.8
Adult literacy rate	87	80
Youth not in employment, education or training (%)	114	45.8
<b>Standard of living</b>	81	82.8
Poverty headcount ratio (% population)	5	85
GDP per capita	78	10.8
<b>Health and environment</b>	88	72
<b>Health</b>	66	74.8
Universal health coverage	50	85
Healthy life expectancy (years)	80	76.8
Under-five mortality rate	50	85.8
<b>Environmental performance</b>	81	61.7
Renewable energy consumption (%)	38	53.3
Household footprint per capita	88	80.8
Natural hazard exposure	100	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# SUDAN

**GKI RANK** 145/154

**GKI SCORE** 30.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Sudan is a weak performer in terms of its knowledge infrastructure. It ranks 145th out of 154 countries in the Global Knowledge Index 2021 and 19th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Investment in telecommunication services (% GDP)
- + Firms with new product/service (%)
- + Firms that spend on R&D (%)
- + Firms producing new goods and services (%)
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

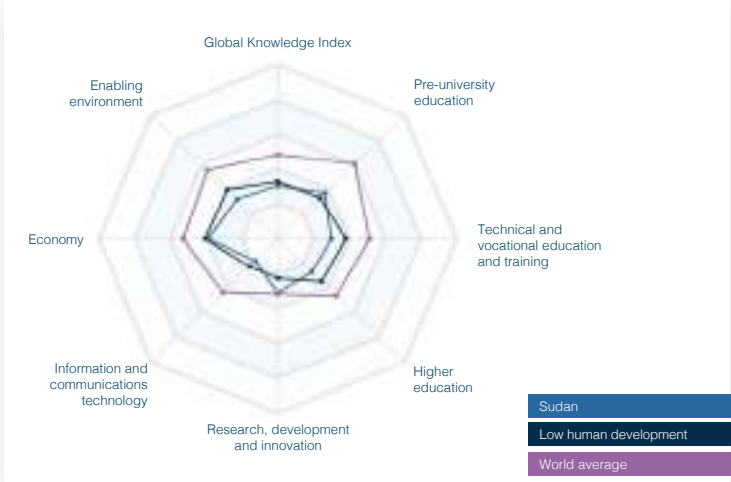
- Net enrolment rate in primary education
- Pupil-teacher ratio in tertiary education
- Intellectual property receipts (% total trade)
- Fixed-broadband subscriptions by speed per hundred people
- Trade (% GDP)

### KEY INDICATORS

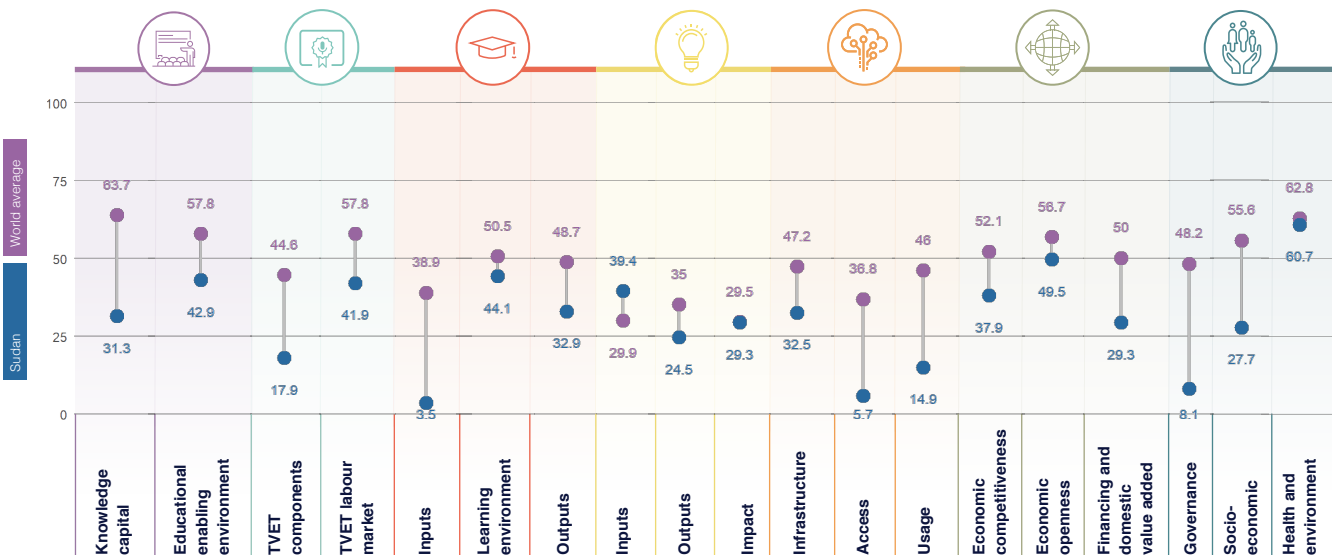
**GDP** US\$ billions ..... **176.415**  
**Population** ..... **43,849,269**  
**HDI** ..... **0.51**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	134	37.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	150	29.9
HIGHER EDUCATION	149	26.8
RESEARCH, DEVELOPMENT AND INNOVATION	70	31.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	151	17.7
ECONOMY	137	38.9
ENABLING ENVIRONMENT	151	32.2



## GKI PILLARS





# SUDAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	144	31.3
Enrollment	141	30.0
Net enrolment rate in primary education	144	8
Net enrolment rate in lower secondary education	117	52.1
Net enrolment rate in upper secondary education	112	40.1
Completion	120	43.5
Years of compulsory education in primary and secondary	119	81.5
Completion rate in upper secondary education	80	35.0
Success rate rate in the last grade of lower secondary education	118	25.2
Completion	108	10.0
Assessment of 15-year-old students in math, science and reading	116	119
Learning-adjusted years of schooling	108	10.5
<b>Educational enabling environment</b>	121	40.9
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	120	37.0
Class attendance rate in early childhood education	76	37.5
Proportion of children who are developmentally on track	116	116
Presence of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	84	41.0
Completion rate in upper secondary education, gender parity	80	50.4
Completion rate in upper secondary education, wealth parity	80	50.2
Completion rate in upper secondary education, location parity	87	45.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	161	17.8
Companies training apprentices	116	10.4
Firms offering formal training (%)	121	5.8
Labour force with short-cycle tertiary education (%)	18	83.7
Participation rate in formal and non-formal education and training	67	3.7
<b>TVET resources</b>	111	3.1
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	118	3.1
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and infrastructure</b>	116	116
Extent of staff training	116	116
Quality of vocational training	116	116
Ratio of high-skil TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>	110	41.9
Efficiency of the labour market	116	10.7
Firms considered well matched with workforce (%)	80	72.1
Employment educational mismatch (%)	116	116
Presence of skilled production workers	86	41.8
Unemployment rate with vocational education	119	34.4
Real TVET unemployment	100	10.2
Share of TVET occupations	122	31.0
Manufacturing employment (%)	111	25.9
Quality and infrastructure	121	41.7
Enrollment in vocational education, gender parity	116	116
Useable employment rate	112	45.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	147	3.5
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	116	3
Enrollment in bachelor's or equivalent level (%)	101	9.4
Enrollment in masters, doctoral or equivalent (%)	116	8.6
Resources	141	6
Ratios/teacher ratio in tertiary education	121	9
Researchers in higher education (%)	116	116
<b>Learning environment</b>	88	44.1
<b>Quality and academic freedom</b>	116	41.2
Teachers in tertiary education, gender parity	86	50.4
Labour mobility rate	116	116
Academic freedom	117	43.1
<b>Quality and infrastructure</b>	81	41
Class attendance rate in tertiary education, gender parity	24	82.0
Class attendance rate in tertiary education, wealth parity	43	25.3
Class attendance rate in tertiary education, location parity	45	4.7
<b>Outputs</b>	102	31.9
<b>Enrollment</b>	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	101	12.0
Labour force participation rate with advanced education	100	58.5
Unemployment rate with advanced education	100	9.4
<b>Impact</b>	116	116
University tertiary enrollment in R&D	116	116
GNR&D dollars R&D per 100 persons in higher education	116	116
<b>INNOVATION, SCIENCE AND TECHNOLOGY</b>		
<b>Inputs</b>	10	18.4
Government R&D expenditure	11	10.7
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	28	82.0
<b>Quality and infrastructure</b>	11	10
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	13	52
<b>Quality and infrastructure</b>	116	11
High-skilled employment (%)	116	116
Intellectual property payments (% total trade)	100	6
State of digital development	116	116
<b>Outputs</b>	111	24.2
<b>Quality and infrastructure</b>	107	11
Average documents per researcher	116	116
Citations per document	100	13.0
Patent applications (per 100 billion GDP)	80	50.4
<b>Quality and infrastructure</b>	11	110
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	80	8.3
PCT applications (per 100 billion GDP)	100	30.5
Firms producing new goods and services (%)	17	71.8



# SUDAN

	Rank	Value
<b>Consumer Electronics</b>	106	22
Smartphone applications (per 100 million GDP)	113	4.8
Cultural goods exports (% exports)	133	0.5
Printing and publishing output (% manufactured output)	199	199
<b>Energy</b>	73	25.3
<b>Energy</b>	73	25.3
Renewable investment's proportion	194	194
Depth of innovative companies	194	194
ISO 9001 quality certificates (% GDP)	138	1.3
ISO 14001 environmental certificates (% GDP)	124	1
<b>Energy</b>	73	25.3
CERO forecast from abroad (%)	199	199
Cost savings per strategic alliance deals (% GDP)	79	7.2
Computer software spending (% GDP)	199	199
<b>Entrepreneurship</b>	3	100
New business density per thousand population	199	199
Firms with new products/services (%)	23	36.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	163	27.7
<b>Infrastructure</b>	128	25.9
<b>Coverage</b>	81	21.1
3G/4G mobile network coverage (% population)	124	4.2
Secure Internet servers per 1 million population	147	0.2
Investment in telecommunication services (% GDP)	1	100
<b>Quality</b>	164	0.8
Mobile internet and download speeds	111	0.7
Fixed broadband upload and download speeds	112	1.8
Fixed broadband subscriptions (y-o-y) per hundred people	133	8
<b>Accessibility</b>	139	45.1
Fixed broadband bandwidth (% Gbps per capita)	199	199
Mobile broadband basket (% Gbps per capita)	125	39.2
Internet and telephony competition	119	80
<b>Access</b>	164	8.7
<b>Subscriptions</b>	164	11
Active mobile-broadband subscriptions per fixed-line inhabitants	126	17.8
International Internet bandwidth per user	142	11.8
Households with Internet access at home (%)	147	3.8
<b>Skills and employment</b>	161	0.8
Individuals with standard ICT skills (%)	83	0.8
Tertiary graduates from ICT programmes (%)	117	8
ICT employment (%)	199	199
<b>Usage</b>	182	16.3
<b>Services</b>	147	10.4
Government online services	137	30.6
Fixed broadband internet traffic per subscription	86	0.5
Mobile broadband internet traffic per subscription	117	1.3
Internet users (%)	129	21.3
<b>Services</b>	162	10.2
ICT FDI patent applications (per 100 million GDP)	160	22.7
E-participation	147	21.4
Internet activities by individuals (%)	199	199
Trade in digitally deliverable services (% total trade)	143	4.5
<b>ECONOMY</b>	127	23.9
<b>Economic Competitiveness</b>	138	27.3
<b>Infrastructure Investment</b>	141	21.1
Overhead capital formation (% GDP)	143	7
Logistics performance	119	25.7
Transport productive capacity	108	19.9
Building quality control	47	80

	Rank	Value
<b>Business Agility</b>	191	60.1
Ease of starting a business	133	76.7
Recovery recovery rate	86	32.8
Entrepreneurial employee activity rate	25	36.8
Growth of corporate transactions	111	14.3
<b>Business openness</b>	161	66.3
<b>Trade and investment</b>	122	20.0
Trade (% GDP)	148	3
High-technology trade (% total trade)	52	81
Market concentration	100	89
Market concentration	400	85.5
Product diversity	27	49.4
Climate financial openness	74	55.2
Foreign direct investment, net inflows (% GDP)	71	47.8
Cost dynamics	199	199
<b>Financing and domestic value added</b>	148	26.3
<b>Financing and costs</b>	128	20.4
Domestic credit to private sector (% GDP)	148	1.8
MSME financing gap (% GDP)	87	51.3
Tax and contribution rate (% profit)	109	82
Bank nonperforming loans (%)	199	199
Unmet loan demand	143	21.2
Medium- and high-tech activities value added	199	199
Industry and services value added (% GDP)	148	25.8
Labour underutilization rate	142	24.8
Output per worker	112	6.1
<b>ENABLING ENVIRONMENT</b>	161	22.3
<b>Governance</b>	148	8.1
<b>Political environment</b>	122	7.3
Peace and stability	147	5.7
View and accountability	141	9.2
Quality of institutions	127	6.8
Rule of law	138	12
Control of corruption	148	6.7
Government effectiveness	100	5.8
<b>Socio-economic</b>	158	27.7
<b>Gender equity</b>	121	21.4
Female-to-male ratio in parliament	199	199
Female-to-male labour force participation	138	37.6
Female-to-male ratio in internal wage	100	85.1
<b>Gender equality</b>	199	20.7
Social protection coverage (% population)	121	6.7
Adult literacy rate	111	49.8
Youth not in employment, education or training (%)	141	30.1
<b>Standard of living</b>	122	6
Poverty headcount ratio (% population)	199	199
GDP per capita	124	3
<b>Health and environment</b>	162	60.7
<b>Health</b>	108	61.2
Universal health coverage	122	44
Healthy life expectancy (years)	113	62.0
Under-five mortality rate	152	51
<b>Environmental performance</b>	81	22.0
Renewable energy consumption (%)	30	83.7
Household footprint per capita	80	88.1
Natural hazard exposure	72	59

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# SURINAME

## KEY INDICATORS

GDP US\$ billions	8.473
Population	586,634
HDI	0.738

**GKI RANK** 88/154

**GKI SCORE** 46

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Suriname is a moderate performer in terms of its knowledge infrastructure. It ranks 88th out of 154 countries in the Global Knowledge Index 2021 and 25th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Share of students enrolled in secondary vocational programmes
- + Gross enrolment ratio in early childhood education
- + ISO 9001 quality certificates (% GDP)
- + Trade in digitally deliverable services (% total trade)
- + Pupil-trained teacher ratio in primary education

### AREAS OF IMPROVEMENT

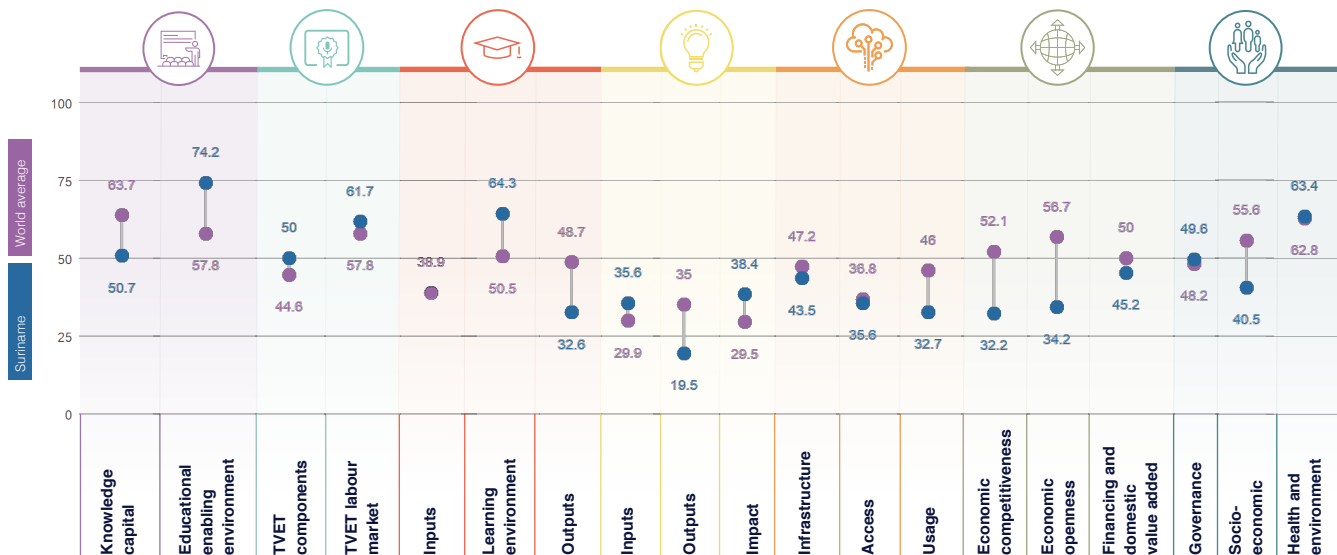
- Entrepreneurial employee activity rate
- Ease of starting a business
- Insolvency recovery rate
- Product concentration
- Fixed broadband Internet traffic per subscription

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	88	62.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	51	55.9
HIGHER EDUCATION	61	48.5
RESEARCH, DEVELOPMENT AND INNOVATION	69	31.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	94	37.2
ECONOMY	144	37.2
ENABLING ENVIRONMENT	89	51.2



## GKI PILLARS







# SURINAME

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	111	80.7
Enrollment	112	83.0
Net enrolment rate in primary education	119	82.0
Net enrolment rate in lower secondary education	89	79.1
Net enrolment rate in upper secondary education	100	84.1
Completion	100	83.0
Years of compulsory education in primary and secondary	132	49.2
Completion rate in upper secondary education	104	85.4
Success rate rate in the last grade of lower secondary education	122	81.8
Outcomes	116	116
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	116	116
<b>Educational enabling environment</b>	<b>27</b>	<b>74.9</b>
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	81	83.0
Pupil-based teacher ratio in primary education	15	84.4
Pupil-based teacher ratio in secondary education	21	83.6
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	23	23
Class attendance rate in early childhood education	12	79.1
Proportion of children who are developmentally on track	21	65.6
Proportion of children with stimulating home learning environments	34	63.3
Pupil-based teacher ratio in preprimary education	25	87.6
Quality and infrastructure	11	81.1
Completion rate in upper secondary education, gender parity	108	71.2
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	81	49.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	11	43.0
Firms offering formal training (%)	59	43.6
Labour force with short-cycle tertiary education (%)	116	116
Participation rate in formal and non-formal education and training	116	116
TVET resources	11	112.2
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	4	89.2
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	122	32.0
Extent of staff training	89	44.7
Quality of vocational training	116	116
Ratio of high-skill TVET occupations earnings to average wage	67	27.9
Ratio of medium-skill TVET occupations earnings to average wage	47	47.4
<b>TVET labour market</b>		
Efficiency of the labour market	107	31
Firms considered well educated workforce (%)	55	89.6
Employment educational mismatch (%)	94	30.0
Proportion of skilled production workers	82	84.6
Unemployment rate with vocational education	116	116
High TVET unemployment	11	11.0
Share of TVET occupations	20	86.0
Manufacturing employment (%)	132	38.7
Quality and infrastructure	21	64.6
Enrollment in vocational education, gender parity	42	86.7
Useable employment rate	44	80.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	116	116
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	116	116
Ratios/teacher ratio in tertiary education	116	116
Research in higher education (%)	116	116
<b>Learning environment</b>		
Directly paid academic freedom	11	14.0
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	116	116
Academic freedom	77	74.0
Quality and infrastructure	21	54.4
Class attendance rate in tertiary education, gender parity	74	63.4
Class attendance rate in tertiary education, wealth parity	28	45.4
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Skilled labour	81	8.4
Educational attainment rate, bachelor's or equivalent	00	6.8
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	111	31
Labour force participation rate with advanced education	124	24.0
Unemployment rate with advanced education	29	87.1
Impact	102	32.0
University tertiary enrollment in FTE	111	30.0
UNITE indicators per FTE personnel in higher education	116	116
<b>Entrepreneurship, innovation and services trade</b>		
Access	41	12.2
Access to FDI investments	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
Quality and infrastructure	11	112.2
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	23	46.2
Quality and infrastructure	11	112.2
High-skill employment (%)	18	62.0
Intellectual property payments (% total trade)	92	5
State of digital development	118	31
<b>Statistics</b>		
Access to FDI investments	11	11.0
Average documents per researcher	116	116
Citations per document	12	29
Patent applications (per 100 billion GDP)	116	116
Quality and infrastructure	11	112.2
Intellectual property receipts (% total trade)	106	1.7
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	79	37.9



# SURINAME

	Rank	Value
<b>Consumer electronics</b>	100	37.5
Treatment applications per 100 million GDP	100	100
Cultural goods exports (% exports)	100	0.0
Printing and publishing output (% manufactured output)	100	100
<b>Energy</b>	85	45.0
<b>Energy</b>	85	45.0
Renewable installations' productive	100	100
Depth of innovative companies	100	100
ISO 9001 quality certificates (% GDP)	20	83.7
ISO 14001 environmental certificates (% GDP)	80	14.7
<b>Finance</b>	100	100
CERD forecast from abroad (%)	100	100
Joint ventures per strategic industry deals (% GDP)	100	100
Computer software spending (% GDP)	100	100
<b>Government services</b>	80	60.0
New business density per thousand population	50	11.0
Firms with new products/services (%)	20	70
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	84	37.2
<b>Infrastructure</b>	87	40.0
<b>Coverage</b>	80	33.0
30MHz mobile network coverage (% population)	80	81.0
Secure Internet servers per 1 million population	40	10.0
Investment in telecommunication services (% GDP)	81	24.1
<b>Quality</b>	80	33.0
Mobile internet and download speeds	100	100
Fixed broadband upload and download speeds	100	100
Fixed broadband subscriptions (y speed) per hundred people	71	22.0
<b>Availability</b>	80	33.0
Fixed broadband latency (% QM per capita)	100	85.0
Mobile broadband basket (% QM per capita)	80	50.0
Internet and telephony competition	100	70.0
<b>Access</b>	81	30.0
<b>Subscribers</b>	80	41.0
Active mobile broadband subscriptions per hundred inhabitants	50	20.0
International Internet bandwidth per user	70	30.7
Households with Internet access at home (%)	81	54.0
<b>Skills and employment</b>	70	20.0
Individuals with standard ICT skills (%)	100	100
Tertiary graduates from ICT programmes (%)	100	100
ICT employment (%)	80	20.0
<b>Usage</b>	110	37.7
<b>Services</b>	100	30.0
Government online services	100	25.0
Fixed broadband internet traffic per subscription	100	0
Mobile broadband internet traffic per subscription	40	10.0
Internet users (%)	100	40.1
<b>Commerce</b>	80	40.0
ICT/FIT patent applications (per 100,000 GDP)	100	100
E-participation	100	20
Internet activities by individuals (%)	100	100
Trade in digitally deliverable services (% total trade)	20	80.4
<b>ECONOMY</b>	100	37.2
<b>Economic complexity/structure</b>	100	37.2
Export diversification	110	40
Overhead capital formation (% GDP)	100	100
Logistics performance	100	100
Transport productive capacity	20	40.0
Building quality control	100	40.0

	Rank	Value
<b>Business agility</b>	100	37.0
Ease of starting a business	100	81.0
Recovery recovery rate	100	84
Entrepreneurial employee activity rate	80	1.0
Growth of corporate transactions	110	10.0
<b>Corporate openness</b>	100	30.0
Trade and investment	100	30.0
Trade (% GDP)	30	40.0
High-technology trade (% total trade)	100	25.0
Market concentration	100	20.0
Market concentration	100	20.0
Product diversity	100	20.0
Contract financial openness	80	10.0
Foreign direct investment, net inflows (% GDP)	80	40.0
Cost dynamics	100	100
<b>Financing and domestic value added</b>	100	40.0
Financing and costs	100	20.0
Domestic credit to private sector (% GDP)	100	0.1
IMRS financing gap (% GDP)	70	80.0
Tax and contribution rate (% profit)	30	70.0
Bank nonperforming loans (%)	100	100
Unmet loan demand	80	10.0
Medium- and high-tech activities value added	100	10.0
Industry and services value added (% GDP)	31	80.0
Labour underutilization rate	100	20.0
Output per worker	80	10.0
<b>ENABLING ENVIRONMENT</b>	84	31.0
<b>Governance</b>	87	40.0
Political environment	50	20.0
Peace and stability	40	80
View and accountability	80	80.0
Quality of institutions	80	40.1
Rule of law	70	80
Control of corruption	80	30
Government effectiveness	100	30.0
<b>Socio-economic</b>	100	40.0
Gender equity	100	50.0
Female-to-male ratio in parliament	80	40.0
Female-to-male labour force participation	100	80
Female-to-male ratio in internal wage	100	100
Gender inequality	80	10.0
Social protection coverage (% population)	87	31.0
Adult literacy rate	80	80.0
Youth not in employment, education or training (%)	110	40.0
Standard of living	100	10.0
Poverty headcount ratio (% population)	100	100
GDP per capita	80	10.0
<b>Health and environment</b>	80	30.0
Health	80	10.0
Universal health coverage	71	71
Healthy life expectancy (years)	100	80.0
Under-five mortality rate	80	80.1
Environmental performance	70	60.1
Renewable energy consumption (%)	80	10.0
Household footprint per capita	81	80.1
Natural hazard exposure	60	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# SWEDEN

**GKI RANK** 2/154

**GKI SCORE** 70

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Sweden is a leading performer in terms of its knowledge infrastructure. It ranks 2nd out of 154 countries in the Global Knowledge Index 2021 and 2nd out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + Logistics performance
- + ICT employment (%)
- + ICT PCT patent applications (per 100 billion GDP)
- + Joint ventures per strategic alliance deals (% GDP)
- + Growth of innovative companies

### AREAS OF IMPROVEMENT

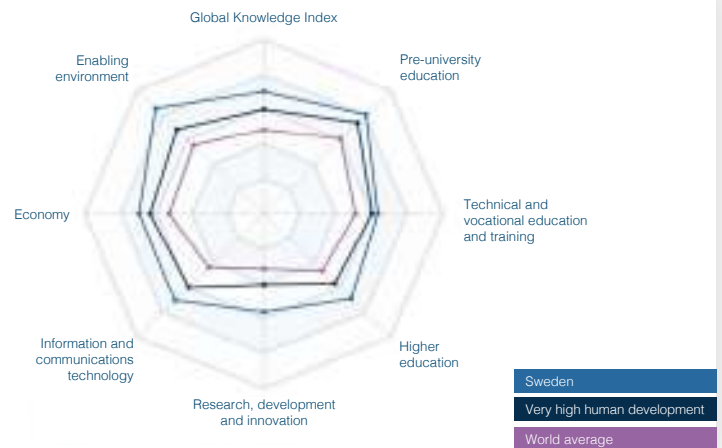
- Tax and contribution rate (% profit)
- Ratio of high-skill TVET occupations earnings to average wage
- Share of students enrolled in post-secondary vocational programmes
- Researchers in higher education (%)
- Ecological footprint per capita

### KEY INDICATORS

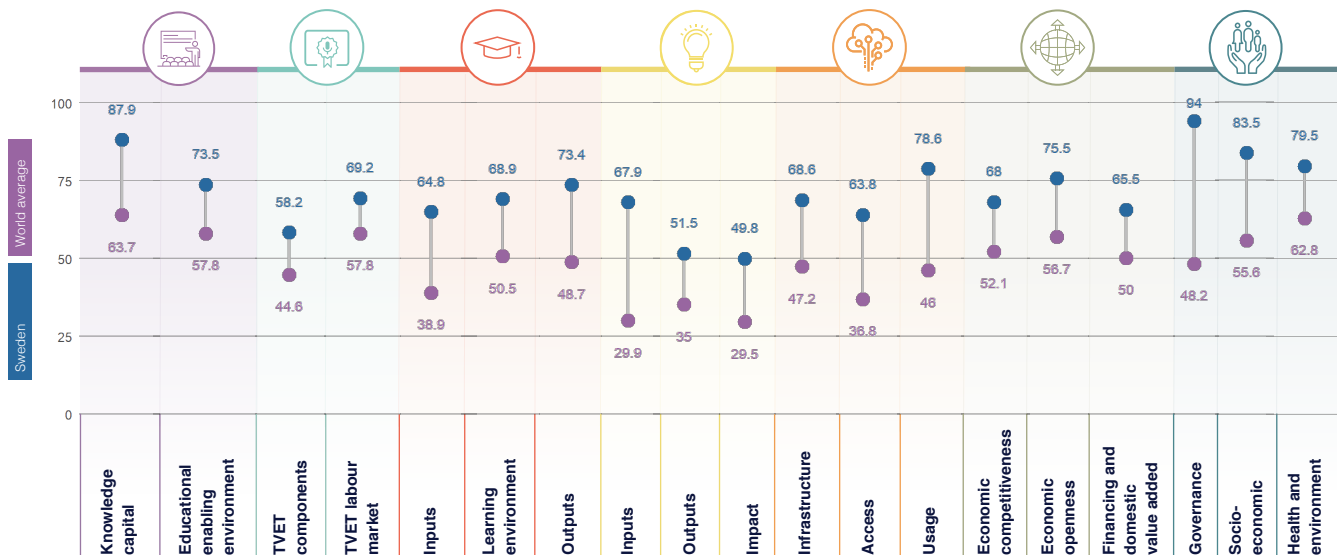
**GDP US\$ billions** 528.06  
**Population** 10,099,270  
**HDI** 0.945

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	10	80.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	27	63.7
HIGHER EDUCATION	3	69
RESEARCH, DEVELOPMENT AND INNOVATION	5	56.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	9	70.3
ECONOMY	13	69.7
ENABLING ENVIRONMENT	3	85.6



## GKI PILLARS







# SWEDEN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	8	90.7
Enrollment	8	93.5
Net enrolment rate in primary education	13	99.6
Net enrolment rate in lower secondary education	8	99.6
Net enrolment rate in upper secondary education	10	99.6
Completion	13	95.7
Years of compulsory education in primary and secondary	47	69.9
Completion rate in upper secondary education	12	97
Success rate rate in the last grade of lower secondary education	5	91
Completion	11	93.0
Assessment of 15-year-old students in math, science and reading	13	88.6
Learning-adjusted years of schooling	8	95.4
<b>Educational enabling environment</b>		
Expenditure	10	93.0
Government expenditure on primary education (% GDP)	8	88.0
Government expenditure on secondary education (% GDP)	8	82.8
Government funding per primary student (% GDP per capita)	19	58.9
Government funding per secondary student (% GDP per capita)	30	49.6
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	33	71.7
Class attendance rate in early childhood education	18	71.7
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	9	93.0
Completion rate in upper secondary education, gender parity	10	97.7
Completion rate in upper secondary education, wealth parity	10	92.6
Completion rate in upper secondary education, location parity	25	96.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Technical training enrollment	1	93.0
Firms offering formal training (%)	8	77.6
Labour force with short-cycle tertiary education (%)	27	80.7
Participation rate in formal and non-formal education and training	5	86.4
TVET resources	15	84.2
Government expenditure on vocational education (%)	33	55.4
Share of students enrolled in secondary vocational programmes	35	32.6
Share of students enrolling in postsecondary vocational programmes	76	49
TVET quality and infrastructure	10	84.2
Extent of staff training	11	79.7
Quality of vocational training	20	64.6
Ratio of high-skill TVET occupations earnings to average wage	80	16.4
Ratio of median-skill TVET occupations earnings to average wage	73	39.2
<b>TVET labour market</b>		
Efficiency of the labour market	31	73.0
Firms considered with inequality educated workforce (%)	79	63.6
Employment educational mismatch (%)	29	70.5
Proportion of skilled production workers	1	84.1
Unemployment rate with vocational education	39	63.2
Real TVET unemployment	10	84.2
Share of TVET occupations	51	60.0
Manufacturing employment (%)	86	33.1
Quality and infrastructure	31	84.1
Enrollment in vocational education, gender parity	73	54.7
Useable employment rate	64	60.5

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	3	84.8
Government expenditure per tertiary student	9	81.1
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	11	90.4
Enrollment in bachelor's or equivalent level (%)	35	33.4
Enrollment in master's, doctoral or equivalent (%)	7	67.4
Resources	111	111
Rp/teacher ratio in tertiary education	29	64.8
Research staff in higher education (%)	55	21.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	36	65.0
Labour mobility rate	37	29.2
Academic freedom	8	86.4
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Retention	10	57.2
Educational attainment rate, bachelor's or equivalent	28	49
Educational attainment rate, master's or equivalent	28	44.0
Educational attainment rate, doctoral or equivalent	7	65.0
Employment	10	81.1
Labour force participation rate with advanced education	15	84.6
Unemployment rate with advanced education	48	67.0
Impact	3	10.0
University tertiary enrollment in R&D	7	75
OECD students per 1000 personnel in higher education	9	83.0
<b>Government's contribution to innovation and economic growth</b>		
Impact	5	17.2
Quality and infrastructure	5	84.2
GDP (% GDP)	4	47
GERD per researcher	23	41.4
Researchers per thousand labour force	9	25.4
Tertiary graduates from STEM programmes (%)	37	66.0
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	9	84.6
GERD financed by business enterprises (%)	12	71.2
Researchers in business enterprises (%)	4	85.0
Firms that spend on R&D (%)	42	31.2
Quality and infrastructure	5	84.2
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	7	65.4
State of cluster development	18	66.0
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	54	59.0
Citations per document	38	23.2
Patent applications (per 100 billion GDP)	8	78.6
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	7	73.1
Research design applications (per 100 billion GDP)	30	34.0
PCT applications (per 100 billion GDP)	5	87.0
Firms producing new goods and services (%)	8	80.0





# SWEDEN

	Rank	Value
<b>Consumer Innovation Performance</b>	35	80.0
Treatment applications per 100 million GDP	47	35.7
Cultural goods exports (% exports)	88	12.1
Printing and publishing output (% manufactured output)	80	20.5
<b>Energy</b>	5	100.0
<b>Finance</b>	35	80.0
Access to venture capital	21	43.1
Depth of innovative companies	3	34.2
ISO 9001 quality certificates (% GDP)	53	34
ISO 14001 environmental certificates (% GDP)	21	45.4
<b>Industry</b>	7	100.0
CERD forecast from abroad (%)	40	19.2
Joint ventures per strategic alliance deals (% GDP)	3	84.2
Computer software spending (% GDP)	10	40.0
<b>Government Performance</b>	37	80.0
New business density per thousand population	24	35.7
Firms with new products/services (%)	76	82.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	9	100.0
<b>Infrastructure</b>	16	80.0
<b>Coverage</b>	30	100.0
3G/LTE mobile network coverage (% population)	1	100
Secure Internet servers per 1 million population	25	34.2
Investment in telecommunication services (% GDP)	108	21.5
<b>Quality</b>	10	100.0
Mobile upload and download speeds	13	47.0
Fixed broadband upload and download speeds	8	50
Fixed broadband subscriptions (by speed) per hundred people	13	86.0
<b>Availability</b>	27	80.0
Fixed broadband latency (% QM per capita)	38	87.6
Mobile broadband basket (% QM per capita)	20	81.1
Internet and telephony competition	1	100
<b>Access</b>	14	100.0
<b>Subscribers</b>	33	80
Active mobile-broadband subscriptions per fixed-line inhabitants	11	57.1
International Internet bandwidth per user	88	41.8
Households with Internet access at home (%)	60	80.0
<b>Skills and employment</b>	3	100.0
Individuals with standard ICT skills (%)	19	83.0
Tertiary graduates from ICT programmes (%)	70	31.1
ICT employment (%)	2	80.0
<b>Usage</b>	3	100.0
<b>Services</b>	10	80.0
Government online services	15	80
Fixed broadband internet traffic per subscriber	104	19
Mobile broadband internet traffic per subscriber	25	34
Internet users (%)	14	84.0
<b>Commerce</b>	2	100.0
ICT/FIT patent applications (per 100,000 GDP)	2	80.0
E-participation	40	80.0
Internet activities by individuals (%)	3	85.1
Trade in digitally deliverable services (% total trade)	4	75.4
<b>ECONOMY</b>	13	80.0
<b>Economic Competitiveness</b>	15	80
<b>Infrastructure Investment</b>	33	100.0
Overhead capital formation (% GDP)	40	84.1
Logistics performance	2	30.0
Transport productive capacity	40	37.0
Building quality control	115	80

	Rank	Value
<b>Business Agility</b>	14	100.0
Ease of starting a business	34	80.0
Recovery recovery rate	21	84.0
Entrepreneurial employee activity rate	15	82.7
Growth of corporate transactions	13	85.7
<b>Customer experience</b>	14	100.0
Trust and dissatisfaction	14	70.0
Taxs (% GDP)	94	34.4
High-technology trade (% total trade)	24	81.0
Market concentration	35	80.0
Market concentration	1	80.0
Product diversity	33	80.0
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	75	47.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	16	80.0
<b>Financing and costs</b>	10	100.0
Domestic credit to private sector (% GDP)	13	80.0
MSME financing gap (% GDP)	104	19
Tax and contribution rate (% profit)	103	80.0
Bank nonperforming loans (%)	3	80.0
Unmet loan demand	31	80.0
Medium- and high-tech activities value added	11	81.0
Industry and services value added (% GDP)	45	80.0
Labour underutilization rate	89	80.0
Output per worker	16	40.0
<b>ENABLING ENVIRONMENT</b>	2	80.0
<b>Governance</b>	8	84
Political environment	6	81.0
Peace and stability	15	80.0
View and accountability	1	87.1
Quality of institutions	6	80.0
Rule of law	6	80.0
Control of corruption	5	80.0
Government effectiveness	6	80.0
<b>Socio-economic</b>	4	80.0
Gender equity	3	80.0
Female-to-male ratio in parliament	1	80.0
Female-to-male labour force participation	17	80.0
Female-to-male ratio in internal wage	40	80.0
Gender inequality	4	87.1
Social protection coverage (% population)	1	100
Adult literacy rate	104	19
Youth not in employment, education or training (%)	7	84.0
Standard of living	10	81.0
Poverty headcount ratio (% population)	42	30.0
GDP per capita	14	40.0
<b>Health and environment</b>	3	70.0
Health	6	80.0
Universal health coverage	5	80
Healthy life expectancy (years)	13	87.0
Under-five mortality rate	10	80.0
Environmental performance	31	80.0
Renewable energy consumption (%)	30	84.0
Household footprint per capita	108	80.0
Natural hazard exposure	1	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 1/154

**GKI SCORE** 71.5

**WORLD AVERAGE** 48.4

# SWITZERLAND

## KEY INDICATORS

**GDP US\$ billions** 573.136  
**Population** 8,654,618  
**HDI** 0.955

## COUNTRY PERFORMANCE SUMMARY

Switzerland is a leading performer in terms of its knowledge infrastructure. It ranks 1st out of 154 countries in the Global Knowledge Index 2021 and 1st out of the 61 countries with very high human development.

### AREAS OF STRENGTH

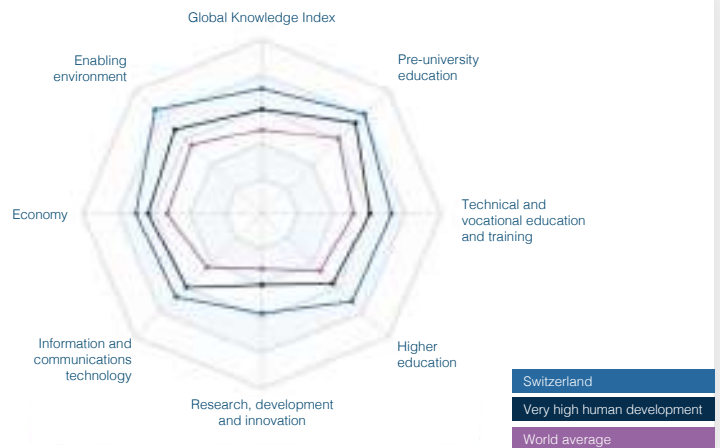
- + Extent of staff training
- + Quality of vocational training
- + Fixed-broadband subscriptions by speed per hundred people
- + Government effectiveness
- + University-industry collaboration in R&D

### AREAS OF IMPROVEMENT

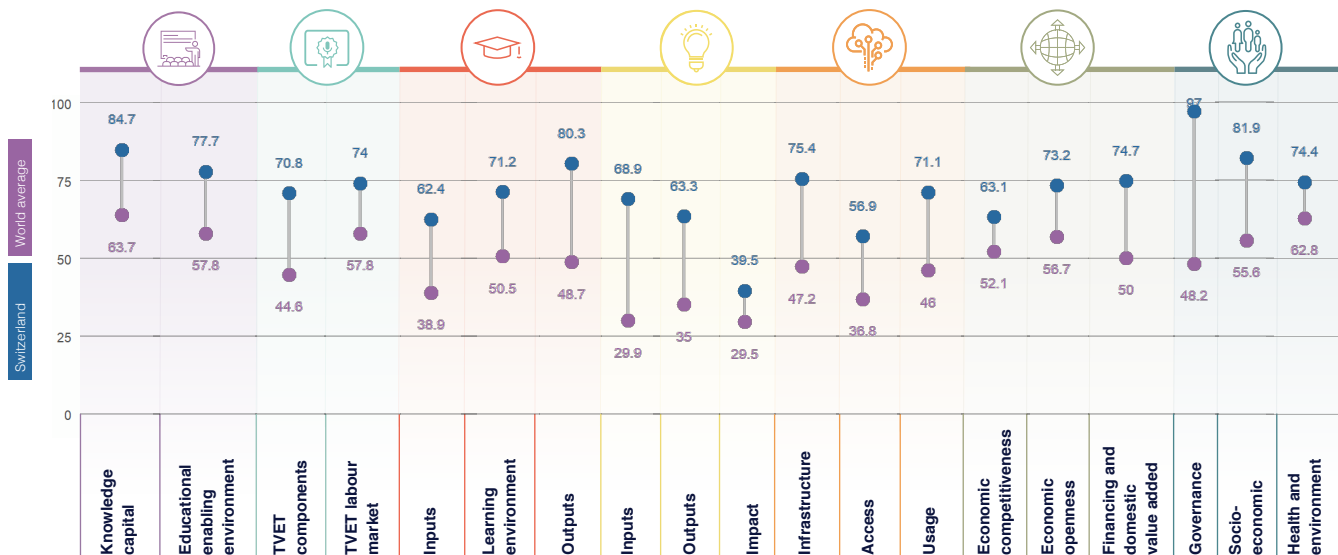
- Years of compulsory education in primary and secondary
- Ecological footprint per capita
- Building quality control
- Share of students enrolled in post-secondary vocational programmes
- Tertiary graduates from ICT programmes (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	4	81.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	3	72.4
HIGHER EDUCATION	1	71.3
RESEARCH, DEVELOPMENT AND INNOVATION	1	57.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	13	67.8
ECONOMY	9	70.3
ENABLING ENVIRONMENT	5	84.4



## GKI PILLARS





# SWITZERLAND

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	78	84.7
Enrollment	8	93
Net enrolment rate in primary education	8	90.7
Net enrolment rate in lower secondary education	22	89.2
Net enrolment rate in upper secondary education	16	86
Completion	44	80.5
Years of compulsory education in primary and secondary	67	69.2
Completion rate in upper secondary education	20	83.2
Success rate rate in the last grade of lower secondary education	49	79.2
Completion	24	74.0
Assessment of PISA/PIAAC students in math, science and reading	19	67
Learning-adjusted years of schooling	24	82.3
<b>Educational enabling environment</b>	18	77.7
Expenditure	31	42.5
Government expenditure on primary education (% GDP)	45	41.1
Government expenditure on secondary education (% GDP)	38	35.4
Government funding per primary student (% GDP per capita)	12	58.8
Government funding per secondary student (% GDP per capita)	39	35.0
Resources	1	100
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	13	81.2
Class attendance rate in early childhood education	8	87.8
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	81	80.2
Completion rate in upper secondary education, gender parity	41	84.3
Completion rate in upper secondary education, wealth parity	49	84.3
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Communication and writing	2	11.5
Firms offering formal training (%)	106	106
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	2	83.8
TVET resources	10	100.0
Government expenditure on vocational education (%)	79	46.5
Share of students enrolled in secondary vocational programmes	12	57.9
Share of students enrolled in postsecondary vocational programmes	71	33.6
TVET quality and infrastructure	11	100.0
Extent of staff training	1	76
Quality of vocational training	1	90.0
Ratio of high-skill TVET occupations earnings to average wage	82	29.3
Ratio of medium-skill TVET occupations earnings to average wage	81	45.5
<b>TVET labour market</b>		
Efficiency of the labour market	11	100.0
Firms considered with inequality educated workforce (%)	106	106
Employment educational mismatch (%)	30	75.2
Proportion of skilled production workers	106	106
Unemployment rate with vocational education	27	87.3
Real TVET unemployment	10	111.2
Share of TVET occupations	64	72.5
Manufacturing employment (%)	84	42.1
Quality and infrastructure	81	82.1
Enrollment in vocational education, gender parity	75	73.4
Useable employment rate	27	80.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	5	88.8
Government expenditure per tertiary student	4	82.2
Teaching staff compensation (% tertiary expenditure)	33	43.1
Enrollment	25	47.5
Enrollment in bachelor's or equivalent level (%)	32	33.8
Enrollment in masters, doctoral or equivalent (%)	23	61.0
Resources	61	71.1
Rap teacher ratio in tertiary education	11	80.8
Researchers in higher education (%)	45	43.4
<b>Learning environment</b>		
Directly paid academic freedom	25	71.2
Teachers in tertiary education, gender parity	78	85
Labour mobility rate	8	82.7
Academic freedom	9	85.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>		
Retention	1	82.2
Educational attainment rate, bachelor's or equivalent	106	106
Educational attainment rate, master's or equivalent	5	78.0
Educational attainment rate, doctoral or equivalent	1	100
Employment	10	85.0
Labour force participation rate with advanced education	51	81.5
Unemployment rate with advanced education	27	87.8
Impact	15	85.2
University tertiary enrollment in R&D	2	77.5
OECD students per 1000 personnel in higher education	22	85.0
<b>Government's contribution and economic role</b>		
Balance	4	112.2
Share of GDP expenditure	2	112.2
GDP (% GDP)	5	68.1
OEFD per researcher	8	83.5
Researchers per thousand labour force	19	62.0
Tertiary graduates from STEM programmes (%)	44	48.8
<b>Government's contribution and economic role</b>		
OEFD performed by business enterprises (%)	4	84.5
OEFD financed by business enterprises (%)	9	82.9
Researchers in business enterprises (%)	21	60.0
Firms that spend on R&D (%)	106	106
Quality of research environment	1	95
High-skilled employment (%)	106	106
Intellectual property payments (% total trade)	1	100
State of cluster development	5	71.0
<b>Outputs</b>		
Share of GDP expenditure	2	95
Average documents per researcher	18	72.0
Citations per document	21	43.1
Patent applications (per 100 billion GDP)	9	82.2
<b>Government's contribution and economic role</b>		
Intellectual property receipts (% total trade)	3	65.1
Research design applications (per 100 billion GDP)	26	31
PCT applications (per 100 billion GDP)	4	88.2
Firms producing new goods and services (%)	106	106





# SWITZERLAND

	Rank	Value
<b>Consumer Innovation</b>	5	95
Treatment applications per 100 million GDP	25	54.2
Cultural goods exports (% exports)	6	31
Printing and publishing output (% manufactured output)	45	27.9
<b>Science</b>	10	75.5
<b>Health</b>	15	67.5
Risks of institutions' persistence	38	46.1
Depth of innovative companies	33	47
ISO 9001 quality certificates (% GDP)	25	57.5
ISO 14001 environmental certificates (% GDP)	27	32.7
<b>Energy</b>	7	89.5
CERO forecast from abroad (%)	65	13
Coal reserves per storage volume deals (% GDP)	11	49.1
Computer software spending (% GDP)	2	81.5
<b>Government</b>	100	100
New business density per thousand population	33	22.5
Firms with new products/service (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	11	67.9
<b>Infrastructure</b>	5	75.4
<b>Coverage</b>	7	100
30MHz mobile network coverage (% population)	13	100
Secure Internet servers per 1 million population	6	65.7
Investment in telecommunication services (% GDP)	81	27.2
<b>Speed</b>	7	111.5
Mobile upload and download speeds	9	89.9
Fixed broadband upload and download speeds	6	80.8
Fixed broadband subscriptions (y speed) per hundred people	1	100
<b>Availability</b>	24	59.1
Fixed broadband latency (% QM per capita)	24	39
Mobile broadband latency (% QM per capita)	30	75.5
Internet and telephony competition	1	100
<b>Access</b>	23	56.8
<b>Subscribers</b>	19	81
Active mobile-broadband subscriptions per fixed-line inhabitants	27	44.5
International Internet bandwidth per user	12	45.6
Households with Internet access at home (%)	26	81.2
<b>Skills and employment</b>	17	71.7
Individuals with standard ICT skills (%)	5	82.1
Tertiary graduates from ICT programmes (%)	100	10.7
ICT employment (%)	12	56.4
<b>Usage</b>	14	71.5
<b>Services</b>	25	59.7
Government online services	59	82.9
Fixed broadband Internet traffic per subscriber	27	35
Mobile broadband Internet traffic per subscriber	19	30
Internet users (%)	62	80.9
<b>Commerce</b>	5	82.5
ICT FDI patent applications (per 100 million GDP)	11	36.4
E-participation	17	80.9
Internet activities by individuals (%)	11	86.9
Trade in digitally deliverable services (% total trade)	5	75.5
<b>ECONOMY</b>	9	70.3
<b>Economic Competitiveness</b>	21	65.5
<b>Productivity</b>	11	81.5
Open fixed capital formation (% GDP)	30	67.8
Logistics performance	13	72.5
Transport productive capacity	29	41.1
Building quality control	115	60

	Rank	Value
<b>Business agility</b>	36	64.9
Cost of starting a business	75	88.4
Recovery recovery rate	47	50.1
Entrepreneurial employee activity rate	8	83.4
Growth of corporate transactions	59	21.4
<b>Employee experience</b>	24	75.2
Trust and dissatisfaction	20	67.4
<b>Tax</b>	27	49.2
Tax (% GDP)	37	49.2
High-technology trade (% total trade)	40	54.7
Market concentration	66	72.7
Market concentration	44	82.9
Product diversity	15	95
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	87	36.9
Cost dynamics	1	100
<b>Financing and domestic value added</b>	6	74.7
<b>Financing and costs</b>	9	81.5
Domestic credit to private sector (% GDP)	9	84.8
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	37	75.8
Bank nonperforming loans (%)	5	87.9
Unsecured loans volume	9	81.5
Medium- and high-tech activities value added	5	77
Industry and services value added (% GDP)	10	75.9
Labour underutilization rate	71	89.3
Output per worker	7	80.8
<b>ENABLING ENVIRONMENT</b>	8	84.4
<b>Governance</b>	5	87
Political environment	3	95
Peace and stability	6	83.4
View and accountability	4	89.9
Quality of institutions	5	85.1
Rule of law	6	87.9
Control of corruption	7	87.1
Government effectiveness	2	89.9
<b>Socio-economic</b>	7	81.8
Gender equity	12	84.5
Female-to-male ratio in parliament	19	72.4
Female-to-male labour force participation	28	81.4
Female-to-male ratio in internal wage	69	90
Gender inequality	10	81.5
Social protection coverage (% population)	24	82.5
Adult literacy rate	106	106
Youth not in employment, education or training (%)	14	82.5
Standard of living	6	86
Poverty headcount ratio (% population)	30	75
GDP per capita	4	89.9
<b>Health and environment</b>	7	74.4
<b>Health</b>	7	80
Universal health coverage	12	85
Healthy life expectancy (years)	4	84.7
Under-five mortality rate	25	88.2
Environmental performance	81	84.9
Renewable energy consumption (%)	73	25.1
Household footprint per capita	112	88.3
Natural hazard exposure	20	77

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# TAJIKISTAN

**GKI RANK** 116/154

**GKI SCORE** 39.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Tajikistan is a modest performer in terms of its knowledge infrastructure. It ranks 116th out of 154 countries in the Global Knowledge Index 2021 and 15th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Adult literacy rate
- + Gross attendance ratio for tertiary education, location parity
- + Firms constrained with inadequately educated workforce (%)
- + Firms with new product/service (%)
- + Ecological footprint per capita

### AREAS OF IMPROVEMENT

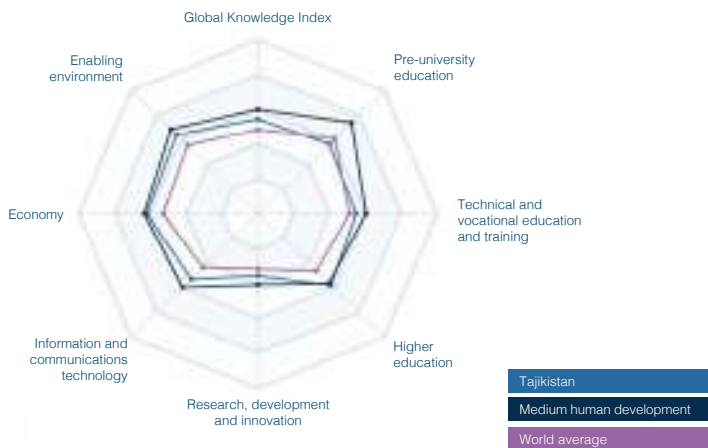
- Intellectual property payments (% total trade)
- Research institutions prominence
- GERD financed from abroad (%)
- Internet and telephony competition
- Extent of corporate transparency

### KEY INDICATORS

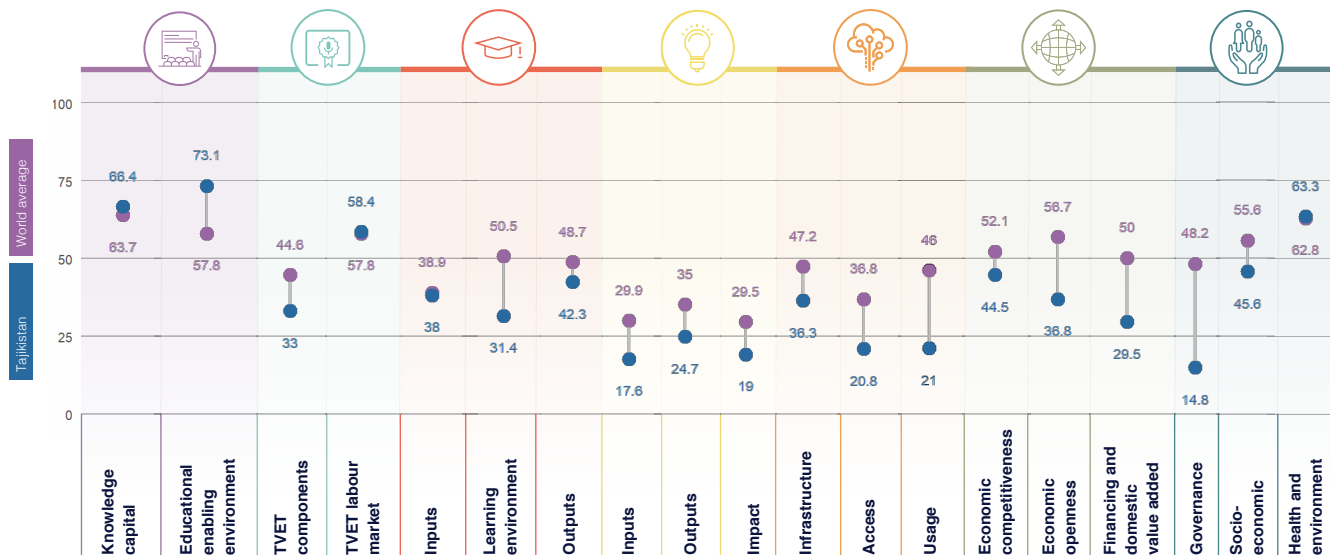
**GDP** US\$ billions ..... **33.132**  
**Population** ..... **9,537,642**  
**HDI** ..... **0.668**

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	63	69.7
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	103	45.7
HIGHER EDUCATION	118	37.3
RESEARCH, DEVELOPMENT AND INNOVATION	128	20.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	123	26
ECONOMY	145	36.9
ENABLING ENVIRONMENT	132	41.2



## GKI PILLARS





# TAJIKISTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	88	66.4
Enrollment	88	81.7
Net enrolment rate in primary education	20	88.3
Net enrolment rate in lower secondary education	88	81.3
Net enrolment rate in upper secondary education	100	54.0
Completion	72	33.3
Years of compulsory education in primary and secondary	67	69.9
Completion rate in upper secondary education	88	74
Success rate rate in the last grade of lower secondary education	42	70.6
Completion	37	43.2
Assessment of "Olympiad" students in math, science and reading	116	116
Learning-adjusted years of schooling	88	43.2
<b>Educational enabling environment</b>		
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	88	80.3
Pupil-based teacher ratio in primary education	42	84.4
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	88	81
Class attendance rate in early childhood education	128	7.4
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	42	84.5
Quality and infrastructure	88	83.0
Completion rate in upper secondary education, gender parity	88	76.4
Completion rate in upper secondary education, wealth parity	34	82.1
Completion rate in upper secondary education, location parity	35	83.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	88	40
Firms offering formal training (%)	88	39
Labour force with short-cycle tertiary education (%)	88	83.1
Participation rate in formal and non-formal education and training	116	116
TVET enrolment	116	2.3
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	127	2.3
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	88	83.0
Extent of staff training	88	38
Quality of vocational training	88	53.4
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	88	72.0
Firms considered with inappropriately educated workforce (%)	13	87.7
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	88	83.0
Unemployment rate with vocational education	45	80
Real TVET unemployment	116	116
Share of TVET occupations	88	47.0
Manufacturing employment (%)	132	11.1
Quality and infrastructure	88	83.0
Enrollment in vocational education, gender parity	116	116
Useable employment rate	78	60.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	133	21
Government expenditure per tertiary student	121	2.1
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	116	116
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	38	76
Ratios/teacher ratio in tertiary education	73	76
Research in higher education (%)	116	116
<b>Learning environment</b>		
<b>Directly and indirectly funded</b>		
Teachers in tertiary education, gender parity	71	88.0
Labour mobility rate	88	3
Academic freedom	128	9.3
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	88	57.0
Class attendance rate in tertiary education, wealth parity	37	49.0
Class attendance rate in tertiary education, location parity	8	32.7
<b>Outputs</b>		
Skilled labour	45	11.0
Educational attainment rate, bachelor's or equivalent	88	29.0
Educational attainment rate, master's or equivalent	33	61.8
Educational attainment rate, doctoral or equivalent	116	116
Employment	116	116
Labour force participation rate with advanced education	116	116
Unemployment rate with advanced education	116	116
Impact	42	49
University tertiary enrollment in FTE	43	49
OECD students per FTE personnel in higher education	116	116
<b>Government's contribution to the economy</b>		
<b>Inputs</b>		
Government R&D expenditure	88	11.0
GDP (% GDP)	112	1.7
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	62	49.7
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	82	3
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	74	19
Quality of research environment	116	116
High-skill employment (%)	116	116
Intellectual property payments (% total trade)	123	6
State of cluster development	114	34.0
<b>Outputs</b>		
<b>Government R&amp;D expenditure</b>		
Average documents per researcher	116	116
Citations per document	87	26.0
Patent applications (per 100 billion GDP)	111	28.3
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	88	1.2
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	104	30.3
Firms producing new goods and services (%)	87	22.0

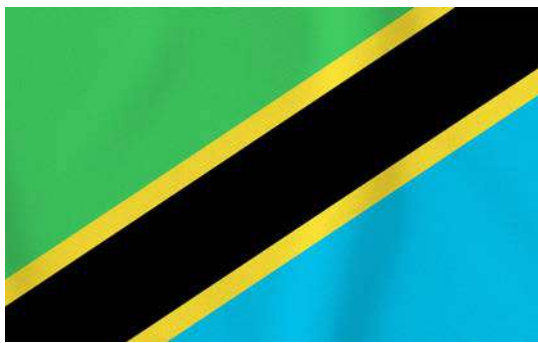


# TAJIKISTAN

	Rank	Value
<b>Consumer electronics</b>	10	75.1
Treatment applications per 100 million GDP	37	8.8
Cultural goods exports (% exports)	194	0.9
Printing and publishing output (% manufactured output)	27	41.2
<b>Energy</b>	133	35
<b>Energy</b>	100	10.5
Risks of institutions' persistence	115	8
Depth of innovative corporates	88	82.5
ISO 9001 quality certificates (% GDP)	162	0.1
ISO 14001 environmental certificates (% GDP)	143	0.7
<b>Environment</b>	100	5.5
CERO received from abroad (%)	100	8
Cost savings per strategic alliance deals (% GDP)	71	7.3
Computer software spending (% GDP)	85	6.3
<b>Government services</b>	75	66.9
New business density per thousand population	100	0.8
Firms with new products/services (%)	17	37.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	123	26
<b>Infrastructure</b>	169	36.3
<b>Coverage</b>	80	81.5
3G/4G mobile network coverage (% population)	88	81
Secure Internet servers per 1 million population	113	1.8
Investment in telecommunication services (% GDP)	116	114
<b>Quality</b>	116	114
Mobile upload and download speeds	116	114
Fixed broadband upload and download speeds	116	114
Fixed broadband subscriptions (y-speed) per hundred people	116	114
<b>Availability</b>	161	34.5
Fixed broadband latency (% QM per capita)	100	81.8
Mobile broadband basket (% QM per capita)	155	28.5
Internet and telephone competition	100	8
<b>Access</b>	128	30.8
<b>Subscriptions</b>	100	11.1
Active mobile-broadband subscriptions per fixed-line inhabitants	138	8
International Internet bandwidth per user	188	5.2
Households with Internet access at home (%)	112	26.5
<b>Skills and employment</b>	77	15.1
Individuals with standard ICT skills (%)	114	118
Tertiary graduates from ICT programmes (%)	80	25.1
ICT employment (%)	104	118
<b>Usage</b>	143	21
<b>Services</b>	100	14.7
Government online services	100	31.8
Fixed broadband Internet traffic per subscription	114	114
Mobile broadband Internet traffic per subscription	114	114
Internet users (%)	136	17.7
<b>Commerce</b>	100	17.5
ICT/FIT patent applications (per 100,000 GDP)	114	118
E-participation	139	34.5
Internet activities by individuals (%)	114	118
Trade in digitally deliverable services (% total trade)	100	0.1
<b>ECONOMY</b>	143	30.8
<b>Economic Competitiveness</b>	188	44.5
<b>Infrastructure Investment</b>	80	41.1
Overhead capital formation (% GDP)	85	80.8
Logistics performance	129	33.5
Transport productive capacity	113	35.5
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	110	41.5
Ease of starting a business	32	83.2
Recovery recovery rate	89	32.1
Entrepreneurial employee activity rate	116	114
Growth of corporate transactions	118	8
<b>Executive opinions</b>	148	30.8
<b>Trust and development</b>	111	31.0
Trade (% GDP)	100	21
High-technology trade (% total trade)	121	20
Market concentration	86	88.8
Market concentration	114	114
Product diversity	100	34.1
Climate financial openness	138	12
Foreign direct investment, net inflows (% GDP)	77	41
Cost dynamics	86	49.2
<b>Financing and domestic value added</b>	147	25.8
<b>Financing and costs</b>	147	25.8
Domestic credit to private sector (% GDP)	137	5.8
IMRS financing gap (% GDP)	84	85.3
Tax and contribution rate (% profit)	188	39.7
Bank nonperforming loans (%)	118	12.4
Unmet loan demand	127	31.0
Medium- and high-tech activities value added	101	2.8
Industry and services value added (% GDP)	100	41.5
Labour underutilization rate	80	84.0
Output per worker	115	5.3
<b>ENABLING ENVIRONMENT</b>	100	41.3
<b>Governance</b>	142	14.8
<b>Political environment</b>	100	13.0
Peace and stability	100	27.4
View and accountability	102	28
Quality of institutions	145	15.0
Rule of law	144	9.8
Control of corruption	147	7.7
Government effectiveness	100	25.5
<b>Socio-economic</b>	118	45.8
<b>Gender equity</b>	100	42.7
Female-to-male ratio in parliament	79	31.3
Female-to-male labour force participation	128	56.1
Female-to-male ratio in internal wage	114	114
Gender inequality	80	81.7
Social protection coverage (% population)	95	24.5
Adult literacy rate	1	89.7
Youth not in employment, education or training (%)	52	59
<b>Standard of living</b>	100	32.0
Poverty headcount ratio (% population)	81	85.5
GDP per capita	128	2.4
<b>Health and environment</b>	82	81.5
<b>Health</b>	101	89.0
Universal health coverage	85	85
Healthy life expectancy (years)	100	89.0
Under-five mortality rate	110	72.4
<b>Environmental performance</b>	81	81
Renewable energy consumption (%)	40	41
Household footprint per capita	14	87.1
Natural hazard exposure	119	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# TANZANIA

## (UNITED REPUBLIC OF)

### KEY INDICATORS

GDP US\$ billions	152.787
Population	59,734,213
HDI	0.529

**GKI RANK** 132/154

**GKI SCORE** 34.7

**WORLD AVERAGE** 48.4

### COUNTRY PERFORMANCE SUMMARY

Tanzania (United Republic of) is a weak performer in terms of its knowledge infrastructure. It ranks 132nd out of 154 countries in the Global Knowledge Index 2021 and 9th out of the 27 countries with low human development.

### AREAS OF STRENGTH

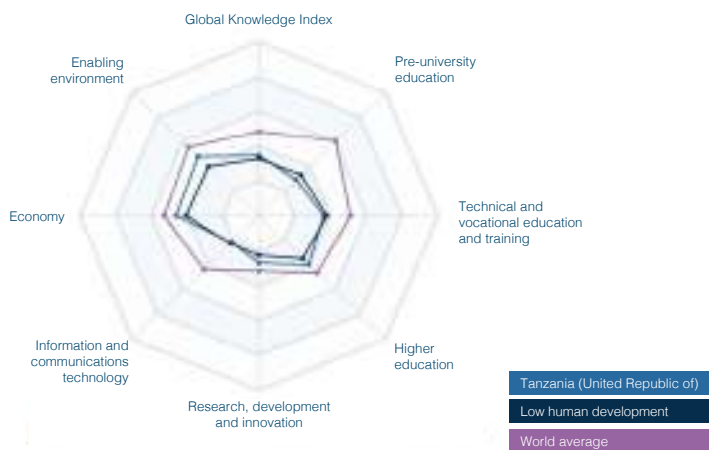
- + Labour force participation rate with advanced education
- + Gross fixed capital formation (% GDP)
- + Renewable energy consumption (%)
- + Cultural goods exports (% exports)
- + GERD per researcher

### AREAS OF IMPROVEMENT

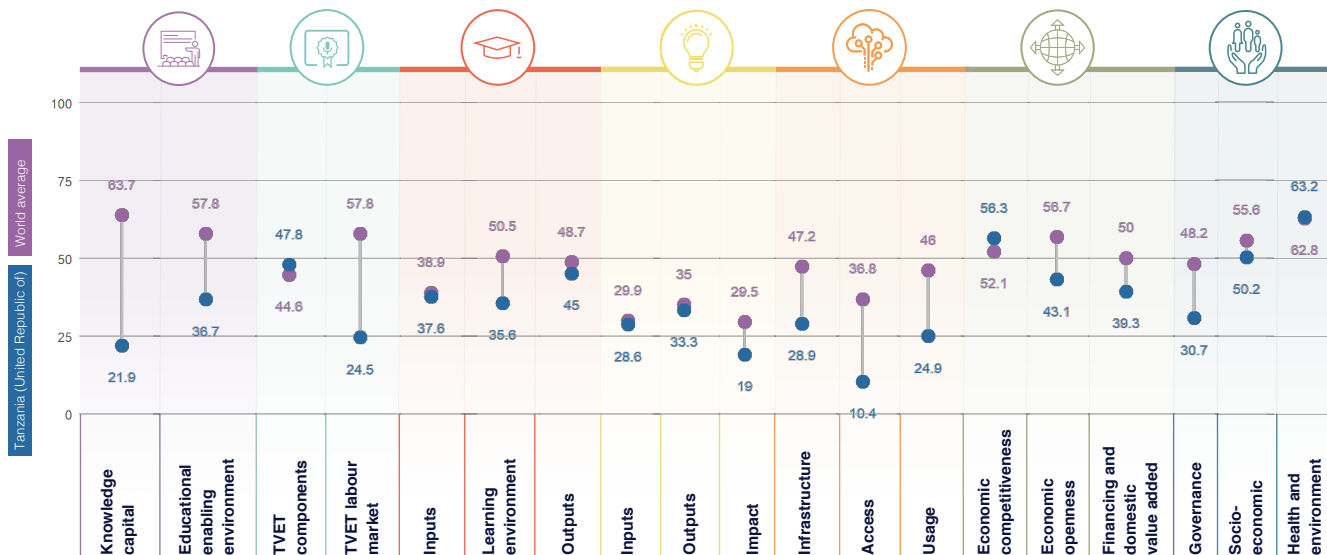
- Net enrolment rate in lower secondary education
- Pupil-trained teacher ratio in pre-primary education
- Gross attendance ratio for tertiary education, location parity
- Patent applications (per 100 billion GDP)
- Female-to-male ratio in Internet usage

### SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	148	29.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	139	36.2
HIGHER EDUCATION	106	39.4
RESEARCH, DEVELOPMENT AND INNOVATION	98	26.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	145	21.4
ECONOMY	107	46.2
ENABLING ENVIRONMENT	103	48



### GKI PILLARS





# TANZANIA (UNITED REPUBLIC OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	181	21.8
Enrollment	143	17.2
Net enrolment rate in primary education	128	81.1
Net enrolment rate in lower secondary education	102	8
Net enrolment rate in upper secondary education	104	0.4
Completion	147	27.2
Years of compulsory education in primary and secondary	126	82.8
Completion rate in upper secondary education	128	9.8
Success rate rate in the last grade of lower secondary education	120	17.8
Completion	124	21.2
Assessment of 15-year-old students in math, science and reading	118	11.8
Learning-adjusted years of schooling	125	21.5
<b>Educational enabling environment</b>		
Expenditure	101	21.2
Government expenditure on primary education (% GDP)	81	27.2
Government expenditure on secondary education (% GDP)	122	7.3
Government funding per primary student (% GDP per capita)	108	22.5
Government funding per secondary student (% GDP per capita)	88	20.6
Resources	81	81.1
Pupil-based teacher ratio in primary education	77	81.7
Pupil-based teacher ratio in secondary education	118	11.8
Schools with access to computers in primary education (%)	118	11.8
Schools with access to computers in secondary education (%)	118	11.8
Early learning	101	21.1
Class attendance rate in early childhood education	81	81.2
Proportion of children who are developmentally on track	118	11.8
Proportion of children with stimulating home learning environments	118	11.8
Pupil-based teacher ratio in preprimary education	81	8
Quality and infrastructure	117	21.2
Completion rate in upper secondary education, gender parity	112	80.2
Completion rate in upper secondary education, wealth parity	121	0.8
Completion rate in upper secondary education, location parity	108	25.2
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	81	21.2
Firms offering formal training (%)	81	27.2
Labour force with short-cycle tertiary education (%)	118	11.8
Participation rate in formal and non-formal education and training	118	11.8
TVET enrolment	81	21.2
Government expenditure on vocational education (%)	118	11.8
Share of students enrolled in secondary vocational programmes	124	0.8
Share of students enrolled in postsecondary vocational programmes	81	8
TVET quality and infrastructure	11	21.4
Extent of staff training	81	81.2
Quality of vocational training	70	22.2
Ratio of high-skil TVET occupations earnings to average wage	12	7
Ratio of medium-skil TVET occupations earnings to average wage	81	22.2
<b>TVET labour market</b>		
Efficiency of the labour market	143	24.2
Firms considered with inappropriately educated workforce (%)	119	22.6
Employment educational mismatch (%)	114	8
Proportion of skilled production workers	28	23.7
Unemployment rate with vocational education	118	11.8
Real TVET unemployment	81	21.2
Share of TVET occupations	141	12.2
Manufacturing employment (%)	148	7
Quality and infrastructure	108	22.2
Enrollment in vocational education, gender parity	105	24
Useable employment rate	142	14.2

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	118	11.8
Government expenditure per tertiary student	118	11.8
Teaching staff compensation (% tertiary expenditure)	118	11.8
Enrollment	101	21.1
Enrollment in bachelor's or equivalent level (%)	121	0.8
Enrollment in masters, doctoral or equivalent (%)	126	0.4
Resources	31	24.2
Pupil-teacher ratio in tertiary education	58	28.2
Researchers in higher education (%)	24	22.2
<b>Learning environment</b>		
Directly paid academic freedom	71	21.2
Teachers in tertiary education, gender parity	81	21.2
Labour mobility rate	118	11.8
Academic freedom	21	80.2
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	81	27.2
Class attendance rate in tertiary education, wealth parity	81	20.4
Class attendance rate in tertiary education, location parity	38	6
<b>Outputs</b>		
Attainment	128	2.2
Educational attainment rate, bachelor's or equivalent	101	2.1
Educational attainment rate, master's or equivalent	118	11.8
Educational attainment rate, doctoral or equivalent	118	11.8
Employment	1	80.2
Labour force participation rate with advanced education	1	100
Unemployment rate with advanced education	81	81.7
Impact	11	22.2
University tertiary enrollment in R&D	27	27.7
CRIDE scholars rate per 100 personnel in higher education	81	22.2
<b>Government's contribution to economic growth</b>		
Output	12	22.2
Government R&D expenditure	81	2
GDP (% GDP)	81	12.2
GERD per researcher	1	100
Researchers per thousand labour force	108	0.1
Tertiary graduates from STEM programmes (%)	117	17.8
<b>Government's contribution to innovation</b>		
GERD performed by business enterprises (%)	118	11.8
GERD financed by business enterprises (%)	118	11.8
Researchers in business enterprises (%)	118	11.8
Firms that spend on R&D (%)	52	24.2
Quality and infrastructure	108	22.2
High-skilled employment (%)	118	11.8
Intellectual property payments (% total trade)	118	1.4
State of cluster development	51	48.4
<b>Outputs</b>		
Government R&D expenditure	118	22.2
Average documents per researcher	12	25
Citations per document	86	17.7
Patent applications (per 100 billion GDP)	127	8
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	114	0.5
Research and development expenditure (per 100 billion GDP)	118	11.8
PCT applications (per 100 billion GDP)	125	23.2
Firms producing new goods and services (%)	27	85.2

# TANZANIA (UNITED REPUBLIC OF)

	Rank	Value		Rank	Value
<b>Consumer electronics</b>			<b>Business agility</b>	80	51.0
Treatment applications per 100 million GDP	108	5.1	Cost of starting a business	136	14.2
Cultural goods exports (% exports)	11	85.8	Recovery recovery time	121	22.1
Printing and publishing output (% manufactured output)	24	43.0	Entrepreneurial employee activity rate	116	11.9
<b>Energy</b>	123	10	Growth of corporate transactions	79	57.1
<b>Finance</b>	35	71.1	<b>Executive openness</b>	127	42.3
Access to investors' provisions	78	10.3	Trust and development	113	22
Depth of innovative companies	43	54.0	Taxs (% GDP)	143	0.1
ISO 9001 quality certificates (% GDP)	108	1.8	High-technology trade (% total trade)	42	23.5
ISO 14001 environmental certificates (% GDP)	122	1.8	Media concentration	100	84.1
<b>Infrastructure</b>	100	11.1	Market concentration	87	81.3
CERD freedom from abuse (%)	116	11.8	Political openness	113	34.2
Cost of storage per storage volume deals (% GDP)	108	1.8	Private financial openness	86	16.4
Computer software spending (% GDP)	124	0.4	Foreign direct investment, net inflows (% GDP)	100	30.0
<b>Government</b>	75	51.1	Gov dynamics	81	46.7
New business density per thousand population	121	0.8	<b>Forecasting and strategic value added</b>	124	10.0
Firms with new products/services (%)	27	34.7	Forecasting and costs	100	21.7
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	148	21.8	Domestic credit to private sector (% GDP)	130	3.8
<b>Infrastructure</b>	122	26.9	IMRS financing gap (% GDP)	35	75.0
<b>Connectivity</b>	141	21.3	Tax and contribution rate (% profit)	100	83.8
30MHz mobile network coverage (% population)	128	42	Bank nonperforming loans (%)	86	82.0
Secure Internet servers per 1 million population	128	1	Unbanked adult share	113	20.0
Investment in telecommunication services (% GDP)	116	11.8	Medium- and high-tech activities value added	120	7.3
<b>Quality</b>	122	11.8	Industry and services value added (% GDP)	139	37.5
Mobile upload and download speeds	100	8	Labour underutilization rate	87	81.4
Fixed broadband upload and download speeds	85	5.1	Output per worker	141	1.8
Fixed broadband subscriptions (by speed) per hundred people	116	11.8	<b>ENABLING ENVIRONMENT</b>	100	81
<b>Availability</b>	111	25.7	<b>Governance</b>	105	30.7
Fixed broadband bandwidth (% Gbps per capita)	121	88.0	Political environment	100	31.0
Mobile broadband basket (% Gbps per capita)	100	30.0	Peace and stability	54	25
Internet and telephone competition	1	100	View and accountability	100	26.0
<b>Access</b>	143	10.6	Quality of institutions	100	30.1
<b>Subscriptions</b>	107	0.8	Rule of law	111	29.0
Active mobile-broadband subscriptions per fixed-line inhabitants	148	0.1	Control of corruption	87	42.4
International Internet bandwidth per user	102	0.8	Government effectiveness	128	20.7
Households with Internet access at home (%)	109	14.2	<b>Socio-economic</b>	88	50.2
<b>Skills and employment</b>	110	10.1	Gender equity	71	67
Individuals with standard ICT skills (%)	114	11.9	Female-to-male ratio in parliament	35	58.4
Tertiary graduates from ICT programmes (%)	85	27.0	Female-to-male labour force participation	11	80.6
ICT employment (%)	120	0.8	Female-to-male ratio in internal wage	110	52.1
<b>Usage</b>	121	24.9	Government access	111	81.2
<b>Services</b>	100	11.1	Social protection coverage (% population)	115	11.5
Government online services	97	85.0	Adult literacy rate	80	71.0
Fixed broadband Internet traffic per subscription	100	0.1	Youth not in employment, education or training (%)	80	70.5
Mobile broadband Internet traffic per subscription	80	10.8	Standard of living	100	22.0
Internet users (%)	108	15.0	Poverty headcount ratio (% population)	82	83.2
<b>Commerce</b>	100	24.4	GDP per capita	120	1.7
ICT/FIT patent applications (per 100,000 GDP)	100	24.5	<b>Health and environment</b>	83	63.2
E-participation	85	30	Health	100	69.0
Internet activities by individuals (%)	114	11.8	Universal health coverage	134	43
Trade in digitally deliverable services (% total trade)	142	0.8	Healthy life expectancy (years)	119	47.6
<b>ECONOMY</b>	107	80.2	Under-five mortality rate	125	55.1
<b>Economic complexity</b>	81	55.3	Economic and performance	11	30.7
Manufacture innovation	100	61.4	Renewable energy consumption (%)	9	80.0
Overhead capital formation (% GDP)	1	100	Household footprint per capita	28	88.4
Logistics performance	54	49.8	Natural hazard exposure	100	40
Transport productive capacity	123	10.0			
Building quality control	47	80			

\*All values are normalized to a scale from 0 (worst) to 100 (best).

# THAILAND

**GKI RANK** 68/154

**GKI SCORE** 49.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Thailand is a moderate performer in terms of its knowledge infrastructure. It ranks 68th out of 154 countries in the Global Knowledge Index 2021 and 11th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Labour underutilization rate
- + GERD financed by business enterprises (%)
- + Firms constrained with inadequately educated workforce (%)
- + Proportion of children who are developmentally on track
- + Fixed-broadband upload and download speeds

### AREAS OF IMPROVEMENT

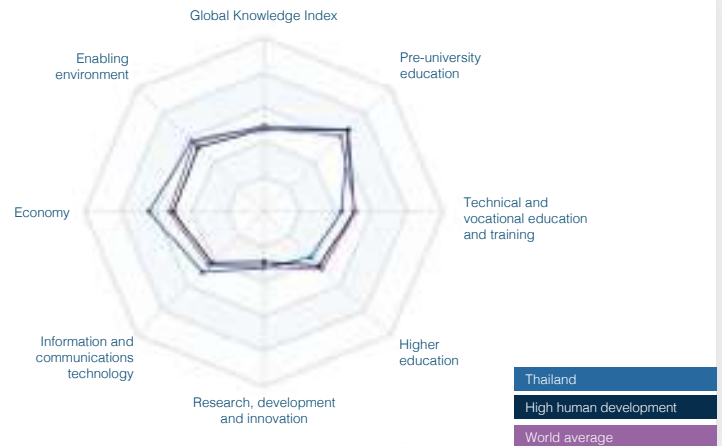
- Academic freedom
- Firms producing new goods and services (%)
- Average documents per researcher
- Participation rate in formal and non-formal education and training
- Firms that spend on R&D (%)

### KEY INDICATORS

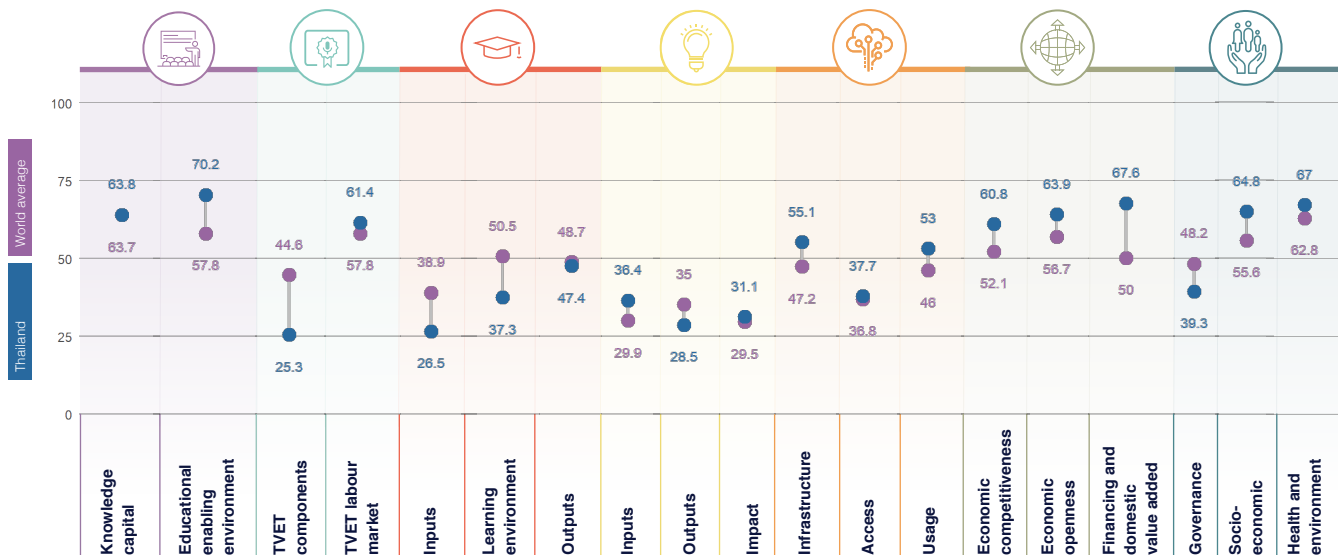
**GDP US\$ billions** 1,206.458  
**Population** 69,799,978  
**HDI** 0.777

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	73	67
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	114	43.4
HIGHER EDUCATION	120	37
RESEARCH, DEVELOPMENT AND INNOVATION	63	32
INFORMATION AND COMMUNICATIONS TECHNOLOGY	64	48.6
ECONOMY	32	64.1
ENABLING ENVIRONMENT	63	57



## GKI PILLARS







# THAILAND

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	87	63.8
Enrolment	100	73.0
Net enrolment rate in primary education	104	79
Net enrolment rate in lower secondary education	106	79
Net enrolment rate in upper secondary education	70	73.0
Completion	88	80
Years of compulsory education in primary and secondary	87	89.0
Completion rate in upper secondary education	82	88.7
Success rate rate in the last grade of lower secondary education	77	80
Completion	118	40.0
Assessment of 15-year-old students in math, science and reading	109	30
Learning-adjusted years of schooling	83	81.1
<b>Educational spending environment</b>	43	70.0
Expenditure	100	17.0
Government expenditure on primary education (% GDP)	29	46
Government expenditure on secondary education (% GDP)	94	20.1
Government funding per primary student (% GDP per capita)	13	58.1
Government funding per secondary student (% GDP per capita)	80	37
Resources	81	87
Pupil-based teacher ratio in primary education	6	80.0
Pupil-based teacher ratio in secondary education	49	77.0
Schools with access to computers in primary education (%)	32	80.0
Schools with access to computers in secondary education (%)	41	80.7
Early learning	14	81.1
Class attendance rate in early childhood education	47	84.8
Proportion of children who are developmentally on track	3	82.0
Proportion of children with stimulating home learning environments	4	80.0
Pupil-based teacher ratio in preprimary education	104	79
Quality and infrastructure	107	70.4
Completion rate in upper secondary education, gender parity	88	80.0
Completion rate in upper secondary education, wealth parity	82	44.0
Completion rate in upper secondary education, location parity	46	80.4
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	147	30.0
Companies training apprentices	143	10.0
Firms offering formal training (%)	100	30.0
Labour force with short-cycle tertiary education (%)	104	19
Participation rate in formal and non-formal education and training	87	0.4
TVET enrolment	114	11.0
Government expenditure on vocational education (%)	104	19
Share of students enrolled in secondary vocational programmes	70	17.0
Share of students enrolled in postsecondary vocational programmes	104	19
TVET quality and infrastructure	107	41.0
Extent of staff training	89	55.1
Quality of vocational training	73	51.0
Ratio of high-end TVET occupations earnings to average wage	70	44.0
Ratio of median-end TVET occupations earnings to average wage	74	30.1
<b>TVET labour market</b>	64	81.4
Efficiency of the labour market	88	33.0
Firms considered well-integrated educated workforce (%)	2	89.2
Employment educational mismatch (%)	71	50
Proportion of skilled production workers	108	35.7
Unemployment rate with vocational education	104	78
Real TVET unemployment	100	80.0
Share of TVET occupations	90	40.0
Manufacturing employment (%)	30	80.0
Quality and infrastructure	111	30
Enrolment in vocational education, gender parity	89	80.0
Useable employment rate	104	40.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	120	24.0
Expenditure	86	16.0
Government expenditure per tertiary student	80	10.0
Teaching staff compensation (% tertiary expenditure)	71	20.1
Enrolment	107	21.7
Enrolment in bachelor's or equivalent level (%)	80	28.7
Enrolment in masters, doctoral or equivalent (%)	60	14.0
Resources	103	42.0
Rapiteacher ratio in tertiary education	100	58.0
Researchers in higher education (%)	60	50.0
<b>Learning environment</b>	100	37.0
<b>Quality and academic freedom</b>	100	29.1
Teachers in tertiary education, gender parity	56	68.7
Labour mobility rate	89	4.8
Academic freedom	124	13
Quality and infrastructure	58	45.0
Class attendance rate in tertiary education, gender parity	108	73.0
Class attendance rate in tertiary education, wealth parity	29	43.4
Class attendance rate in tertiary education, location parity	34	18.0
<b>Outputs</b>	88	47.4
<b>Attainment</b>	51	11.0
Educational attainment rate, bachelor's or equivalent	57	30.0
Educational attainment rate, master's or equivalent	58	7.6
Educational attainment rate, doctoral or equivalent	65	4.3
<b>Employment</b>	14	68.7
Labour force participation rate with advanced education	27	81.0
Unemployment rate with advanced education	9	60.0
<b>Impact</b>	86	30.1
University tertiary enrollment in R&D	21	68.1
OECD indicators per 100 personnel in higher education	80	18.0
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	81	34.4
Access to credit resources	100	100.0
GDP (% GDP)	55	20.1
GERD per researcher	58	24.0
Researchers per thousand labour force	49	12.0
Tertiary graduates from STEM programmes (%)	35	80.0
<b>Quality of the innovation environment</b>	100	100.0
GERD performed by business enterprises (%)	25	20
GERD financed by business enterprises (%)	1	100
Researchers in business enterprises (%)	12	34
Firms that spend on R&D (%)	118	0.2
<b>Quality of business environment</b>	107	40.0
High-skilled employment (%)	83	25.0
Intellectual property payments (% total trade)	18	45.0
State of startup development	45	51.8
<b>Outputs</b>	101	30.0
<b>Access to credit resources</b>	100	100.0
Average documents per researcher	104	32.0
Citations per document	112	15.0
Patent applications (per 100 billion GDP)	73	48.0
<b>Quality of business environment</b>	107	40.0
Intellectual property receipts (% total trade)	83	11.0
Research design applications (per 100 billion GDP)	34	21.0
PCT applications (per 100 billion GDP)	55	52.0
Firms producing new goods and services (%)	113	6.1





# THAILAND

	Rank	Value
<b>Consumer Electronics</b>	77	45.3
Treatment applications per 100 million GDP	80	10.0
Cultural goods exports (% exports)	21	42.4
Printing and publishing output (% manufactured output)	74	17.7
<b>Energy</b>	45	71.1
<b>Finance</b>	71	30.8
Access to venture's provisions	41	24.1
Depth of innovative companies	33	59.3
ISO 9001 quality certificates (% GDP)	39	31
ISO 14001 environmental certificates (% GDP)	31	20
<b>Logistics</b>	67	11.9
CERD received from abroad (%)	60	1.3
Joint ventures per strategic industry deals (% GDP)	58	12.1
Computer software spending (% GDP)	54	22.3
<b>Manufacturing</b>	70	16.7
New business density per thousand population	87	0.5
Firms with new products/services (%)	9	85.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	64	46.3
<b>Infrastructure</b>	62	30.3
<b>Coverage</b>	69	44.3
3G/4G mobile network coverage (% population)	32	68.0
Secure Internet servers per 1 million population	83	6.1
Investment in telecommunication services (% GDP)	69	22.1
<b>Quality</b>	41	41.0
Mobile internet and download speeds	41	60.6
Fixed-broadband upload and download speeds	5	63.2
Fixed-broadband subscriptions (by speed) per hundred people	62	21.6
<b>Availability</b>	71	34.0
Fixed broadband latency (% QM per capita)	64	72.9
Mobile broadband basket (% QM per capita)	71	63.8
Internet and telephony competition	62	54.1
<b>Access</b>	78	27.7
<b>Connectivity</b>	61	30
Active mobile-broadband subscriptions per fixed-line inhabitants	58	29.0
International Internet bandwidth per user	34	49.3
Households with Internet access at home (%)	40	61.3
<b>Skills and employment</b>	107	17.1
Individuals with standard ICT skills (%)	69	11.8
Tertiary graduates from ICT programmes (%)	69	22.0
ICT employment (%)	64	7.8
<b>Usage</b>	69	23
<b>Services</b>	69	61.6
Government online services	41	75.4
Fixed broadband internet traffic per subscription	70	26.3
Mobile broadband internet traffic per subscription	7	83.7
Internet users (%)	64	36.0
<b>Commerce</b>	66	11.2
ICT FDI parent applications (per 100 million GDP)	60	36.4
E-participation	60	77.4
Internet activities by individuals (%)	63	30.5
Trade in digitally deliverable services (% total trade)	53	45.4
<b>ECONOMY</b>	33	64.7
<b>Economic Competitiveness</b>	42	60.8
<b>Infrastructure Investment</b>	10	11.3
Overhead capital formation (% GDP)	67	69.2
Logistics performance	29	63.3
Transport productive capacity	61	29
Building quality control	75	73.3

	Rank	Value
<b>Business Agility</b>	37	64.3
Ease of starting a business	43	62.4
Recovery recovery rate	26	36.1
Entrepreneurial employee activity rate	44	19.0
Growth of corporate transactions	13	65.7
<b>Corporate Governance</b>	67	63.3
<b>Trade and Investment</b>	17	71
Trade (% GDP)	39	40.9
High-technology trade (% total trade)	12	73.0
Market concentration	79	61.6
Market concentration	30	63.0
<b>Product Innovation</b>	76	61.0
Climate financial openness	64	41.7
Foreign direct investment, net inflows (% GDP)	65	30.0
Cost dynamics	41	61
<b>Financing and domestic value added</b>	18	67.3
<b>Financing and costs</b>	12	70.0
Domestic credit to private sector (% GDP)	9	61.5
MSME financing gap (% GDP)	23	60.0
Tax and contribution rate (% profit)	40	76.1
Bank nonperforming loans (%)	63	61
<b>Unmet needs index</b>	10	100.4
Medium- and high-tech activities value added	33	68.5
Industry and services value added (% GDP)	20	71.0
Labour underutilization rate	1	109
Output per worker	75	13.2
<b>ENABLING ENVIRONMENT</b>	62	57
<b>Governance</b>	81	32.3
<b>Political environment</b>	114	25.3
Peace and stability	111	24.5
View and accountability	114	24.1
Quality of institutions	67	53.2
Rule of law	61	57.3
Control of corruption	69	35.0
Government effectiveness	56	63.0
<b>Socio-economic</b>	43	64.8
<b>Gender equity</b>	66	69
Female-to-male ratio in parliament	118	14.7
Female-to-male labour force participation	75	36
Female-to-male ratio in internal wage	50	67.3
<b>Government</b>	49	75.0
Social protection coverage (% population)	47	67.1
Adult literacy rate	60	89
Youth not in employment, education or training (%)	57	71.0
<b>Standard of living</b>	32	63.0
Poverty headcount ratio (% population)	9	62
GDP per capita	64	15.1
<b>Health and environment</b>	44	67
<b>Health</b>	61	61.0
Universal health coverage	25	60
Healthy life expectancy (years)	46	63.0
Under-five mortality rate	57	63.0
<b>Environmental performance</b>	101	45.0
Renewable energy consumption (%)	74	24.0
Household footprint per capita	76	63.0
Natural hazard exposure	125	39

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# TIMOR-LESTE

**GKI RANK** 109/154

**GKI SCORE** 40.5

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Timor-Leste is a modest performer in terms of its knowledge infrastructure. It ranks 109th out of 154 countries in the Global Knowledge Index 2021 and 11th out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Government expenditure on primary education (% of GDP)
- + Ecological footprint per capita
- + Ratio of high-skill TVET occupations earnings to average wage
- + Tax and contribution rate (% profit)
- + Firms with new product/service (%)

### AREAS OF IMPROVEMENT

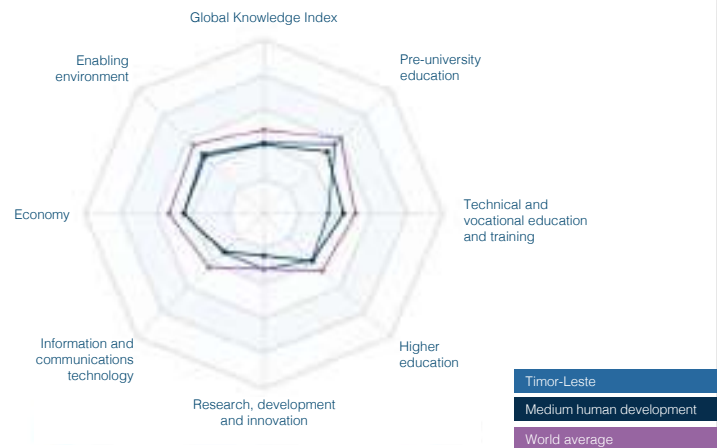
- Firms offering formal training (%)
- Government expenditure on vocational education (%)
- Intellectual property payments (% total trade)
- Intellectual property receipts (% total trade)
- Extent of corporate transparency

### KEY INDICATORS

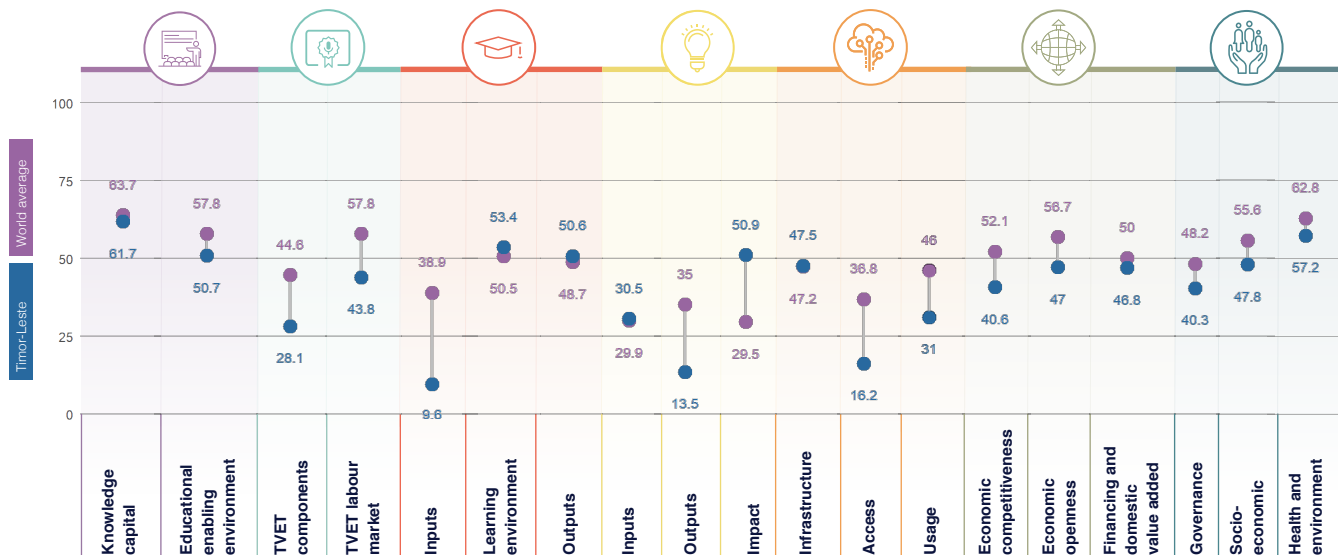
<b>GDP US\$ billions</b>	<b>4.194</b>
<b>Population</b>	<b>1,318,442</b>
<b>HDI</b>	<b>0.606</b>

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	102	56.2
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	141	36
HIGHER EDUCATION	115	37.9
RESEARCH, DEVELOPMENT AND INNOVATION	66	31.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	108	31.5
ECONOMY	117	44.8
ENABLING ENVIRONMENT	101	48.4



## GKI PILLARS





# TIMOR-LESTE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	84	41.7
Enrollment	37	83.0
Net enrolment rate in primary education	80	85.1
Net enrolment rate in lower secondary education	80	85.8
Net enrolment rate in upper secondary education	89	70
Completion	50	83.0
Years of compulsory education in primary and secondary	67	65.2
Completion rate in upper secondary education	84	83.1
Success rate rate in the last grade of lower secondary education	81	74.5
Completion	88	73.0
Assessment of TIMSS/PIRLS students in math, science and reading	116	116
Learning-adjusted years of schooling	108	38.5
<b>Educational enabling environment</b>	<b>104</b>	<b>80.2</b>
Expenditure	7	83.0
Government expenditure on primary education (% GDP)	1	100
Government expenditure on secondary education (% GDP)	49	34
Government funding per primary student (% GDP per capita)	19	30
Government funding per secondary student (% GDP per capita)	43	35.0
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	110	41.0
Class attendance rate in early childhood education	108	19.0
Proportion of children who are developmentally on track	59	33.0
Proportion of children with stimulating home learning environments	70	81.4
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	88	91
Completion rate in upper secondary education, gender parity	81	80.0
Completion rate in upper secondary education, wealth parity	82	33.4
Completion rate in upper secondary education, location parity	81	40
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>100</b>	<b>34.5</b>
Commence training and learning	107	38
Firms offering formal training (%)	105	8
Labour force with short-cycle tertiary education (%)	69	85.2
Participation rate in formal and non-formal education and training	57	6.7
TVET resources	107	7.7
Government expenditure on vocational education (%)	79	8
Share of students enrolled in secondary vocational programmes	74	15.4
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	74	82.0
Extent of staff training	108	33.7
Quality of vocational training	116	116
Ratio of high-skill TVET occupations earnings to average wage	1	100
Ratio of medium-skill TVET occupations earnings to average wage	111	34
<b>TVET labour market</b>	<b>100</b>	<b>40.8</b>
Efficiency of the labour market	88	53.0
Firms considered with inappropriately educated workforce (%)	87	76
Employment educational mismatch (%)	89	33.7
Proportion of skilled production workers	88	83.4
Unemployment rate with vocational education	44	82.1
Real TVET unemployment	113	14.0
Share of TVET occupations	100	20.7
Manufacturing employment (%)	147	8.2
Quality and infrastructure	110	53.0
Enrollment in vocational education, gender parity	82	75.4
Useable employment rate	125	20

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>143</b>	<b>8.8</b>
Expenditure	107	5.8
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	80	98.8
Enrollment	116	116
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	116	116
Pupil-teacher ratio in tertiary education	116	116
Research in higher education (%)	116	116
<b>Learning environment</b>	<b>88</b>	<b>33.4</b>
Timeliness and academic freedom	14	31.0
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	116	116
Academic freedom	73	37.2
Quality and infrastructure	77	25.0
Class attendance rate in tertiary education, gender parity	64	31.0
Class attendance rate in tertiary education, wealth parity	71	13.0
Class attendance rate in tertiary education, location parity	58	3.8
<b>Outputs</b>	<b>83</b>	<b>50.8</b>
Efficiency	116	116
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	88	34.0
Labour force participation rate with advanced education	88	80.5
Unemployment rate with advanced education	66	82.1
Impact	100	25.2
University tertiary enrollment in FTE	100	25.4
UNITE indicators per FTE personnel in higher education	116	116
<b>INNOVATION, RESEARCH AND DEVELOPMENT</b>		
<b>Inputs</b>	<b>10</b>	<b>10.8</b>
Access to FDI resources	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality of innovation environment</b>	<b>87</b>	<b>100.0</b>
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Patents that spend on R&D (%)	28	45.0
Quality of innovation environment	116	100.0
High-skilled employment (%)	79	12.0
Intellectual property payments (% total trade)	104	6
State of cluster development	128	33.0
<b>Outputs</b>	<b>100</b>	<b>10.0</b>
Access to FDI resources	116	116
Average documents per researcher	116	116
Citations per document	118	14.8
Patent applications (per 100 billion GDP)	116	116
<b>Quality of innovation environment</b>	<b>100</b>	<b>100.0</b>
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	116	116
PCT applications (per 100 billion GDP)	116	116
Firms producing new goods and services (%)	58	48.0





# TIMOR-LESTE

	Rank	Value
<b>Consumer confidence</b>	100	77.7
Treatment applications per 100 million GDP	106	106
Cultural goods exports (% exports)	125	0.8
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>	1	100
<b>Energy</b>	100	100
Renewable installations' proportion	106	106
Depth of innovative companies	106	106
ISO 9001 quality certificates (% GDP)	106	106
ISO 14001 environmental certificates (% GDP)	106	106
<b>Environment</b>	100	100
CERO forecast from abroad (%)	106	106
Cost of waste per storage volume dealt (% GDP)	106	106
Computer software spending (% GDP)	106	106
<b>Government efficiency</b>	100	100
New business density per thousand population	34	22
Firms with new products/services (%)	12	35.6
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	106	21.3
<b>Infrastructure</b>	113	47.3
<b>Coverage</b>	107	34.2
30MHz mobile network coverage (% population)	117	60.0
Secure Internet servers per 1 million population	113	1.8
Investment in telecommunication services (% GDP)	106	106
<b>Quality</b>	106	106
Mobile upload and download speeds	106	106
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (y speed) per hundred people	106	106
<b>Availability</b>	115	60.0
Fixed broadband basket (% GNI per capita)	138	44.1
Mobile broadband basket (% GNI per capita)	124	59.2
Internet and telephone connectivity	1	100
<b>Access</b>	128	16.2
<b>Subscriptions</b>	100	11.0
Active mobile-broadband subscriptions per fixed-line inhabitants	133	12.4
International Internet bandwidth per user	147	6.1
Households with Internet access at home (%)	121	16.0
<b>Skills and employment</b>	99	11.1
Individuals with standard ICT skills (%)	106	106
Tertiary graduates from ICT programmes (%)	106	106
ICT employment (%)	87	16.1
<b>Usage</b>	117	31
<b>Services</b>	106	100
Government online services	123	44.1
Fixed broadband Internet traffic per subscription	106	106
Mobile broadband Internet traffic per subscription	106	106
Internet users (%)	123	23.0
<b>Commerce</b>	100	10.1
ICT/FIT patent applications (per 100 million GDP)	106	106
E-participation	108	45.0
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	143	7.4
<b>ECONOMY</b>	117	43.3
<b>Economic complexity</b>	123	40.0
<b>Infrastructure investment</b>	100	30.4
Overhead capital formation (% GDP)	60	60.0
Logistics performance	106	106
Transport productive capacity	34	30
Building quality control	102	20

	Rank	Value
<b>Business agility</b>	100	44.7
Cost of starting a business	82	89.4
Recovery recovery rate	106	106
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	118	6
<b>Business openness</b>	112	47
Trade and investment	101	26
Trade (% GDP)	66	34.2
High-technology trade (% total trade)	106	106
Market concentration	81	73.6
Market concentration	106	106
Product diversity	100	100
Charitable financial openness	106	106
Foreign direct investment, net inflows (% GDP)	85	33.0
Cost dynamics	106	106
<b>Financing and domestic value added</b>	34	40.0
Financing and costs	100	41.2
Domestic credit to private sector (% GDP)	100	6
MSME financing gap (% GDP)	87	30.0
Tax and contribution rate (% profit)	11	60.0
Bank nonperforming loans (%)	106	106
Unmet loan demand	10	41.4
Medium- and high-tech activities value added	106	106
Industry and services value added (% GDP)	66	65.1
Labour underutilization rate	46	11.0
Output per worker	100	2.8
<b>ENABLING ENVIRONMENT</b>	101	46.4
<b>Governance</b>	87	40.3
Political environment	50	55.4
Peace and stability	59	52.0
View and accountability	96	38
Quality of institutions	102	23.0
Rule of law	142	11.1
Control of corruption	81	45.2
Government effectiveness	101	16.2
<b>Socio-economic</b>	104	47.3
Gender equity	44	21.1
Female-to-male ratio in parliament	35	62.5
Female-to-male labour force participation	43	63.6
Female-to-male ratio in internal wage	106	106
Gender inequality	112	44.7
Social protection coverage (% population)	91	25.0
Adult literacy rate	100	68.0
Youth not in employment, education or training (%)	34	58.0
Standard of living	100	21.7
Poverty headcount ratio (% population)	100	41.2
GDP per capita	121	2.2
<b>Health and environment</b>	122	57.2
Health	100	57
Universal health coverage	100	52
Healthy life expectancy (years)	100	60.0
Under-five mortality rate	118	60.0
Environmental performance	99	17.0
Renewable energy consumption (%)	90	10.1
Household footprint per capita	6	66
Natural hazard exposure	92	54

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# TOGO

**GKI RANK** 133/154

**GKI SCORE** 34.4

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Togo is a weak performer in terms of its knowledge infrastructure. It ranks 133rd out of 154 countries in the Global Knowledge Index 2021 and 10th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Investment in telecommunication services (% GDP)
- + Ease of starting a business
- + Female-to-male labour force participation
- + Government expenditure on primary education (% of GDP)
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

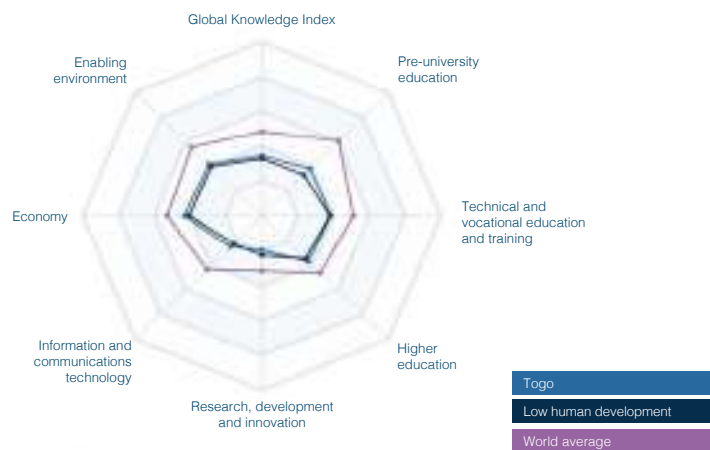
- Proportion of children with stimulating home learning environment
- Completion rate in upper secondary education, gender parity
- Intellectual property payments (% total trade)
- Intellectual property receipts (% total trade)
- Individuals with standard ICT skills (%)

### KEY INDICATORS

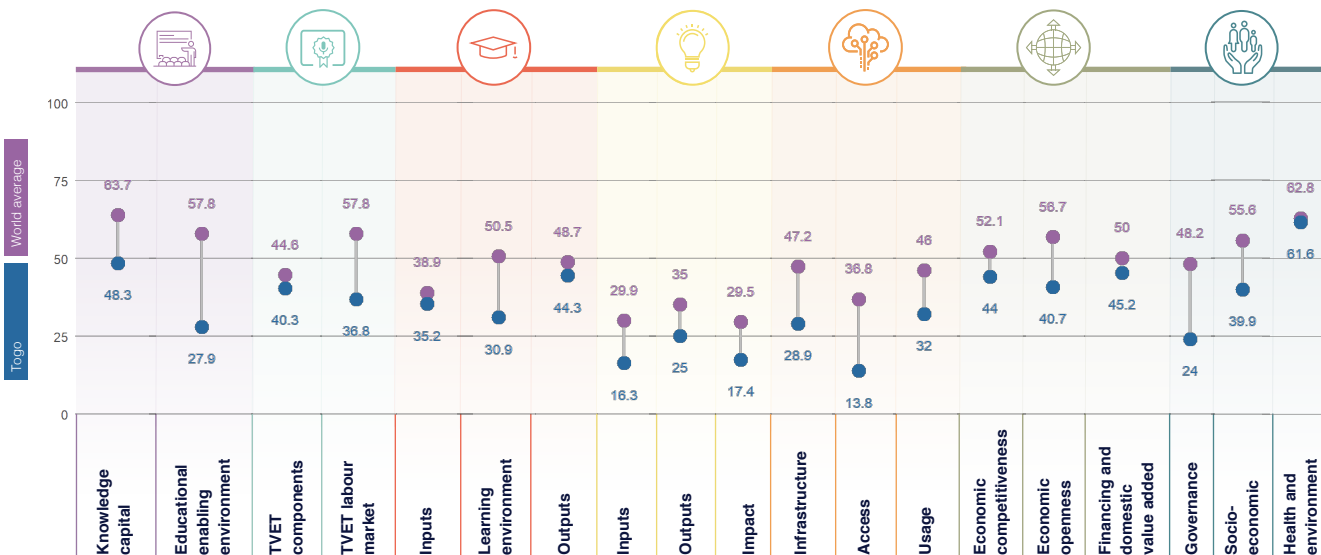
**GDP US\$ billions** 13,152  
**Population** 8,278,737  
**HDI** 0.515

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	132	38.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	133	38.6
HIGHER EDUCATION	121	36.8
RESEARCH, DEVELOPMENT AND INNOVATION	134	19.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	129	24.9
ECONOMY	124	43.3
ENABLING ENVIRONMENT	129	41.9



## GKI PILLARS





# TOGO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	112	36.1
Enrollment	118	68.3
Net enrolment rate in primary education	119	87.1
Net enrolment rate in lower secondary education	21	80.0
Net enrolment rate in upper secondary education	106	70.1
Retention rate in lower secondary education	116	35
Retention rate in upper secondary education	115	35
Completion rate in primary and secondary	120	42.2
Years of compulsory education in primary and secondary	42	76.9
Completion rate in upper secondary education	122	33.0
Success rate rate in the last grade of lower secondary education	117	36.0
Completion rate in upper secondary education	107	33.0
Assessment of 15-year-old students in math, science and reading	116	114
Learning-adjusted years of schooling	114	25.0
<b>Educational enabling environment</b>		
Enrollment	71	50.0
Government expenditure on primary education (% GDP)	12	63.6
Government expenditure on secondary education (% GDP)	116	93.5
Government funding per primary student (% GDP per capita)	88	28.9
Government funding per secondary student (% GDP per capita)	85	21.2
Resources	111	30.1
Pupil-based teacher ratio in primary education	61	50.7
Pupil-based teacher ratio in secondary education	116	114
Schools with access to computers in primary education (%)	80	2.1
Schools with access to computers in secondary education (%)	81	25.1
Early learning	108	26.0
Class attendance rate in early childhood education	100	21.4
Proportion of children who are developmentally on track	61	22.2
Proportion of children with stimulating home learning environments	69	19
Pupil-based teacher ratio in preprimary education	87	66.0
Quality and infrastructure	111	21.0
Completion rate in upper secondary education, gender parity	126	35.1
Completion rate in upper secondary education, wealth parity	113	2.5
Completion rate in upper secondary education, location parity	100	26.9
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET components</b>		
Technical training enrollment	41	17.0
Firms offering formal training (%)	58	41.1
Labour force with short-cycle tertiary education (%)	50	73.0
Participation rate in formal and non-formal education and training	116	118
TVET resources	71	63.0
Government expenditure on vocational education (%)	40	27.9
Share of students enrolled in secondary vocational programmes	57	0.2
Share of students enrolled in postsecondary vocational programmes	1	109
TVET quality and infrastructure	114	17.0
Extent of staff training	116	114
Quality of vocational training	116	114
Ratio of high-skil TVET occupations earnings to average wage	112	7.7
Ratio of medium-skill TVET occupations earnings to average wage	109	20
<b>TVET labour market</b>		
Efficiency of the labour market	113	41.1
Firms considered with inappropriately educated workforce (%)	81	61.2
Employment educational mismatch (%)	111	0.7
Proportion of skilled production workers	75	66.0
Unemployment rate with vocational education	58	55.1
Real TVET unemployment	61	41.0
Share of TVET occupations	119	34.0
Manufacturing employment (%)	28	51.4
Quality and infrastructure	114	21.7
Enrollment in vocational education, gender parity	116	114
Useable employment rate	138	20.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrollment	81	33.2
Enrollment	81	23.0
Government expenditure per tertiary student	113	4.2
Teaching staff compensation (% tertiary expenditure)	23	55.8
Enrollment	100	6.8
Enrollment in bachelor's or equivalent level (%)	80	9.1
Enrollment in masters, doctoral or equivalent (%)	138	4.0
Resources	81	31
Rapit teacher ratio in tertiary education	81	63.0
Researchers in higher education (%)	20	78.7
<b>Learning environment</b>		
Enrollment and academic freedom	116	41.7
Teachers in tertiary education, gender parity	123	1
Labour mobility rate	116	114
Academic freedom	75	76.2
Quality and infrastructure	81	21.2
Class attendance rate in tertiary education, gender parity	81	48.0
Class attendance rate in tertiary education, wealth parity	77	9.5
Class attendance rate in tertiary education, location parity	88	2.0
<b>Outputs</b>		
Enrollment	116	114
Educational attainment rate, bachelor's or equivalent	116	114
Educational attainment rate, master's or equivalent	116	114
Educational attainment rate, doctoral or equivalent	116	114
Employment	81	63.0
Labour force participation rate with advanced education	48	77.1
Unemployment rate with advanced education	108	58.0
Impact	114	21.7
University tertiary enrollment in R&D	116	114
CRIDE indicators per 100 personnel in higher education	77	21.1
<b>Government's contribution to economic growth</b>		
Enrollment	116	114
Government's contribution to economic growth	116	114
GDP (% GDP)	60	5.2
GERD per researcher	88	18.0
Researchers per thousand labour force	25	0.5
Tertiary graduates from STEM programmes (%)	116	114
<b>Government's contribution to economic growth</b>		
GERD performed by business enterprises (%)	116	114
GERD financed by business enterprises (%)	116	114
Researchers in business enterprises (%)	116	114
Firms that spend on R&D (%)	28	38.0
Quality and infrastructure	114	21.7
High-skilled employment (%)	51	24
Intellectual property payments (% total trade)	104	6
State of cluster development	116	114
<b>Outputs</b>		
Government's contribution to economic growth	116	114
Average documents per researcher	58	55.0
Citations per document	116	7.8
Patent applications (per 100 billion GDP)	116	114
<b>Government's contribution to economic growth</b>		
Intellectual property receipts (% total trade)	117	6
Research and development expenditure (per 100 billion GDP)	116	114
PCT applications (per 100 billion GDP)	74	48.5
Firms producing new goods and services (%)	16	48.1



# TOGO

	Rank	Value
<b>Business environment</b>	100	5.5
Treatment applications per 100 million GDP	106	1.6
Cultural goods exports (% exports)	119	1.7
Printing and publishing output (% manufactured output)	106	1.6
<b>Energy</b>	100	11.3
<b>Energy</b>	100	11.3
Renewable installations' productive	104	1.6
Depth of innovative companies	104	1.6
ISO 9001 quality certificates (% GDP)	100	11.3
ISO 14001 environmental certificates (% GDP)	80	4.8
<b>Employment</b>	100	11.3
CERD freedom from abuse (%)	80	10.5
Joint ventures per strategic industry deals (% GDP)	88	5.2
Computer software spending (% GDP)	94	6.3
<b>Government efficiency</b>	100	11.3
New business density per thousand population	80	3.8
Firms with one or more subsidiaries (%)	30	34.1
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	122	24.9
<b>Infrastructure</b>	122	26.9
<b>Coverage</b>	80	10.3
30MHz mobile network coverage (% population)	100	16.1
Secure Internet servers per 1 million population	103	0.8
Investment in telecommunication services (% GDP)	11	29.0
<b>Speed</b>	100	11.3
Mobile upload and download speeds	104	1.6
Fixed broadband upload and download speeds	104	1.6
Fixed broadband subscriptions (y speed) per hundred people	110	1.3
<b>Availability</b>	100	11.3
Fixed broadband latency (% QM per capita)	141	41.6
Mobile broadband basket (% QM per capita)	147	14.7
Internet and telephone competition	140	42.0
<b>Access</b>	124	10.8
<b>Subscriptions</b>	100	11.3
Active mobile-broadband subscriptions per fixed-line inhabitants	100	12.0
International Internet bandwidth per user	111	30.2
Households with Internet access at home (%)	114	26.3
<b>Skills and employment</b>	100	11.3
Individuals with standard ICT skills (%)	85	8
Tertiary graduates from ICT programmes (%)	104	1.6
ICT employment (%)	86	9.1
<b>Usage</b>	114	10
<b>Services</b>	100	11.3
Government online services	100	10
Fixed broadband Internet traffic per subscription	65	17.4
Mobile broadband Internet traffic per subscription	100	10
Internet users (%)	149	14.0
<b>Commerce</b>	100	11.3
eTPUOT patent applications (per 100,000 GDP)	43	50.1
E-participation	100	11.3
Internet activities by individuals (%)	104	1.6
Trade in digitally deliverable services (% total trade)	113	24.0
<b>ECONOMY</b>	104	63.3
<b>Economic Competitiveness</b>	100	11.3
FDI inflows (billion USD)	100	41.0
Overhead capital formation (% GDP)	97	81.8
Logistics performance	115	36.2
Transport productive capacity	108	9.4
Building quality control	75	73.0

	Rank	Value
<b>Business agility</b>	100	11.3
Ease of starting a business	15	88.1
Recovery recovery rate	82	38.1
Entrepreneurial employee activity rate	41	22.5
Growth of corporate transactions	88	26.0
<b>Corporate openness</b>	104	10.7
Trade and investment	100	11.3
Trade (% GDP)	111	20
High-technology trade (% total trade)	100	27.7
Market concentration	77	24.8
Market concentration	50	80.0
Product diversity	140	10.7
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	100	38
Cost dynamics	104	10.7
<b>Financing and domestic value added</b>	100	40.2
Financing and costs	100	11.3
Domestic credit to private sector (% GDP)	110	9.2
IMRE financing gap (% GDP)	20	81.0
Tax and contribution rate (% profit)	100	88.1
Bank nonperforming loans (%)	104	10.7
Unmet loan demand	80	10.0
Medium- and high-tech activities value added	104	10.7
Industry and services value added (% GDP)	104	40.7
Labour underutilization rate	80	23.0
Output per worker	144	1.3
<b>ENABLING ENVIRONMENT</b>	128	41.8
<b>Governance</b>	128	24
Political environment	100	21.0
Peace and stability	108	15.0
View and accountability	111	28
Quality of institutions	100	20.0
Rule of law	110	28.8
Control of corruption	100	25.0
Government effectiveness	108	25
<b>Socio-economic</b>	128	29.0
Gender equity	110	10.0
Female-to-male ratio in parliament	100	20
Female-to-male labour force participation	15	80.8
Female-to-male ratio in internal wage	100	10.0
Gender inequality	100	10.0
Social protection coverage (% population)	100	21
Adult literacy rate	100	68.0
Youth not in employment, education or training (%)	41	80.0
Standard of living	100	11.0
Poverty headcount ratio (% population)	100	22.0
GDP per capita	104	18
<b>Health and environment</b>	88	61.8
Health	100	11.0
Universal health coverage	104	40
Healthy life expectancy (years)	108	40
Under-five mortality rate	100	45.7
Environmental performance	0	81
Renewable energy consumption (%)	10	27.0
Household footprint per capita	20	88.1
Natural hazard exposure	30	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# TRINIDAD AND TOBAGO

## KEY INDICATORS

GDP US\$ billions	33.34
Population	1,399,491
HDI	0.796

**GKI RANK** 76/154

**GKI SCORE** 48.3  
**WORLD AVERAGE** 48.4

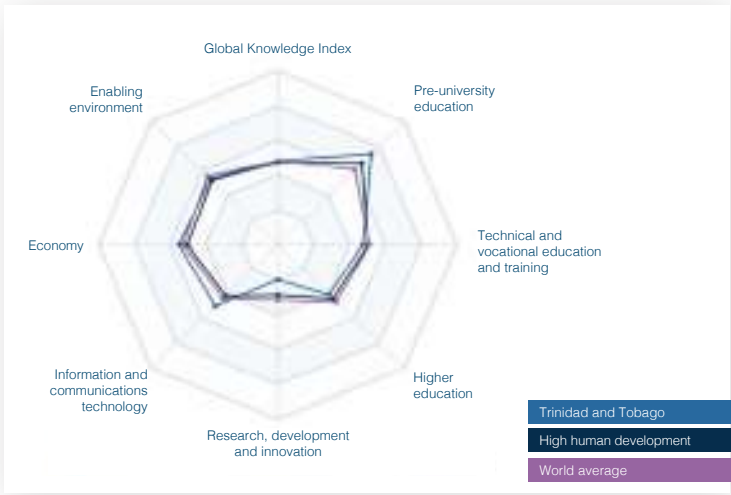
**COUNTRY PERFORMANCE SUMMARY**  
Trinidad and Tobago is a moderate performer in terms of its knowledge infrastructure. It ranks 76th out of 154 countries in the Global Knowledge Index 2021 and 18th out of the 39 countries with high human development.

- AREAS OF STRENGTH**
- + Industry and services value added (% GDP)
  - + Share of TVET occupations
  - + Transport productive capacity
  - + Completion rate in upper secondary education, location parity
  - + GERD financed from abroad (%)

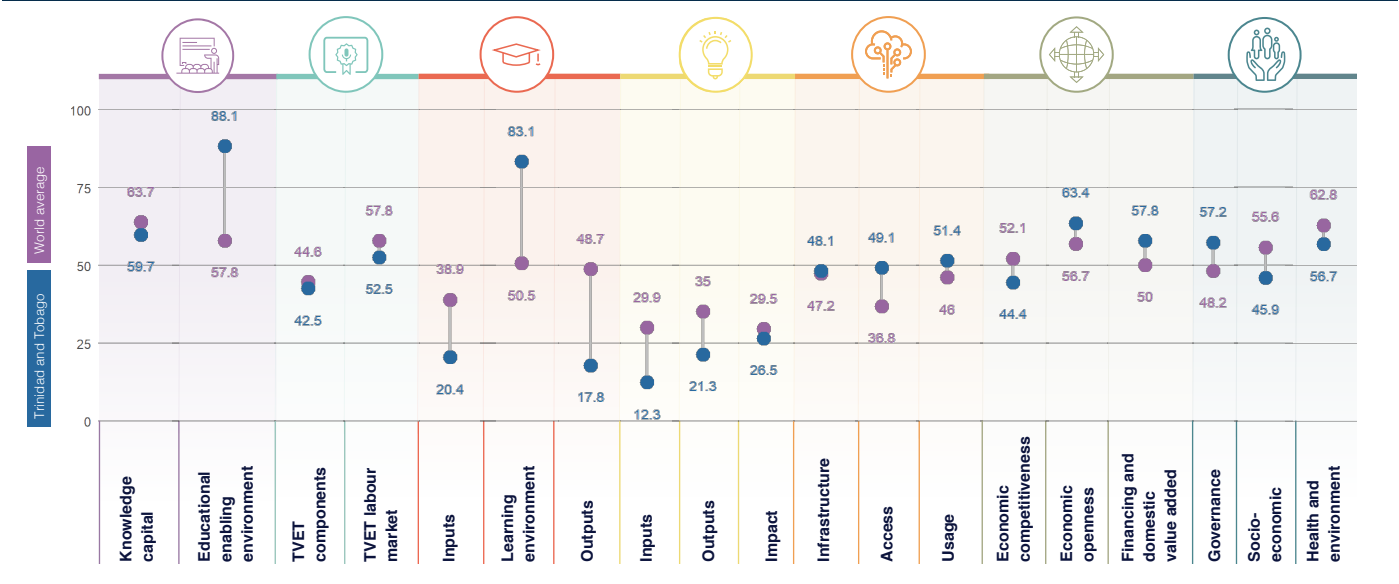
- AREAS OF IMPROVEMENT**
- Patent applications (per 100 billion GDP)
  - Firms with new product/service (%)
  - Ecological footprint per capita
  - Citations per document
  - Unemployment rate with advanced education

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	44	73.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	91	47.5
HIGHER EDUCATION	104	40.4
RESEARCH, DEVELOPMENT AND INNOVATION	130	20
INFORMATION AND COMMUNICATIONS TECHNOLOGY	60	49.5
ECONOMY	62	55.2
ENABLING ENVIRONMENT	80	53.3



## GKI PILLARS





# TRINIDAD AND TOBAGO

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	88	28.7
Enrolment	106	116
Net enrolment rate in primary education	106	116
Net enrolment rate in lower secondary education	106	116
Net enrolment rate in upper secondary education	106	116
Completion	80	83.0
Years of compulsory education in primary and secondary	126	83.0
Completion rate in upper secondary education	47	83.0
Success rate rate in the last grade of lower secondary education	106	116
Completion	54	80.7
Assessment of Trinidadian students in math, science and reading	10	34.3
Learning-adjusted years of schooling	54	80.1
<b>Educational enabling environment</b>	1	80.1
Enrolment	106	116
Government expenditure on primary education (% GDP)	106	116
Government expenditure on secondary education (% GDP)	106	116
Government funding per primary student (% GDP per capita)	106	116
Government funding per secondary student (% GDP per capita)	106	116
Resources	10	80.1
Pupil-based teacher ratio in primary education	106	116
Pupil-based teacher ratio in secondary education	106	116
Schools with access to computers in primary education (%)	106	116
Schools with access to computers in secondary education (%)	43	83.1
Early learning	23	71.0
Class attendance rate in early childhood education	88	88.7
Proportion of children who are developmentally on track	21	74.1
Proportion of children with stimulating home learning environments	17	87.6
Pupil-based teacher ratio in preprimary education	20	80.0
Quality and infrastructure	50	81.0
Completion rate in upper secondary education, gender parity	63	80.0
Completion rate in upper secondary education, wealth parity	37	72.0
Completion rate in upper secondary education, location parity	1	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	88	80.0
Communications training and learning	106	116
Firms offering formal training (%)	71	33.8
Labour force with short-cycle tertiary education (%)	106	116
Participation rate in formal and non-formal education and training	106	116
TVET enrolment	106	116
Government expenditure on vocational education (%)	106	116
Share of students enrolled in secondary vocational programmes	106	116
Share of students enrolled in postsecondary vocational programmes	106	116
TVET quality and infrastructure	37	80.0
Extent of staff training	71	89.6
Quality of vocational training	80	82.0
Ratio of high-skill TVET occupations earnings to average wage	106	116
Ratio of median-skill TVET occupations earnings to average wage	106	116
<b>TVET labour market</b>	106	80.0
Efficiency of the labour market	106	80.4
Firms considered well matched with workforce (%)	113	22.6
Employment educational mismatch (%)	106	116
Proportion of skilled production workers	113	33.0
Unemployment rate with vocational education	106	116
Real TVET unemployment	50	81.0
Share of TVET occupations	80	35.0
Manufacturing employment (%)	117	24.0
Quality and infrastructure	50	71.0
Enrolment in vocational education, gender parity	106	116
Useable employment rate	58	70.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	104	40.4
Enrolment	106	116
Government expenditure per tertiary student	106	116
Teaching staff compensation (% tertiary expenditure)	106	116
Enrolment	106	116
Enrolment in bachelor's or equivalent level (%)	106	116
Enrolment in masters, doctoral or equivalent (%)	106	116
Resources	108	30.4
Pupil-teacher ratio in tertiary education	106	116
Research in higher education (%)	50	28.4
<b>Learning environment</b>	3	83.1
Timely and academic freedom	5	83.1
Teachers in tertiary education, gender parity	106	116
Labour mobility rate	106	116
Academic freedom	63	83.1
Quality and infrastructure	106	116
Class attendance rate in tertiary education, gender parity	106	116
Class attendance rate in tertiary education, wealth parity	106	116
Class attendance rate in tertiary education, location parity	106	116
<b>Outputs</b>	101	17.8
Attainment	80	14.4
Educational attainment rate, bachelor's or equivalent	80	13.1
Educational attainment rate, master's or equivalent	77	10.8
Educational attainment rate, doctoral or equivalent	55	11.0
Employment	102	10.4
Labour force participation rate with advanced education	118	35.0
Unemployment rate with advanced education	108	6
Impact	108	24.8
University tertiary enrollment in R&D	100	32.0
CRIDE scholars rate per 1000 personnel in higher education	81	18.0
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	106	10.0
Human capital formation	106	116
GDP (% GDP)	111	1.0
GERD per researcher	57	7.8
Researchers per thousand labour force	68	7.5
Tertiary graduates from STEM programmes (%)	106	116
<b>Quality and infrastructure</b>	106	116
GERD performed by business enterprises (%)	80	0.3
GERD financed by business enterprises (%)	73	18.0
Researchers in business enterprises (%)	73	1.3
Firms that spend on R&D (%)	54	24.0
<b>Quality and infrastructure</b>	80	10.0
High-skill employment (%)	106	116
Intellectual property payments (% total trade)	77	12.0
State of cluster development	80	40.0
<b>Outputs</b>	108	10.0
Human capital formation	106	116
Average documents per researcher	60	87.7
Citations per document	108	4.5
Patent applications (per 100 billion GDP)	102	13.0
<b>Quality and infrastructure</b>	106	116
Intellectual property receipts (% total trade)	58	0.6
Research design applications (per 100 billion GDP)	86	2.8
PCT applications (per 100 billion GDP)	106	37
Firms producing new goods and services (%)	51	48.0

# TRINIDAD AND TOBAGO

	Rank	Value
<b>Consumer Innovation and Adoption</b>	111	61.1
Treatment applications per 100 million GDP	81	16.4
Cultural goods exports (% exports)	97	3.8
Printing and publishing output (% manufactured output)	116	116
<b>Health</b>	35	85.3
<b>Trade</b>	122	112
Risks of institutions' persistence	108	4.8
Depth of innovative companies	101	37.5
ISO 9001 quality certificates (% GDP)	86	6.4
ISO 14001 environmental certificates (% GDP)	80	4.8
<b>Language</b>	97	85.3
CERD freedom from abuse (%)	40	45.0
Joint ventures per strategic industry deals (% GDP)	81	11.1
Computer software spending (% GDP)	116	116
<b>Government Services</b>	81	81.1
New business density per thousand population	116	116
Firms with new products/services (%)	118	37.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	80	85.3
<b>Infrastructure</b>	87	85.3
<b>Coverage</b>	88	41.1
30MHz mobile network coverage (% population)	118	85.3
Secure Internet servers per 1 million population	128	1.4
Investment in telecommunication services (% GDP)	20	85.3
<b>Quality</b>	88	88
Mobile upload and download speeds	100	1.2
Fixed-broadband upload and download speeds	42	19.8
Fixed-broadband subscriptions (by speed) per hundred people	81	81
<b>Availability</b>	87	78
Fixed broadband latency (% QM per capita)	89	85.3
Mobile broadband basket (% QM per capita)	87	50.7
Internet and telephony competition	1	100
<b>Access</b>	83	85.3
<b>Subscriptions</b>	71	81.1
Active mobile-broadband subscriptions per fixed-line inhabitants	102	16.3
International Internet bandwidth per user	29	81.2
Households with Internet access at home (%)	62	77.6
<b>Skills and employment</b>	116	116
Individuals with standard ICT skills (%)	116	116
Tertiary graduates from ICT programmes (%)	116	116
ICT employment (%)	116	116
<b>Usage</b>	84	81.6
<b>Services</b>	58	45.7
Government online services	87	81.2
Fixed broadband Internet traffic per subscriber	21	26.4
Mobile broadband Internet traffic per subscriber	28	25.1
Internet users (%)	62	76.1
<b>Commerce</b>	58	51.1
ICT FDI patent applications (per 100,000 GDP)	76	39.7
E-participation	84	81.9
Internet activities by individuals (%)	116	116
Trade in digitally deliverable services (% total trade)	30	57.7
<b>ECONOMY</b>	81	85.3
<b>Economic Competitiveness</b>	100	84.4
<b>Infrastructure Investment</b>	81	85.3
Overhead capital formation (% GDP)	116	116
Logistics performance	121	35.4
Transport productive capacity	20	45.0
Building quality control	80	86.7

	Rank	Value
<b>Business Agility</b>	100	85.3
Ease of starting a business	73	86.6
Recovery recovery time	112	28.5
Entrepreneurial employee activity rate	54	12.5
Growth of corporate transactions	88	26.0
<b>Business openness</b>	88	85.3
<b>Trade and Investment</b>	41	81.0
Trade (% GDP)	116	116
High-technology trade (% total trade)	80	42.0
Market concentration	80	70.2
Market concentration	100	84.7
<b>Product openness</b>	81	81.0
China's financial openness	58	83.6
Foreign direct investment, net inflows (% GDP)	147	21
Cost dynamics	58	71.6
<b>Financing and domestic value added</b>	88	87.2
<b>Financing and costs</b>	88	88
Domestic credit to private sector (% GDP)	85	16.4
IMRS financing gap (% GDP)	52	80.5
Tax and contribution rate (% profit)	88	88.0
Bank nonperforming loans (%)	52	87.2
<b>Unmet needs index</b>	81	81.7
Medium- and high-tech activities value added	36	46.4
Industry and services value added (% GDP)	4	84.0
Labour underutilization rate	79	89.0
Output per worker	40	82.8
<b>ENABLING ENVIRONMENT</b>	81	85.3
<b>Governance</b>	88	87.2
Political environment	50	80.7
Peace and stability	55	53.5
Value and accountability	41	86.1
Quality of institutions	88	87.7
Rule of law	76	49
Control of corruption	71	81
Government effectiveness	81	81.1
<b>Socio-economic</b>	106	45.3
Gender equity	88	87.0
Female-to-male ratio in parliament	71	36.5
Female-to-male labour force participation	89	88.2
Female-to-male ratio in internal usage	1	100
<b>Government</b>	110	46.6
Social protection coverage (% population)	87	83.0
Adult literacy rate	116	116
Youth not in employment, education or training (%)	121	45.7
<b>Standard of living</b>	107	81.1
Poverty headcount ratio (% population)	116	116
GDP per capita	80	21.1
<b>Health and environment</b>	128	56.7
<b>Health</b>	75	85.1
Universal health coverage	55	74
Healthy life expectancy (years)	80	72.7
Under-five mortality rate	85	80.5
<b>Economic and performance</b>	117	81.0
Renewable energy consumption (%)	147	0.8
Household footprint per capita	188	37.0
Natural hazard exposure	41	88

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 83/154

**GKI SCORE** 47.2

**WORLD AVERAGE** 48.4

# TUNISIA

## KEY INDICATORS

**GDP US\$ billions** 114.965  
**Population** 11,818,618  
**HDI** 0.74

## COUNTRY PERFORMANCE SUMMARY

Tunisia is a moderate performer in terms of its knowledge infrastructure. It ranks 83rd out of 154 countries in the Global Knowledge Index 2021 and 21st out of the 39 countries with high human development.

### AREAS OF STRENGTH

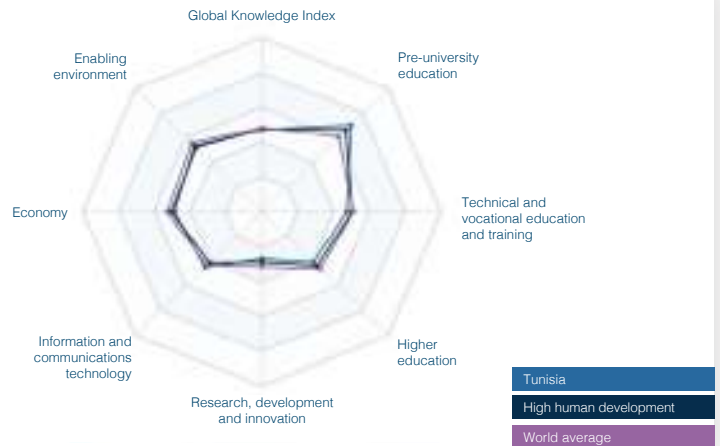
- + Government expenditure on secondary education (% of GDP)
- + Government funding per secondary student (% of GDP per capita)
- + Tertiary graduates from STEM programmes (%)
- + Tertiary graduates from ICT programmes (%)
- + Researchers in higher education (%)

### AREAS OF IMPROVEMENT

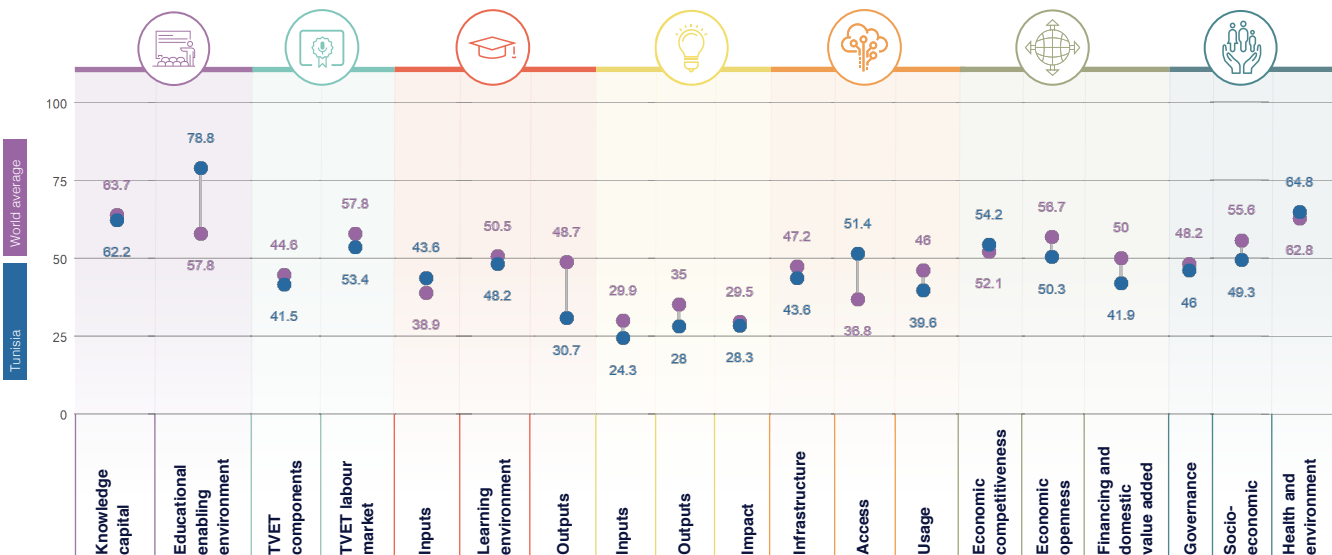
- Chinn-Ito financial openness
- Debt dynamics
- Fixed-broadband upload and download speeds
- Unemployment rate with advanced education
- Proportion of skilled production workers

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	61	70.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	92	47.5
HIGHER EDUCATION	99	40.8
RESEARCH, DEVELOPMENT AND INNOVATION	100	26.8
INFORMATION AND COMMUNICATIONS TECHNOLOGY	72	44.9
ECONOMY	91	48.8
ENABLING ENVIRONMENT	78	53.4



## GKI PILLARS







# TUNISIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	81	70.5
Enrollment	73	82.0
Net enrolment rate in primary education	45	87.0
Net enrolment rate in lower secondary education	106	106
Net enrolment rate in upper secondary education	106	106
Completion	100	81
Years of compulsory education in primary and secondary	67	69.0
Completion rate in upper secondary education	80	82.0
Success rate rate in the last grade of lower secondary education	80	81.0
Completion	110	87.0
Assessment of 15-year-old students in math, science and reading	70	10.0
Learning-adjusted years of schooling	100	40.4
<b>Educational enabling environment</b>	6	78.8
Expenditure	1	100
Government expenditure on primary education (% GDP)	106	106
Government expenditure on secondary education (% GDP)	1	100
Government funding per primary student (% GDP per capita)	106	106
Government funding per secondary student (% GDP per capita)	1	100
Resources	83	80.0
Pupil-based teacher ratio in primary education	25	80.7
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	30	87.7
Schools with access to computers in secondary education (%)	47	89.0
Early learning	61	60.4
Class attendance rate in early childhood education	80	35.0
Proportion of children who are developmentally on track	25	34.1
Proportion of children with stimulating home learning environments	38	73.1
Pupil-based teacher ratio in preprimary education	25	82.0
Quality and infrastructure	80	80.7
Completion rate in upper secondary education, gender parity	111	80.0
Completion rate in upper secondary education, wealth parity	72	30.0
Completion rate in upper secondary education, location parity	78	81.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	81	81.0
Companies training apprentices	106	100.0
Firms offering formal training (%)	100	82.0
Labour force with short-cycle tertiary education (%)	106	106
Participation rate in formal and non-formal education and training	106	106
TVET resources	80	87.0
Government expenditure on vocational education (%)	106	106
Share of students enrolled in secondary vocational programmes	70	14.4
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	70	40
Extent of staff training	80	45.0
Quality of vocational training	80	44.0
Ratio of high-skill TVET occupations earnings to average wage	106	106
Ratio of median-skill TVET occupations earnings to average wage	106	106
<b>TVET labour market</b>	100	80.4
Efficiency of the labour market	104	10.0
Firms considered well-matched with workforce (%)	100	34.0
Employment educational mismatch (%)	106	106
Proportion of skilled production workers	100	8
Unemployment rate with vocational education	106	106
Real TVET unemployment	20	80
Share of TVET occupations	80	81.1
Manufacturing employment (%)	17	84.0
Quality and infrastructure	80	80
Enrollment in vocational education, gender parity	106	106
Useable employment rate	80	80

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	87	43.8
Expenditure	80	81.1
Government expenditure per tertiary student	47	26.1
Teaching staff compensation (% tertiary expenditure)	106	106
Enrollment	80	87.0
Enrollment in bachelor's or equivalent level (%)	88	14.1
Enrollment in masters, doctoral or equivalent (%)	40	40.0
Resources	17	80.0
Pupil-teacher ratio in tertiary education	81	75.0
Research in higher education (%)	11	88.7
<b>Learning environment</b>	88	48.0
<b>Directly and indirectly funded</b>	80	80.0
Teachers in tertiary education, gender parity	20	60.4
Labour mobility rate	78	7.8
Academic freedom	80	80.7
<b>Equity and inclusiveness</b>	80	37
Class attendance rate in tertiary education, gender parity	80	82.0
Class attendance rate in tertiary education, wealth parity	34	38.4
Class attendance rate in tertiary education, location parity	80	16.0
<b>Outputs</b>	108	80.7
<b>Attainment</b>	106	106
Educational attainment rate, bachelor's or equivalent	106	106
Educational attainment rate, master's or equivalent	106	106
Educational attainment rate, doctoral or equivalent	106	106
<b>Employment</b>	100	20.4
Labour force participation rate with advanced education	80	80.0
Unemployment rate with advanced education	100	10.0
<b>Impact</b>	100	80.1
University tertiary enrollment in R&D	80	35.7
OECD indicators per 100 personnel in higher education	80	16.0
<b>ENVIRONMENTAL QUALITY AND INFRASTRUCTURE</b>		
<b>Energy</b>	80	24.0
Access to electricity	80	80.0
CO2E (% GDP)	54	42
GERD per researcher	80	6.8
Researchers per thousand labour force	34	32.4
Tertiary graduates from STEM programmes (%)	2	78.0
<b>Science, technology and innovation</b>	100	80.0
GERD performed by business enterprises (%)	87	3.3
GERD financed by business enterprises (%)	80	23.4
Researchers in business enterprises (%)	80	8
Patents that spend on R&D (%)	80	10.0
<b>Human capital formation</b>	100	100.0
High-skill employment (%)	106	106
Intellectual property payments (% total trade)	108	2.5
State of digital development	111	58.1
<b>Statistics</b>	100	80
<b>Accession to international databases</b>	80	40.0
Average documents per researcher	71	82.7
Citations per document	100	16.0
Patent applications (per 100 billion GDP)	50	80
<b>Infrastructure and connectivity</b>	100	100.0
Intellectual property receipts (% total trade)	52	10.0
Internet bandwidth applications (per 100 billion GDP)	80	10.0
PCT applications (per 100 billion GDP)	100	35.0
Firms producing new goods and services (%)	108	14.4





# TUNISIA

	Rank	Value
<b>Consumer Innovation Adoption</b>	106	116
Treatment applications per 100 million GDP	106	116
Cultural goods exports (% exports)	72	81.1
Printing and publishing output (% manufactured output)	106	116
<b>Finance</b>	81	85.3
<b>Banking</b>	75	80.8
Access to institutions' provisions	85	18.8
Depth of innovative companies	112	42.3
ISO 9001 quality certificates (% GDP)	23	33.1
ISO 14001 environmental certificates (% GDP)	30	21.0
<b>Insurance</b>	91	111.0
CERD received from abroad (%)	65	7.8
Cost of letters per storage volume dealt (% GDP)	100	4.4
Computer software spending (% GDP)	34	20
<b>Government Services</b>	95	111.0
New business density per thousand population	87	8.3
Firms with web presence (%)	22	35.4
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>72</b>	<b>46.9</b>
<b>Infrastructure</b>	86	42.8
<b>Coverage</b>	89	41.3
30MHz mobile network coverage (% population)	71	80.0
Secure Internet servers per 1 million population	90	3.2
Investment in telecommunication services (% GDP)	71	32
<b>Speed</b>	92	18
Mobile internet and download speeds	93	24.9
Fixed broadband upload and download speeds	111	2.1
Fixed broadband subscriptions (y speed) per hundred people	77	17.4
<b>Availability</b>	97	25.4
Fixed broadband bandwidth (% Gbps per capita)	77	24.3
Mobile broadband basket (% Gbps per capita)	74	82.0
Internet and telephony competition	104	80.0
<b>Access</b>	22	81.8
<b>Subscriptions</b>	91	11.8
Active mobile broadband subscriptions per fixed-line inhabitants	81	32
International Internet bandwidth per user	73	28.8
Households with Internet access at home (%)	95	81.4
<b>Skills and employment</b>	11	81.4
Individuals with standard ICT skills (%)	55	22.9
Tertiary graduates from ICT programmes (%)	1	100
ICT employment (%)	104	118
<b>Usage</b>	81	28.8
<b>Services</b>	85	40.5
Government online services	87	82.4
Fixed broadband internet traffic per subscription	49	22.0
Mobile broadband internet traffic per subscription	83	22.0
Internet users (%)	85	84.0
<b>Commerce</b>	100	10.4
ICT FDI parent applications (per 100 million GDP)	76	34.7
E-participation	72	89.1
Internet activities by individuals (%)	104	118
Trade in digitally deliverable services (% total trade)	142	7.4
<b>ECONOMY</b>	<b>81</b>	<b>85.3</b>
<b>Economic Competitiveness</b>	71	54.2
<b>Infrastructure Investment</b>	69	62.2
Overhead capital formation (% GDP)	114	35.0
Logistics performance	100	39.2
Transport productive capacity	70	25.7
Building quality control	8	82.0

	Rank	Value
<b>Business Agility</b>	91	82.2
Ease of starting a business	95	84.8
Recovery recovery rate	41	55.7
Entrepreneurial employee activity rate	49	15.0
Growth of corporate transactions	50	21.4
<b>Business operations</b>	84	86.3
Trade and investment	17	81.0
Trade (% GDP)	37	43.5
High-technology trade (% total trade)	23	81.7
Market concentration	35	86.4
Market concentration	111	84.0
Product diversity	107	11
Charitable financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	80	35.0
Cost dynamics	108	37.7
<b>Financing and domestic value added</b>	117	41.8
<b>Financing and costs</b>	112	10.7
Domestic credit to private sector (% GDP)	36	32.7
MSME financing gap (% GDP)	21	70
Tax and contribution rate (% profit)	142	46.4
Bank nonperforming loans (%)	104	118
Unsecured loans ratio	111	14.1
Medium- and high-tech activities value added	58	32.2
Industry and services value added (% GDP)	82	81
Labour underutilization rate	108	25.7
Output per worker	73	14.3
<b>ENABLING ENVIRONMENT</b>	<b>78</b>	<b>83.4</b>
<b>Governance</b>	72	46
Political environment	81	40.5
Peace and stability	112	24.1
View and accountability	27	87
Quality of institutions	71	81.4
Rule of law	89	82.0
Control of corruption	88	82.4
Government effectiveness	86	83.6
<b>Socio-economic</b>	100	40.3
Gender equity	108	30
Female-to-male ratio in parliament	70	35.0
Female-to-male labour force participation	141	32.1
Female-to-male ratio in internal wage	85	84.3
Gender inequality	102	35.0
Social protection coverage (% population)	85	45.8
Adult literacy rate	80	79
Youth not in employment, education or training (%)	105	41.1
Standard of living	81	83.7
Poverty headcount ratio (% population)	36	79.2
GDP per capita	94	74.2
<b>Health and environment</b>	<b>88</b>	<b>84.8</b>
Health	76	11.7
Universal health coverage	75	70
Healthy life expectancy (years)	84	75.0
Under-five mortality rate	85	87.1
Environmental performance	80	81.0
Renewable energy consumption (%)	100	12.3
Household footprint per capita	88	87.8
Natural hazard exposure	81	80

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 77/154

**GKI SCORE** 48.2

**WORLD AVERAGE** 48.4

# TURKEY

## KEY INDICATORS

**GDP US\$ billions** 2,393.963  
**Population** 84,339,067  
**HDI** 0.82

## COUNTRY PERFORMANCE SUMMARY

Turkey is a moderate performer in terms of its knowledge infrastructure. It ranks 77th out of 154 countries in the Global Knowledge Index 2021 and 59th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

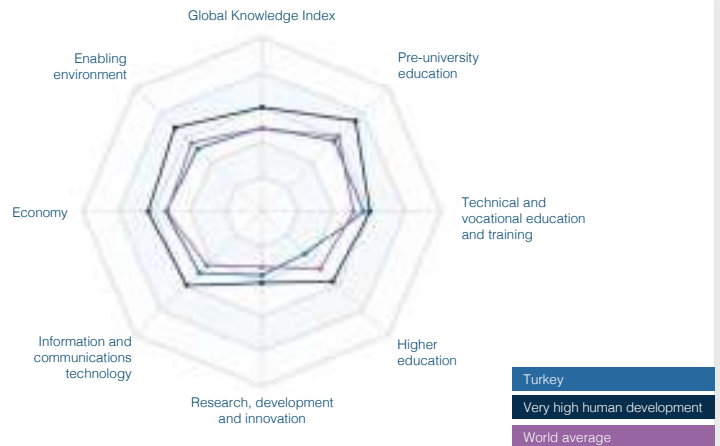
- + Market concentration
- + Product concentration
- + Industrial design applications (per 100 billion GDP)
- + Trademark applications (per 100 billion GDP)
- + Government expenditure on vocational education (%)

### AREAS OF IMPROVEMENT

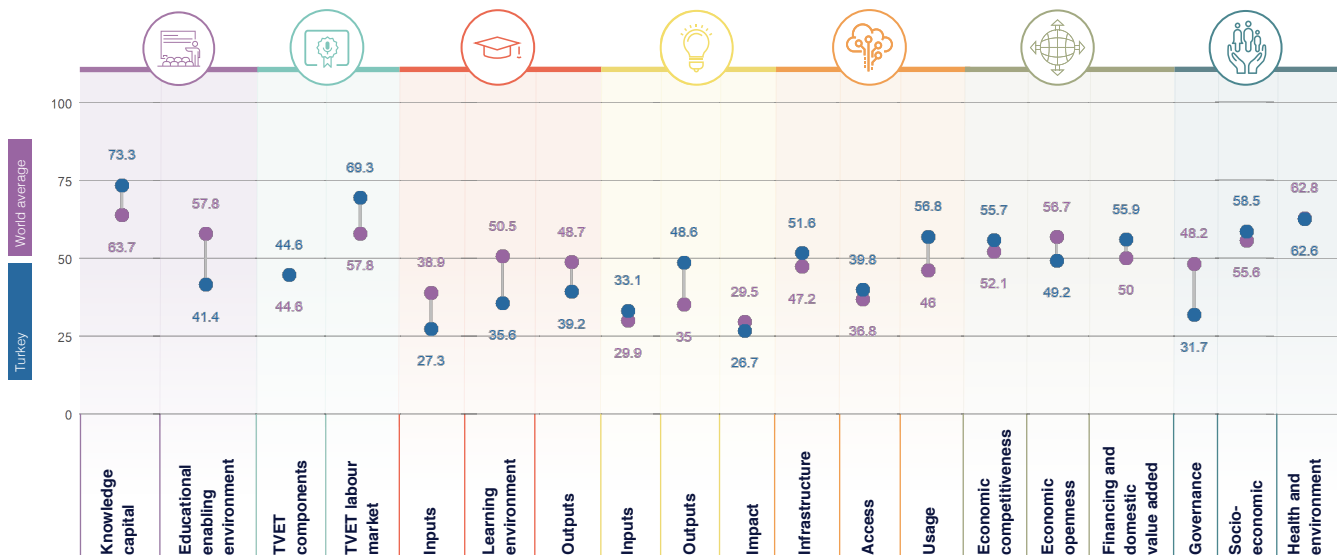
- Tertiary graduates from ICT programmes (%)
- Insolvency recovery rate
- Firms producing new goods and services (%)
- Pupil-teacher ratio in tertiary education
- Academic freedom

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	97	57.3
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	47	56.9
HIGHER EDUCATION	131	34
RESEARCH, DEVELOPMENT AND INNOVATION	44	36.1
INFORMATION AND COMMUNICATIONS TECHNOLOGY	62	49.4
ECONOMY	67	53.6
ENABLING ENVIRONMENT	92	50.9



## GKI PILLARS





# TURKEY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	88	73.3
Enrollment	75	85.5
Net enrolment rate in primary education	89	85.5
Net enrolment rate in lower secondary education	86	85.2
Net enrolment rate in upper secondary education	87	76
Completion	73	71.1
Years of compulsory education in primary and secondary	9	82.5
Completion rate in upper secondary education	85	57.4
Success rate rate in the last grade of lower secondary education	88	72.5
Completion	73	58.5
Assessment of 15-year-old students in math, science and reading	39	82.4
Learning-adjusted years of schooling	82	85.2
<b>Educational enabling environment</b>	<b>108</b>	<b>41.4</b>
Expenditure	88	25.0
Government expenditure on primary education (% GDP)	121	15.9
Government expenditure on secondary education (% GDP)	43	24.3
Government funding per primary student (% GDP per capita)	81	27.1
Government funding per secondary student (% GDP per capita)	80	46.0
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	118	33.0
Class attendance rate in early childhood education	109	78
Proportion of children who are developmentally on track	35	59.2
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	77	81
Completion rate in upper secondary education, gender parity	24	84.7
Completion rate in upper secondary education, wealth parity	75	70
Completion rate in upper secondary education, location parity	72	81.3
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>79</b>	<b>44.8</b>
Companies training apprentices	77	43.0
Firms offering formal training (%)	85	37.5
Labour force with short-cycle tertiary education (%)	90	71.2
Participation rate in formal and non-formal education and training	29	28.2
TVET resources	81	37
Government expenditure on vocational education (%)	9	73.2
Share of students enrolled in secondary vocational programmes	35	33.8
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	116	33.0
Extent of staff training	103	47.3
Quality of vocational training	109	36.0
Ratio of high-skill TVET occupations earnings to average wage	87	24.9
Ratio of medium-skill TVET occupations earnings to average wage	80	36.0
<b>TVET labour market</b>	<b>88</b>	<b>40.3</b>
Efficiency of the labour market	75	44.4
Firms considered well-integrated with labour (%)	83	44.0
Employment educational mismatch (%)	116	116
Proportion of skilled production workers	29	34.1
Unemployment rate with vocational education	94	60.7
Real TVET unemployment	27	41.7
Share of TVET occupations	76	54.0
Manufacturing employment (%)	72	85.6
Quality and infrastructure	45	62.0
Enrollment in vocational education, gender parity	32	89.6
Useable employment rate	72	71.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>123</b>	<b>37.3</b>
Expenditure	88	16.0
Government expenditure per tertiary student	60	16.0
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	31	41.1
Enrollment in bachelor's or equivalent level (%)	8	48.7
Enrollment in masters, doctoral or equivalent (%)	43	37.5
Resources	107	33.0
Ratios/teacher ratio in tertiary education	108	6.8
Researchers in higher education (%)	64	36.1
<b>Learning environment</b>	<b>123</b>	<b>33.8</b>
Directly paid academic freedom	108	33.0
Teachers in tertiary education, gender parity	37	81
Labour mobility rate	82	7
Academic freedom	147	6.4
Quality and infrastructure	56	38.0
Class attendance rate in tertiary education, gender parity	68	74.7
Class attendance rate in tertiary education, wealth parity	47	35.2
Class attendance rate in tertiary education, location parity	82	9.6
<b>Outputs</b>	<b>119</b>	<b>26.2</b>
Attainment	77	16.0
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	88	9.8
Educational attainment rate, doctoral or equivalent	42	22.2
Employment	91	67.4
Labour force participation rate with advanced education	72	72.5
Unemployment rate with advanced education	100	62.5
Impact	80	33.0
University tertiary enrollment in R&D	78	43.0
OECD students per 1000 personnel in higher education	69	26.7
<b>INNOVATION, KNOWLEDGE AND SERVICES</b>		
<b>Inputs</b>	<b>55</b>	<b>22.2</b>
Access to R&D resources	81	33.0
GDP (% GDP)	36	16.2
GERD per researcher	43	25.0
Researchers per thousand labour force	41	22.5
Tertiary graduates from STEM programmes (%)	68	33.0
<b>Quality and infrastructure</b>	<b>55</b>	<b>22.2</b>
GERD performed by business enterprises (%)	55	79
GERD financed by business enterprises (%)	25	81.2
Researchers in business enterprises (%)	17	67.0
Firms that spend on R&D (%)	68	12.0
<b>Quality and infrastructure</b>	<b>55</b>	<b>22.2</b>
High-skill employment (%)	24	48.0
Intellectual property payments (% total trade)	40	28.2
State of cluster development	86	47.0
<b>Outputs</b>	<b>122</b>	<b>26.8</b>
Access to R&D resources	81	33.0
Average documents per researcher	73	51.1
Citations per document	100	16.2
Patent applications (per 100 billion GDP)	20	65.0
<b>Quality and infrastructure</b>	<b>55</b>	<b>22.2</b>
Intellectual property receipts (% total trade)	58	12.2
Research design applications (per 100 billion GDP)	1	398
PCT applications (per 100 billion GDP)	30	70.0
Firms producing new goods and services (%)	118	6.6





# TURKEY

	Rank	Value
<b>Consumer Innovation Readiness</b>		
Treatment applications per 100 million GDP	5	89.4
Cultural goods exports (% exports)	13	59.6
Printing and publishing output (% manufactured output)	79	16.2
<b>Health</b>	<b>86</b>	<b>15.7</b>
<b>Trade</b>	<b>9</b>	<b>89.8</b>
Ratio of institutions' provisions	17	48.1
Depth of innovative companies	87	8.1
ISO 9001 quality certificates (% GDP)	76	12.5
ISO 14001 environmental certificates (% GDP)	87	9.0
<b>Energy</b>	<b>97</b>	<b>11.1</b>
CERD forecast from abroad (%)	80	5.8
Coal reserves per strategic storage deals (% GDP)	118	3.9
Computer software spending (% GDP)	88	42.4
<b>Governmental Services</b>	<b>100</b>	<b>9.0</b>
New business density per thousand population	72	7.7
Firms with new products/services (%)	89	56.4
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>82</b>	<b>46.4</b>
<b>Infrastructure</b>	<b>87</b>	<b>31.8</b>
<b>Coverage</b>	<b>86</b>	<b>44</b>
3G/4G mobile network coverage (% population)	48	88.8
Secure Internet servers per 1 million population	50	15.4
Investment in telecommunication services (% GDP)	118	17.6
<b>Speed</b>	<b>80</b>	<b>38.5</b>
Mobile internet and download speeds	38	54.2
Fixed broadband upload and download speeds	70	7.8
Fixed broadband subscriptions (by speed) per hundred people	57	37.9
<b>Availability</b>	<b>41</b>	<b>56.4</b>
Fixed broadband latency (% QM per capita)	25	88.9
Mobile broadband basket (% QM per capita)	50	87.0
Internet and telephony competition	79	56.4
<b>Access</b>	<b>76</b>	<b>38.8</b>
<b>Subscriptions</b>	<b>81</b>	<b>37.0</b>
Active mobile broadband subscriptions per hundred inhabitants	72	33.8
International Internet bandwidth per user	38	48.0
Households with Internet access at home (%)	29	80.0
<b>Skills and employment</b>	<b>80</b>	<b>21.5</b>
Individuals with standard ICT skills (%)	44	40
Tertiary graduates from ICT programmes (%)	111	11.8
ICT employment (%)	78	11.8
<b>Usage</b>	<b>49</b>	<b>58.8</b>
<b>Services</b>	<b>88</b>	<b>51.7</b>
Government online services	22	85.0
Fixed broadband internet traffic per subscription	29	21.8
Mobile broadband internet traffic per subscription	31	22.8
Internet users (%)	62	70.4
<b>Commerce</b>	<b>88</b>	<b>11.5</b>
ICT FDI patent applications (per 100 million GDP)	37	53.6
E-participation	22	85.0
Internet activities by individuals (%)	30	84.9
Trade in digitally deliverable services (% total trade)	81	35.7
<b>ECONOMY</b>	<b>47</b>	<b>53.6</b>
<b>Economic Competitiveness</b>	<b>64</b>	<b>55.7</b>
<b>Infrastructure Investment</b>	<b>88</b>	<b>15.1</b>
Overhead capital formation (% GDP)	32	89.8
Logistics performance	44	53.6
Transport productive capacity	54	31.7
Building quality control	28	86.7

	Rank	Value
<b>Business Agility</b>	<b>81</b>	<b>53.2</b>
Cost of starting a business	85	88.8
Recovery recovery rate	138	11.4
Entrepreneurial employee activity rate	37	26.8
Growth of corporate transactions	13	85.7
<b>Corporate openness</b>	<b>104</b>	<b>46.2</b>
<b>Trade and investment</b>	<b>40</b>	<b>84.0</b>
Trade (% GDP)	88	20.7
High-technology trade (% total trade)	76	45.2
Market concentration	4	88.8
Market concentration	3	86.7
<b>Product openness</b>	<b>108</b>	<b>31.1</b>
China's financial openness	86	76.4
Foreign direct investment, net inflows (% GDP)	117	34.0
Cost dynamics	28	45.8
<b>Financing and domestic value added</b>	<b>48</b>	<b>50.8</b>
<b>Financing and costs</b>	<b>41</b>	<b>51.2</b>
Domestic credit to private sector (% GDP)	46	28.2
IMRS financing gap (% GDP)	29	79.2
Tax and contribution rate (% profit)	100	85.1
Bank nonperforming loans (%)	68	84.2
Unmet loan demand	19	41.7
Medium- and high-tech activities value added	46	38.5
Industry and services value added (% GDP)	85	80.2
Labour underutilization rate	108	21.7
Output per worker	31	35.3
<b>ENABLING ENVIRONMENT</b>	<b>82</b>	<b>46.8</b>
<b>Governance</b>	<b>104</b>	<b>31.7</b>
<b>Political environment</b>	<b>102</b>	<b>17.3</b>
Peace and stability	104	11.8
View and accountability	118	23.7
Quality of institutions	88	41.7
Rule of law	89	40.4
Control of corruption	82	44.2
Government effectiveness	77	52.4
<b>Socio-economic</b>	<b>89</b>	<b>56.5</b>
<b>Gender equity</b>	<b>107</b>	<b>30</b>
Female-to-male ratio in parliament	111	3.1
Female-to-male labour force participation	103	42.6
Female-to-male ratio in internal wage	59	85.0
<b>Gender equality</b>	<b>88</b>	<b>11.2</b>
Social protection coverage (% population)	39	78.2
Adult literacy rate	42	85.8
Youth not in employment, education or training (%)	117	44.5
<b>Standard of living</b>	<b>38</b>	<b>10.8</b>
Poverty headcount ratio (% population)	55	79.0
GDP per capita	48	23.2
<b>Health and environment</b>	<b>85</b>	<b>62.8</b>
<b>Health</b>	<b>81</b>	<b>61.7</b>
Universal health coverage	56	74
Healthy life expectancy (years)	49	81
Under-five mortality rate	82	88
<b>Environmental performance</b>	<b>100</b>	<b>45.6</b>
Renewable energy consumption (%)	107	12.3
Household footprint per capita	84	78.2
Natural hazard exposure	125	39

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# UGANDA

**GKI RANK** 122/154

**GKI SCORE** 37.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Uganda is a modest performer in terms of its knowledge infrastructure. It ranks 122nd out of 154 countries in the Global Knowledge Index 2021 and 4th out of the 27 countries with low human development.

### AREAS OF STRENGTH

- + Renewable energy consumption (%)
- + GERD financed from abroad (%)
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Firms producing new goods and services (%)
- + Citable documents per R&D personnel in higher education

### AREAS OF IMPROVEMENT

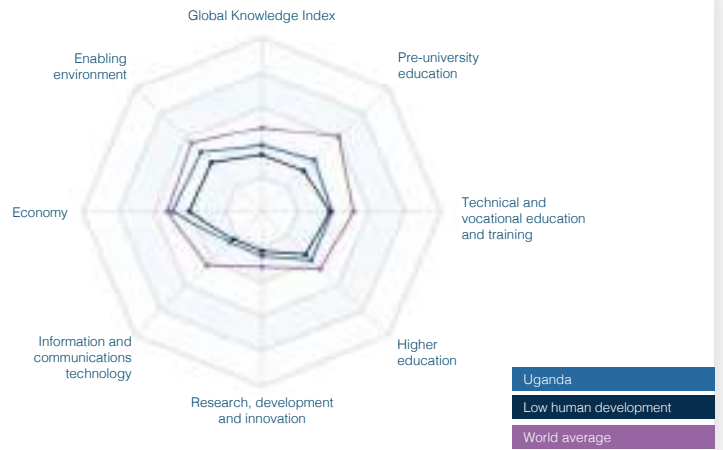
- Government expenditure on secondary education (% of GDP)
- Educational attainment rate, bachelor's or equivalent
- Fixed-broadband subscriptions by speed per hundred people
- Government funding per primary student (% GDP per capita)
- Social protection coverage (% population)

### KEY INDICATORS

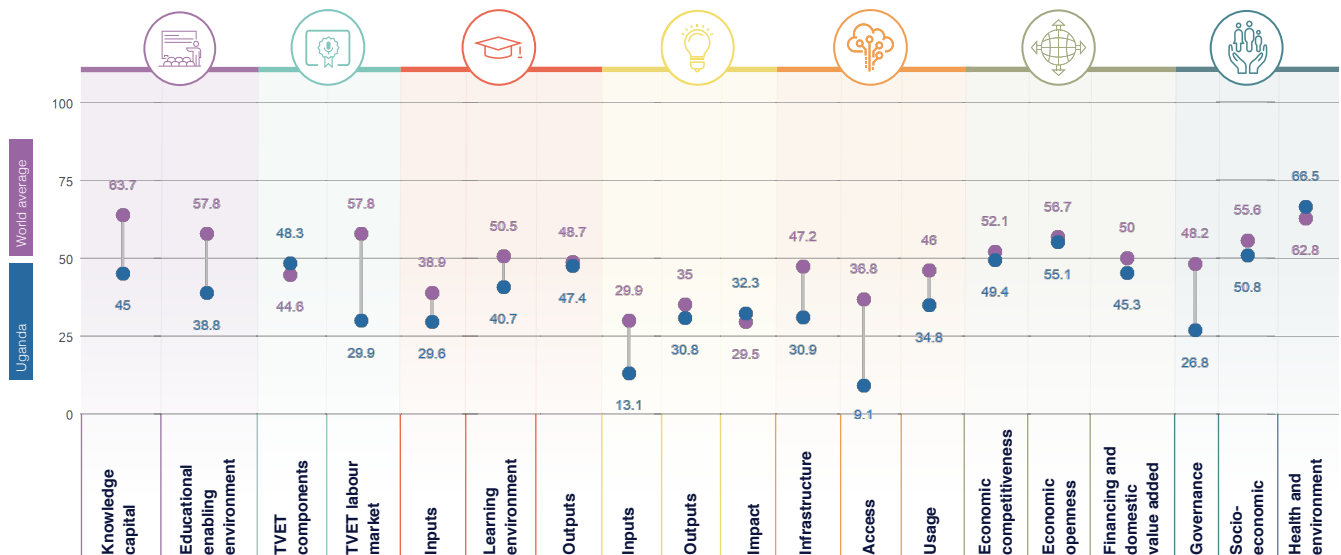
**GDP US\$ billions** 99.605  
**Population** 45,741,000  
**HDI** 0.544

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	127	41.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	130	39.1
HIGHER EDUCATION	107	39.2
RESEARCH, DEVELOPMENT AND INNOVATION	108	25.4
INFORMATION AND COMMUNICATIONS TECHNOLOGY	128	24.9
ECONOMY	85	49.9
ENABLING ENVIRONMENT	102	48.1



## GKI PILLARS





# UGANDA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	120	41.9
Enrollment	73	80.7
Net enrolment rate in primary education	87	84.7
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	141	11.0
Years of compulsory education in primary and secondary	126	11.0
Completion rate in upper secondary education	113	11.0
Success rate rate in the last grade of lower secondary education	128	11.0
Completion	133	10.1
Assessment of Grade 6 students in math, science and reading	116	116
Learning-adjusted years of schooling	138	20.1
<b>Educational enabling environment</b>		
Expenditure	121	11.0
Government expenditure on primary education (% GDP)	89	14.2
Government expenditure on secondary education (% GDP)	127	4.5
Government funding per primary student (% GDP per capita)	125	11.1
Government funding per secondary student (% GDP per capita)	118	116
Resources	89	10.1
Pupil-based teacher ratio in primary education	54	40.0
Pupil-based teacher ratio in secondary education	83	80.0
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	112	43.0
Class attendance rate in early childhood education	123	71
Proportion of children who are developmentally on track	49	44.1
Proportion of children with stimulating home learning environments	49	46.1
Pupil-based teacher ratio in preprimary education	62	70.0
Quality and infrastructure	116	40.1
Completion rate in upper secondary education, gender parity	82	79.1
Completion rate in upper secondary education, wealth parity	100	7.2
Completion rate in upper secondary education, location parity	87	14.1
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	11	14.0
Firms offering formal training (%)	51	47.4
Labour force with short-cycle tertiary education (%)	85	80.0
Participation rate in formal and non-formal education and training	116	116
TVET enrolment	113	10.1
Government expenditure on vocational education (%)	90	17.1
Share of students enrolled in secondary vocational programmes	102	7.1
Share of students enrolled in postsecondary vocational programmes	116	116
TVET quality and infrastructure	9	10.0
Extent of staff training	81	64.0
Quality of vocational training	83	40.0
Ratio of high-skil TVET occupations earnings to average wage	6	81.1
Ratio of medium-skil TVET occupations earnings to average wage	1	109
<b>TVET labour market</b>		
Efficiency of the labour market	111	11.0
Firms considered with inappropriately educated workforce (%)	42	15.4
Employment educational mismatch (%)	100	11.0
Proportion of skilled production workers	86	80.0
Unemployment rate with vocational education	86	86.7
Real TVET unemployment	116	11.1
Share of TVET occupations	106	10
Manufacturing employment (%)	142	10.0
Quality and infrastructure	141	10.0
Enrollment in vocational education, gender parity	116	116
Useable employment rate	121	20.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	113	10.1
Government expenditure per tertiary student	106	4.8
Teaching staff compensation (% tertiary expenditure)	76	11.0
Enrollment	116	116
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
Resources	113	11
Pupil-teacher ratio in tertiary education	100	58.0
Researchers in higher education (%)	54	45.0
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	87	10.0
Labour mobility rate	23	17.0
Academic freedom	122	14.0
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	84	80.0
Class attendance rate in tertiary education, wealth parity	39	17.2
Class attendance rate in tertiary education, location parity	85	16.1
<b>Outputs</b>		
Attainment	126	11
Educational attainment rate, bachelor's or equivalent	100	2.1
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
Employment	86	10.7
Labour force participation rate with advanced education	107	55.1
Unemployment rate with advanced education	87	82.1
Innovation	1	71.0
University tertiary enrollment in R&D	82	42.0
CRISPR patents per 100 personnel in higher education	1	100
<b>Government's contribution to economic growth</b>		
<b>Inputs</b>		
Government R&D expenditure	111	11.1
GDP (% GDP)	106	2.7
GERD per researcher	78	14.0
Researchers per thousand labour force	108	0.2
Tertiary graduates from STEM programmes (%)	116	116
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	86	0.2
GERD financed by business enterprises (%)	89	4.2
Researchers in business enterprises (%)	71	4.5
Firms that spend on R&D (%)	11	81.7
Quality of research environment	114	10
High-skilled employment (%)	83	16.4
Intellectual property payments (% total trade)	81	15.0
State of cluster development	83	4.1
<b>Outputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	11	77.0
Citations per document	100	16.2
Patent applications (per 100 billion GDP)	104	11.0
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	44	17.0
Research design applications (per 100 billion GDP)	81	0.7
PCT applications (per 100 billion GDP)	123	25.1
Firms producing new goods and services (%)	4	88.0



# UGANDA

	Rank	Value
<b>Business environment</b>	128	51.5
Treatment applications per 100 million GDP	94	10.2
Cultural goods exports (% exports)	105	1
Printing and publishing output (% manufactured output)	106	106
<b>Energy</b>	95	55.5
<b>Finance</b>	75	6
Access to institutions' provisions	71	10.5
Depth of innovative companies	52	53.5
ISO 9001 quality certificates (% GDP)	106	4.7
ISO 14001 environmental certificates (% GDP)	80	3.3
<b>Infrastructure</b>	117	16.1
CERD received from abroad (%)	2	80.7
Cost indexes per storage volume deals (% GDP)	99	4.8
Computer software spending (% GDP)	121	0.8
<b>International trade</b>	95	100.0
New business density per thousand population	85	4.2
Firms with new products/services (%)	71	83.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>128</b>	<b>24.9</b>
<b>Infrastructure</b>	124	30.9
<b>Coverage</b>	122	32.5
3G/4G mobile network coverage (% population)	129	51.1
Secure Internet servers per 1 million population	150	0.8
Investment in telecommunication services (% GDP)	29	48.6
<b>Speed</b>	100	3.8
Mobile internet and download speeds	100	6.4
Fixed broadband upload and download speeds	84	5.1
Fixed broadband subscriptions (y speed) per hundred people	132	8
<b>Availability</b>	115	25.4
Fixed broadband latency (% QM per capita)	142	45.4
Mobile broadband basket (% QM per capita)	149	25.0
Internet and telephony competition	1	100
<b>Access</b>	146	8.7
<b>Subscribers</b>	107	11.1
Active mobile-broadband subscriptions per hundred inhabitants	117	10.0
International Internet bandwidth per user	106	106
Households with Internet access at home (%)	142	7
<b>Skills and employment</b>	152	5.8
Individuals with standard ICT skills (%)	106	19
Tertiary graduates from ICT programmes (%)	106	106
ICT employment (%)	100	4.8
<b>Usage</b>	189	24.8
<b>Services</b>	128	21.6
Government online services	81	55.2
Fixed broadband internet traffic per subscription	84	8
Mobile broadband internet traffic per subscription	100	2.1
Internet users (%)	106	106
<b>Statistics</b>	75	11.7
ICT FDI parent applications (per 100 million GDP)	106	106
E-participation	82	57.1
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	75	35.5
<b>ECONOMY</b>	<b>81</b>	<b>48.4</b>
<b>Economic complexity indexes</b>	81	48.4
OECD economic innovation	81	41.6
Overhead capital formation (% GDP)	81	83.9
Logistics performance	101	39.4
Transport productive capacity	103	16.2
Building quality control	47	80

	Rank	Value
<b>Business agility</b>	91	81.5
Ease of starting a business	141	31.3
Recovery recovery rate	85	43.8
Entrepreneurial employee activity rate	45	18.8
Growth of corporate transactions	80	21.4
<b>Corporate openness</b>	77	85.5
Trade and investment	102	10.1
Trade (% GDP)	103	11.5
High-technology trade (% total trade)	118	34
Market concentration	128	89.2
Market concentration	112	82.0
Product diversity	11	61.1
Charitable financial openness	1	108
Foreign direct investment, net inflows (% GDP)	85	43.0
Cost dynamics	100	46.7
<b>Financing and domestic value added</b>	161	45.3
<b>Financing and costs</b>	91	21.2
Domestic credit to private sector (% GDP)	105	4.4
IMRS financing gap (% GDP)	63	85.3
Tax and contribution rate (% profit)	87	73.9
Bank nonperforming loans (%)	79	36.8
Unmet loan demand	102	36
Medium- and high-tech activities value added	100	12.7
Industry and services value added (% GDP)	101	45
Labour underutilization rate	29	81.7
Output per worker	140	1.7
<b>ENABLING ENVIRONMENT</b>	<b>140</b>	<b>46.1</b>
<b>Governance</b>	118	25.8
Political environment	117	24.2
Peace and stability	124	15.3
View and accountability	100	29
Quality of institutions	113	23.5
Rule of law	86	42.9
Control of corruption	125	15.4
Government effectiveness	111	35.3
<b>Socio-economic</b>	88	55.8
Gender equity	57	70.7
Female-to-male ratio in parliament	45	81.1
Female-to-male labour force participation	25	80.4
Female-to-male ratio in internal wage	106	106
Gender inequality	122	45.2
Social protection coverage (% population)	158	8
Adult literacy rate	87	89.0
Youth not in employment, education or training (%)	76	85.0
Standard of living	81	88.8
Poverty headcount ratio (% population)	26	71.0
GDP per capita	128	1.3
<b>Health and environment</b>	<b>48</b>	<b>66.5</b>
Health	101	81.2
Universal health coverage	102	45
Healthy life expectancy (years)	103	46.8
Under-five mortality rate	122	81.0
Environmental performance	7	81.7
Renewable energy consumption (%)	2	83.7
Household footprint per capita	29	86.8
Natural hazard exposure	81	85

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# UKRAINE

**GKI RANK** 61/154

**GKI SCORE** 50.9

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Ukraine is a strong performer in terms of its knowledge infrastructure. It ranks 61st out of 154 countries in the Global Knowledge Index 2021 and 5th out of the 39 countries with high human development.

### AREAS OF STRENGTH

- + Market concentration
- + Poverty headcount ratio (% population)
- + Adult literacy rate
- + Completion rate in upper secondary education, gender parity
- + Pupil-trained teacher ratio in secondary education

### AREAS OF IMPROVEMENT

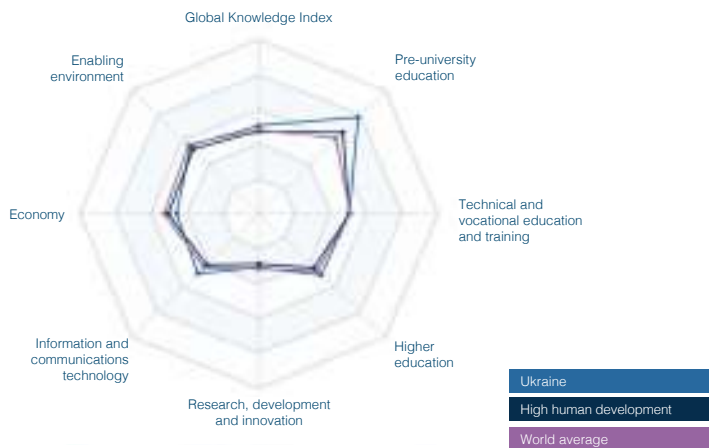
- Researchers in higher education (%)
- Ratio of high-skill TVET occupations earnings to average wage
- Insolvency recovery rate
- Chinn-Ito financial openness
- Bank non-performing loans (%)

### KEY INDICATORS

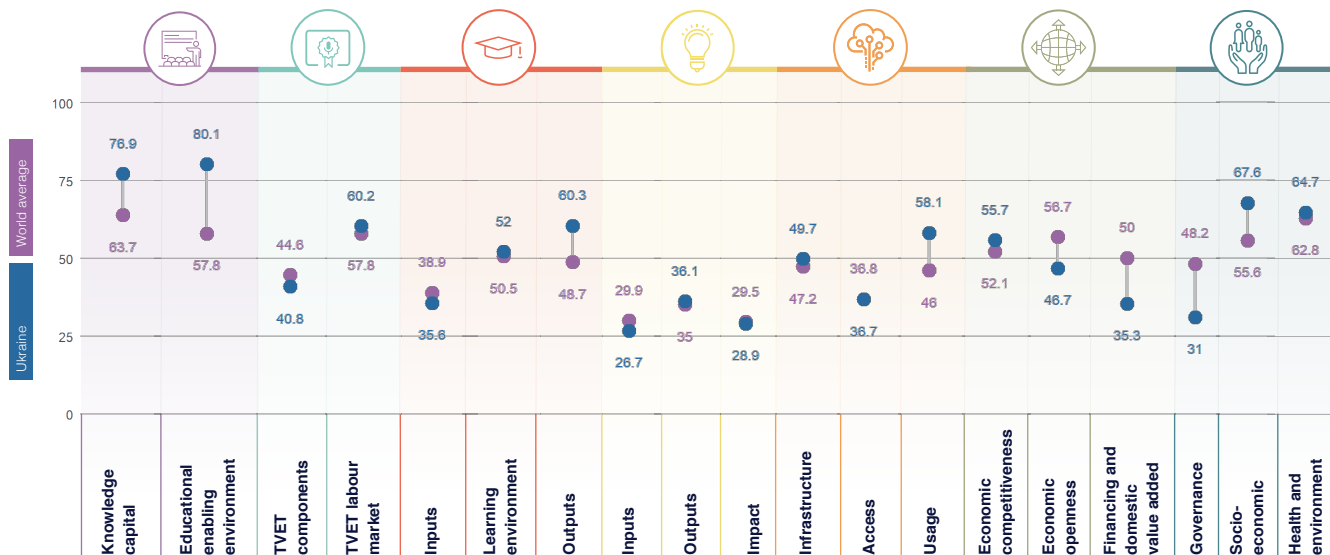
**GDP US\$ billions** 516.683  
**Population** 43,733,759  
**HDI** 0.779

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	23	78.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	78	50.5
HIGHER EDUCATION	54	49.3
RESEARCH, DEVELOPMENT AND INNOVATION	77	30.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	66	48.2
ECONOMY	109	45.9
ENABLING ENVIRONMENT	74	54.4



## GKI PILLARS





# UKRAINE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	23	78.5
Enrollment	31	34
Net enrolment rate in primary education	101	111.0
Net enrolment rate in lower secondary education	85	85.8
Net enrolment rate in upper secondary education	43	89.8
Completion	27	81.1
Years of compulsory education in primary and secondary	28	83.8
Completion rate in upper secondary education	17	84.4
Success rate rate in the last grade of lower secondary education	64	74.1
Completion	41	82.4
Assessment of TIMSS/PIAAC students in math, science and reading	38	82.5
Learning-adjusted years of schooling	39	72.5
<b>Educational enabling environment</b>	6	88.5
Enrollment	31	42.4
Government expenditure on primary education (% GDP)	81	26.9
Government expenditure on secondary education (% GDP)	56	31
Government funding per primary student (% GDP per capita)	1	81.2
Government funding per secondary student (% GDP per capita)	28	42.8
Resources	31	88.8
Pupil-based teacher ratio in primary education	34	80.2
Pupil-based teacher ratio in secondary education	3	89.8
Schools with access to computers in primary education (%)	39	88.0
Schools with access to computers in secondary education (%)	35	89.8
Early learning	1	81
Class attendance rate in early childhood education	114	114
Proportion of children who are developmentally on track	9	85.8
Proportion of children with stimulating home learning environments	6	86.2
Pupil-based teacher ratio in preprimary education	114	114
Quality and infrastructure	11	81.1
Completion rate in upper secondary education, gender parity	3	89.0
Completion rate in upper secondary education, wealth parity	17	85.4
Completion rate in upper secondary education, location parity	20	89
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	64	88.3
Companies training apprentices	119	31
Firms offering formal training (%)	81	29
Labour force with short-cycle tertiary education (%)	114	114
Participation rate in formal and non-formal education and training	114	114
TVET resources	41	88.3
Government expenditure on vocational education (%)	114	114
Share of students enrolled in secondary vocational programmes	95	10.8
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	111	88.1
Extent of staff training	86	80.4
Quality of vocational training	83	83.4
Ratio of high-skill TVET occupations earnings to average wage	119	112.2
Ratio of median-skill TVET occupations earnings to average wage	79	84.5
<b>TVET labour market</b>	71	88.2
Efficiency of the labour market	114	112.2
Firms considered with inappropriately educated workforce (%)	112	26.5
Employment educational mismatch (%)	114	114
Proportion of skilled production workers	8	88
Unemployment rate with vocational education	114	114
Real TVET unemployment	81	112.2
Share of TVET occupations	62	81
Manufacturing employment (%)	81	41.4
Quality and infrastructure	76	112.0
Enrollment in vocational education, gender parity	98	88.2
Useable employment rate	48	88.1

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	81	33.8
Enrollment	81	18.8
Government expenditure per tertiary student	58	16.0
Teaching staff compensation (% tertiary expenditure)	114	114
Enrollment	41	38.1
Enrollment in bachelor's or equivalent level (%)	62	28.5
Enrollment in masters, doctoral or equivalent (%)	39	44
Resources	10	14.1
Rapiteacher ratio in tertiary education	18	88.8
Researchers in higher education (%)	102	18.9
<b>Learning environment</b>		
<b>Directly and academic freedom</b>	111	41.3
Teachers in tertiary education, gender parity	88	82.1
Labour mobility rate	81	14.1
Academic freedom	102	52.7
<b>Equity and inclusiveness</b>	12	88.8
Class attendance rate in tertiary education, gender parity	28	81.7
Class attendance rate in tertiary education, wealth parity	18	88.1
Class attendance rate in tertiary education, location parity	9	88.1
<b>Outputs</b>	34	88.3
<b>Attainment</b>	114	114
Educational attainment rate, bachelor's or equivalent	114	114
Educational attainment rate, master's or equivalent	114	114
Educational attainment rate, doctoral or equivalent	114	114
<b>Employment</b>	81	88.8
Labour force participation rate with advanced education	100	88.4
Unemployment rate with advanced education	81	77.2
<b>Impact</b>	31	88.8
University tertiary enrollment in R&D	82	48.8
OECD indicators per 100 personnel in higher education	14	98
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	11	112.2
<b>Government R&amp;D expenditure</b>	81	114
GDP (% GDP)	66	9.4
GERD per researcher	88	7.7
Researchers per thousand labour force	55	12.7
Tertiary graduates from STEM programmes (%)	48	44.8
<b>Quality of innovation environment</b>	11	112.2
GERD performed by business enterprises (%)	48	7.8
GERD financed by business enterprises (%)	36	37.7
Researchers in business enterprises (%)	43	33
Firms that spend on R&D (%)	72	18.1
<b>Quality of business environment</b>	11	112.2
High-skilled employment (%)	4	73.1
Intellectual property payments (% total trade)	53	19.0
State of startup development	82	48.8
<b>Outputs</b>	11	112.2
<b>Government R&amp;D expenditure</b>	11	112.2
Average documents per researcher	78	48.7
Citations per document	104	112.2
Patent applications (per 100 billion GDP)	28	62.5
<b>Government R&amp;D expenditure</b>	11	112.2
Intellectual property receipts (% total trade)	53	11.5
Research design applications (per 100 billion GDP)	18	38
PCT applications (per 100 billion GDP)	50	59.7
Firms producing new goods and services (%)	67	42.1

# UKRAINE

	Rank	Value		Rank	Value
<b>Business environment</b>			<b>Business agility</b>	61	67
Treatment applications per 100 million GDP	27	52.9	Ease of starting a business	56	67.1
Cultural goods exports (% exports)	89	4.5	Recovery recovery rate	143	9.8
Printing and publishing output (% manufactured output)	72	16.7	Entrepreneurial employee activity rate	196	1.9
<b>Exports</b>	75	25.3	Growth of corporate transactions	1	100
<b>Imports</b>	75	27.5	<b>Corporate openness</b>	113	46.7
Access to investors' protection	62	26	Trust and dissemination	47	64.0
Depth of innovative companies	107	42.5	Taxs (% GDP)	80	32.1
ISO 9001 quality certificates (% GDP)	81	11.3	High-technology trade (% total trade)	69	49.0
ISO 14001 environmental certificates (% GDP)	80	5.8	Market concentration	41	83.5
<b>Integrity</b>	77	16.1	Market concentration	1	99.0
CERD freedom from abuse (%)	18	41.5	Product ownership	143	23.0
Joint ventures per strategic alliance deals (% GDP)	123	3.8	Charitable financial openness	124	8
Computer software spending (% GDP)	93	40.1	Foreign direct investment, net inflows (% GDP)	40	45.0
<b>Government openness</b>	70	16.1	Gov dynamics	110	40
New business density per thousand population	65	6.3	<b>Financing and domestic value added</b>	128	20.3
Firms with one or more alternative (%)	62	61.1	Financing and costs	121	22.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	84	66.2	Domestic credit to private sector (% GDP)	100	12.5
<b>Infrastructure</b>	89	66.7	MSME financing gap (% GDP)	105	31
<b>Coverage</b>	85	66.4	Tax and contribution rate (% profit)	107	62.2
30MHz mobile network coverage (% population)	87	66.5	Bank nonperforming loans (%)	162	8
Secure Internet servers per 1 million population	45	17.5	Unexcused leave taken	71	64.7
Investment in telecommunication services (% GDP)	70	28.9	Medium- and high-tech activities value added	54	32.6
<b>Quality</b>	85	66.3	Industry and services value added (% GDP)	111	22.5
Mobile upload and download speeds	61	21.3	Labour underutilization rate	31	61.2
Fixed broadband upload and download speeds	29	25.0	Output per worker	85	11.5
Fixed broadband subscriptions (by speed) per hundred people	88	36.1	<b>ENABLING ENVIRONMENT</b>	74	54.4
<b>Availability</b>	75	74.1	<b>Governance</b>	107	31
Fixed broadband bandwidth (% Gbps per capita)	87	61.2	Political environment	100	35
Mobile broadband basket (% Gbps per capita)	62	50.0	Peace and stability	100	12.5
Internet and telephony competition	100	67.5	Value and accountability	86	61.7
<b>Access</b>	76	26.7	Quality of institutions	111	31
<b>Subscriptions</b>	75	69.5	Rule of law	118	27.8
Active mobile-broadband subscriptions per fixed-line inhabitants	70	37.2	Control of corruption	119	23.0
International Internet bandwidth per user	81	42.4	Government effectiveness	86	38.9
Households with Internet access at home (%)	70	60.8	<b>Socio-economic</b>	38	67.6
<b>Skills and employment</b>	81	27.0	Gender equity	56	64.2
Individuals with standard ICT skills (%)	75	61	Female-to-male ratio in parliament	87	26.3
Tertiary graduates from ICT programmes (%)	37	42.1	Female-to-male labour force participation	86	32.1
ICT employment (%)	52	26.4	Female-to-male ratio in internal wage	77	54.2
<b>Usage</b>	34	68.5	Government access	81	62.0
<b>Services</b>	17	69.4	Social protection coverage (% population)	196	1.9
Government online services	71	65.2	Adult literacy rate	1	100
Fixed broadband internet traffic per subscription	194	7.8	Youth not in employment, education or training (%)	69	67.2
Mobile broadband internet traffic per subscription	196	1.9	Standard of living	39	31
Internet users (%)	60	60.5	Poverty headcount ratio (% population)	2	69.5
<b>Outcomes</b>	71	71.0	GDP per capita	80	10.6
ICT FDI patent applications (per 100 million GDP)	55	46.6	<b>Health and environment</b>	82	64.7
E-participation	49	81	Health	76	55.5
Internet activities by individuals (%)	81	21.6	Universal health coverage	65	65
Trade in digitally deliverable services (% total trade)	63	42.3	Healthy life expectancy (years)	89	67.2
<b>ECONOMY</b>	104	63.3	Unemployment rate	55	64.4
<b>Economic complexity metrics</b>	81	55.7	Economic total performance	77	62.0
HS-based export diversification	103	41.4	Renewable energy consumption (%)	102	7.2
Overhead capital formation (% GDP)	108	25.1	Household footprint per capita	78	61.2
Logistics performance	65	45.6	Natural hazard exposure	41	65
Transport productive capacity	70	25.5			
Building quality control	47	60			

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK**

**11/154**

**GKI SCORE**

**67.3**

**WORLD AVERAGE**

**48.4**

# UNITED ARAB EMIRATES

## KEY INDICATORS

GDP US\$ billions ..... **655.789**  
 Population ..... **9,890,400**  
 HDI ..... **0.89**

## COUNTRY PERFORMANCE SUMMARY

United Arab Emirates is a leading performer in terms of its knowledge infrastructure. It ranks 11th out of 154 countries in the Global Knowledge Index 2021 and 11th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

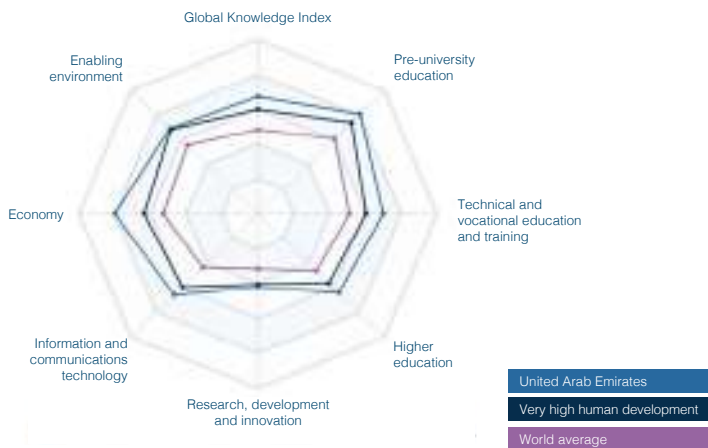
- + Mobile upload and download speeds
- + Active mobile-broadband subscriptions per hundred inhabitants
- + Households with Internet access at home (%)
- + Individuals with standard ICT skills (%)
- + Internet users (%)

### AREAS OF IMPROVEMENT

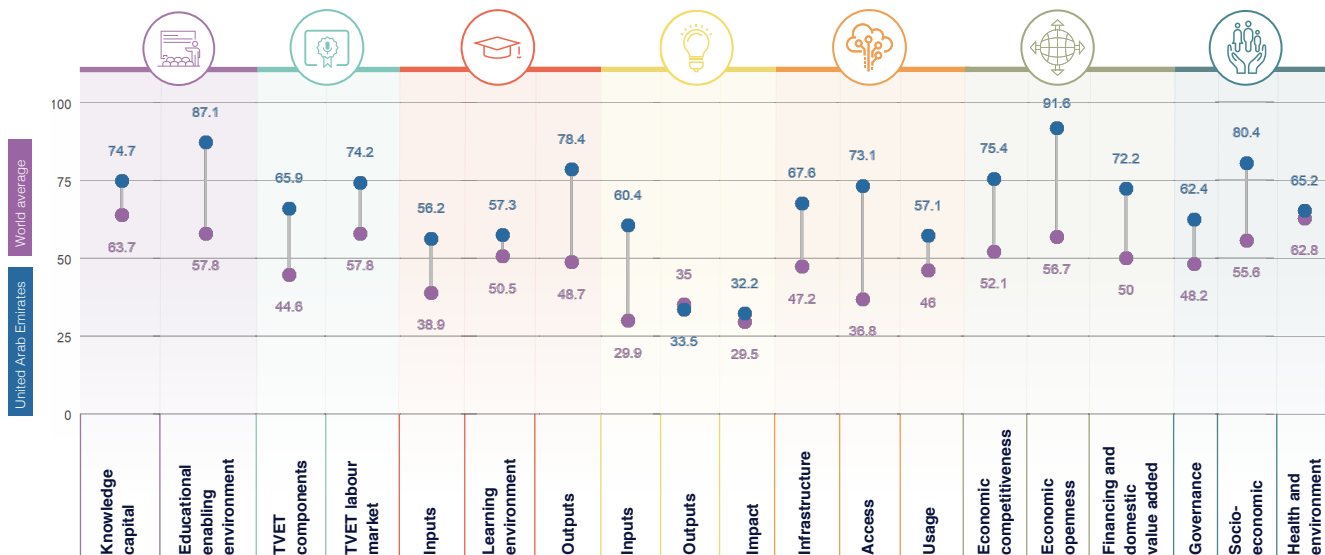
- Trademark applications (per 100 billion GDP)
- Share of students enrolled in secondary vocational programmes
- Renewable energy consumption (%)
- Industrial design applications (per 100 billion GDP)
- Academic freedom

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	6	80.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	8	70.1
HIGHER EDUCATION	16	64
RESEARCH, DEVELOPMENT AND INNOVATION	28	42
INFORMATION AND COMMUNICATIONS TECHNOLOGY	14	65.9
ECONOMY	2	79.8
ENABLING ENVIRONMENT	27	69.3



## GKI PILLARS







# UNITED ARAB EMIRATES

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	88	76.7
Enrollment	31	80.1
Net enrolment rate in primary education	82	84.1
Net enrolment rate in lower secondary education	87	82
Net enrolment rate in upper secondary education	30	84.2
Completion	54	73.5
Years of compulsory education in primary and secondary	5	82.5
Completion rate in upper secondary education	116	116
Success rate rate in the last grade of lower secondary education	88	84.7
Completion	37	52.5
Assessment of 15-year-old students in math, science and reading	45	40.6
Learning-adjusted years of schooling	44	70.1
<b>Educational enabling environment</b>		
Expenditure	116	116
Government expenditure on primary education (% GDP)	116	116
Government expenditure on secondary education (% GDP)	116	116
Government funding per primary student (% GDP per capita)	116	116
Government funding per secondary student (% GDP per capita)	116	116
Resources	33	80.5
Pupil-based teacher ratio in primary education	43	85.5
Pupil-based teacher ratio in secondary education	47	75.1
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	1	81.7
Class attendance rate in early childhood education	116	116
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	44	84.7
Quality and infrastructure	116	116
Completion rate in upper secondary education, gender parity	116	116
Completion rate in upper secondary education, wealth parity	116	116
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	9	81.5
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	22	81.5
Participation rate in formal and non-formal education and training	116	116
TVET resources	10	51.5
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	129	2.5
Share of students enrolled in postsecondary vocational programmes	1	100
TVET quality and infrastructure	5	54.0
Extent of staff training	17	80
Quality of vocational training	34	83.5
Ratio of high-skill TVET occupations earnings to average wage	116	116
Ratio of medium-skill TVET occupations earnings to average wage	116	116
<b>TVET labour market</b>		
Efficiency of the labour market	81	71.0
Firms considered well-integrated with workforce (%)	116	116
Employment educational mismatch (%)	80	85.1
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	11	81.2
Real TVET unemployment	75	65.7
Share of TVET occupations	55	62.0
Manufacturing employment (%)	86	20.6
Quality and infrastructure	5	81.7
Enrollment in vocational education, gender parity	11	80.0
Useable employment rate	4	88.7

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	116	116
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	116	116
Enrollment	11	81.0
Enrollment in bachelor's or equivalent level (%)	21	41.5
Enrollment in masters, doctoral or equivalent (%)	22	81.0
Resources	11	80.0
Pupil-teacher ratio in tertiary education	86	75.4
Researchers in higher education (%)	52	48.5
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	72	80.0
Labour mobility rate	1	100
Academic freedom	107	12.7
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	116	116
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>		
Skilled labour	7	80.0
Educational attainment rate, bachelor's or equivalent	4	80
Educational attainment rate, master's or equivalent	6	75.1
Educational attainment rate, doctoral or equivalent	25	37.0
Skilled labour	9	81.1
Labour force participation rate with advanced education	5	81.5
Unemployment rate with advanced education	21	80.0
Impact	9	74.0
University tertiary enrollment in FTE	21	88.0
OECD students per FTE personnel in higher education	7	83.1
<b>Entrepreneurship, innovation and business start-ups</b>		
Business	5	100.0
Access to FDI investments	11	81.0
GDP (% GDP)	27	25.7
GERD per researcher	5	82.5
Researchers per thousand labour force	42	21.0
Tertiary graduates from STEM programmes (%)	11	84.0
Quality of business environment	9	100.0
GERD performed by business enterprises (%)	27	21.5
GERD financed by business enterprises (%)	5	81.9
Researchers in business enterprises (%)	2	84.0
Firms that spend on R&D (%)	116	116
Quality of business environment	11	100.0
High-skilled employment (%)	4	78.0
Intellectual property payments (% total trade)	116	116
State of cluster development	8	89.5
<b>Startups</b>		
Access to FDI investments	11	81.0
Average documents per researcher	88	45.4
Citations per document	87	26.0
Patent applications (per 100 billion GDP)	106	31
Quality of business environment	11	100.0
Intellectual property receipts (% total trade)	116	116
Research and development expenditure (per 100 billion GDP)	108	1.6
PCT applications (per 100 billion GDP)	61	55.4
Firms producing new goods and services (%)	116	116





# UNITED ARAB EMIRATES

	Rank	Value
<b>Consumer Electronics</b>		
Smartphone applications per 100 million GDP	108	4.8
Cultural goods exports (% exports)	5	21.6
Printing and publishing output (% manufactured output)	32	35.1
<b>Media</b>		
<b>Books</b>		
Books or e-books per capita	57	16.6
Depth of innovative companies	5	33.0
ISO 9001 quality certificates (% GDP)	25	23.2
ISO 14001 environmental certificates (% GDP)	30	30
<b>Software</b>		
GERD received from abroad (%)	106	116
Start-ups raised per strategic venture deals (% GDP)	15	59.6
Computer software spending (% GDP)	30	26.0
<b>Government Services</b>		
New business density per thousand population	35	10
Firms with one or more employees (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>14</b>	<b>62.9</b>
<b>Infrastructure</b>		
<b>Coverage</b>		
3G/4G mobile network coverage (% population)	95	60.0
Secure Internet servers per 1 million population	51	14.5
Investment in telecommunication services (% GDP)	112	21.2
<b>Speed</b>		
Mobile speed and download speeds	1	100
Fixed broadband upload and download speeds	63	25.2
Fixed broadband subscriptions (y speed) per hundred people	25	20
<b>Availability</b>		
Fixed broadband latency (% QM per capita)	3	60.9
Mobile broadband basket (% QM per capita)	47	71.0
Internet and telephony competition	1	100
<b>Access</b>		
<b>Subscriptions</b>		
Active mobile-broadband subscriptions per fixed-line inhabitants	1	100
International Internet bandwidth per user	8	65.6
Households with Internet access at home (%)	1	100
<b>Skills and employment</b>		
Individuals with standard ICT skills (%)	1	100
Tertiary graduates from ICT programmes (%)	25	44.4
ICT employment (%)	44	20.0
<b>Usage</b>		
<b>Services</b>		
Government online services	15	80
Fixed broadband Internet traffic per subscription	6	59.0
Mobile broadband Internet traffic per subscription	62	6.3
Internet users (%)	1	100
<b>Commerce</b>		
ICT FDI parent applications (per 100 million GDP)	75	26.7
E-participation	60	54.1
Internet activities by individuals (%)	25	33.6
Trade in digitally deliverable services (% total trade)	87	33.7
<b>ECONOMY</b>	<b>2</b>	<b>79.8</b>
<b>Economic Competitiveness</b>		
<b>Efficiency</b>		
Overhead capital formation (% GDP)	25	61.7
Logistics performance	11	33.0
Transport productive capacity	6	73.0
Building quality control	1	100

	Rank	Value
<b>Business Agility</b>		
Time of starting a business	15	64.6
Recovery time	9	85.2
Entrepreneurial employee activity rate	55	30
Growth of corporate transactions	20	21.4
<b>Corporate openness</b>		
Trust and dissemination	9	61.2
<b>Talent (% GDP)</b>		
Talent (% GDP)	6	80
High-technology trade (% total trade)	9	24.7
Market concentration	61	26.4
Market concentration	34	60.0
Product diversity	9	61.1
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	9	61.4
Data dynamics	1	100
<b>Financing and domestic value added</b>	<b>6</b>	<b>72.2</b>
<b>Financing and loans</b>		
Domestic credit to private sector (% GDP)	43	29.2
MSME financing gap (% GDP)	106	116
Tax and contribution rate (% profit)	11	60
Bank nonperforming loans (%)	36	61.7
Unmet loan demand	9	71.0
Medium- and high-tech activities value added	2	61.1
Industry and services value added (% GDP)	7	60
Labour underutilization rate	36	60.7
Output per worker	25	40.0
<b>ENABLING ENVIRONMENT</b>	<b>27</b>	<b>66.3</b>
<b>Governance</b>		
Political environment	76	41.2
Peace and stability	35	60
View and accountability	102	16.4
Quality of institutions	26	60.0
Rule of law	22	29.0
Control of corruption	27	65.2
Government effectiveness	21	66
<b>Socio-economic</b>	<b>9</b>	<b>66.4</b>
Gender equity	2	60.0
Female-to-male ratio in parliament	1	100
Female-to-male labour force participation	27	61.4
Female-to-male ratio in internal wage	1	100
Gender inequality	60	61.0
Social protection coverage (% population)	42	72.7
Adult literacy rate	28	66.1
Youth not in employment, education or training (%)	33	60.4
<b>Standard of living</b>		
Poverty headcount ratio (% population)	106	116
GDP per capita	2	61.0
<b>Health and environment</b>	<b>63</b>	<b>65.2</b>
<b>Health</b>		
Universal health coverage	40	70
Healthy life expectancy (years)	9	60
Under-five mortality rate	55	67.0
<b>Environmental performance</b>		
Renewable energy consumption (%)	100	2
Household footprint per capita	119	64.4
Natural hazard exposure	70	50

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 8/154

**GKI SCORE** 69

**WORLD AVERAGE** 48.4

# UNITED KINGDOM

## KEY INDICATORS

GDP US\$ billions **2,797.98**  
 Population **67,886,004**  
 HDI **0.932**

## COUNTRY PERFORMANCE SUMMARY

United Kingdom is a leading performer in terms of its knowledge infrastructure. It ranks 8th out of 154 countries in the Global Knowledge Index 2021 and 8th out of the 61 countries with very high human development.

### AREAS OF STRENGTH

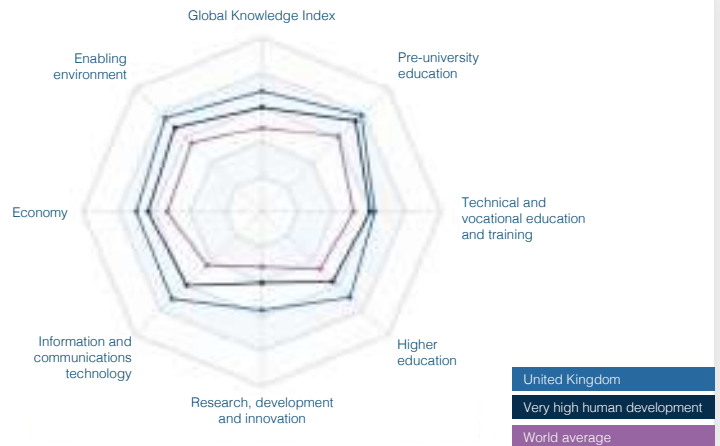
- + Trade in digitally deliverable services (% total trade)
- + Educational attainment rate, bachelor's or equivalent
- + Universal health coverage
- + Completion rate in upper secondary education, wealth parity
- + Cultural goods exports (% exports)

### AREAS OF IMPROVEMENT

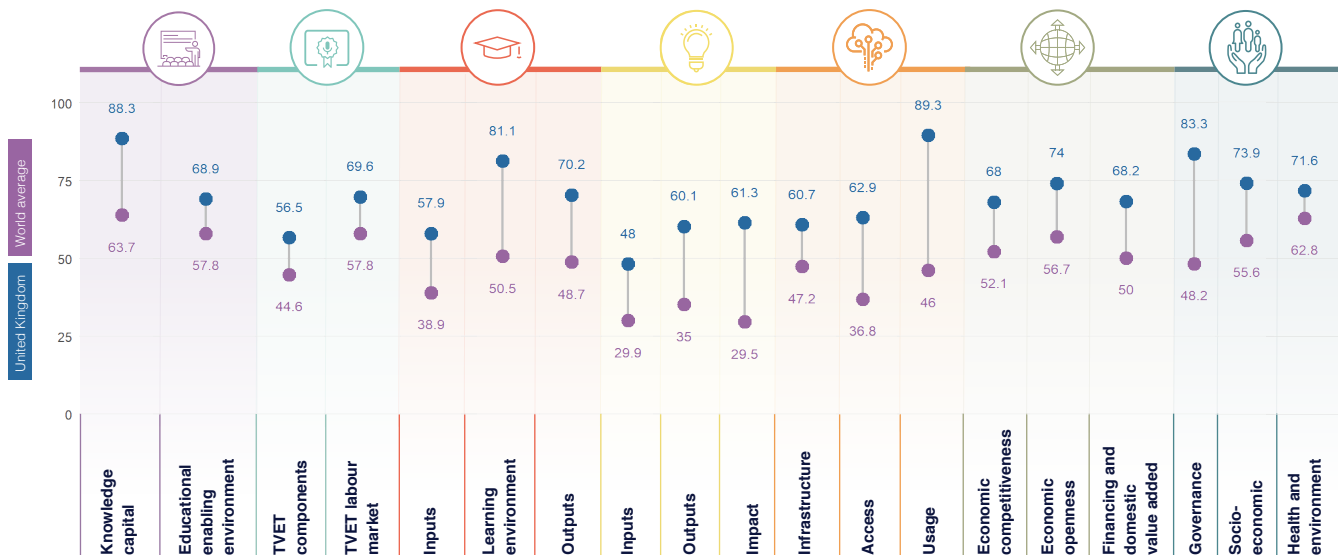
- Trade (% GDP)
- Building quality control
- Gross fixed capital formation (% GDP)
- Investment in telecommunication services (% GDP)
- Ratio of high-skill TVET occupations earnings to average wage

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	22	78.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	29	63.0
HIGHER EDUCATION	2	69.7
RESEARCH, DEVELOPMENT AND INNOVATION	4	56.5
INFORMATION AND COMMUNICATIONS TECHNOLOGY	6	71.0
ECONOMY	11	70.1
ENABLING ENVIRONMENT	17	76.3



## GKI PILLARS





# UNITED KINGDOM

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	2	76.6
Enrolment	31	97.5
Net enrolment rate in primary education	49	96.5
Net enrolment rate in lower secondary education	30	99.6
Net enrolment rate in upper secondary education	20	96.2
Completion	4	93.7
Years of compulsory education in primary and secondary	28	88.6
Completion rate in upper secondary education	6	90
Success rate rate in the last grade of lower secondary education	29	82.5
Completion	12	73.0
Assessment of 15-year-old students in math, science and reading	11	62.1
Learning-adjusted years of schooling	30	80
<b>Educational enabling environment</b>		
Enrolment	31	41.5
Government expenditure on primary education (% GDP)	46	26.7
Government expenditure on secondary education (% GDP)	33	37.7
Government funding per primary student (% GDP per capita)	39	55.1
Government funding per secondary student (% GDP per capita)	44	35.6
Resources	106	106
Pupil-based teacher ratio in primary education	106	106
Pupil-based teacher ratio in secondary education	106	106
Schools with access to computers in primary education (%)	106	106
Schools with access to computers in secondary education (%)	106	106
Early learning	106	106
Class attendance rate in early childhood education	106	106
Proportion of children who are developmentally on track	106	106
Proportion of children with stimulating home learning environments	106	106
Pupil-based teacher ratio in preprimary education	106	106
Quality and infrastructure	4	30
Completion rate in upper secondary education, gender parity	40	65.4
Completion rate in upper secondary education, wealth parity	4	54.5
Completion rate in upper secondary education, location parity	17	66.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	11	79.0
Firms offering formal training (%)	106	106
Labour force with short-cycle tertiary education (%)	30	65.0
Participation rate in formal and non-formal education and training	14	30.5
TVET enrolment	71	41.0
Government expenditure on vocational education (%)	23	45.4
Share of students enrolled in secondary vocational programmes	23	47.7
Share of students enrolled in postsecondary vocational programmes	106	106
TVET quality and infrastructure	30	44.0
Extent of staff training	28	62.7
Quality of vocational training	19	64.7
Ratio of high-skill TVET occupations earnings to average wage	106	11.6
Ratio of medium-skill TVET occupations earnings to average wage	79	36.0
<b>TVET labour market</b>		
Efficiency of the labour market	17	61.5
Firms considered with inequality educated workforce (%)	106	106
Employment educational mismatch (%)	25	70
Proportion of skilled production workers	106	106
Unemployment rate with vocational education	14	60.0
Real TVET unemployment	31	53.0
Share of TVET occupations	79	54.0
Manufacturing employment (%)	86	33.3
Quality and infrastructure	12	46
Enrolment in vocational education, gender parity	45	80
Useable employment rate	41	80

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Enrolment	16	67.8
Expenditure	11	63.7
Government expenditure per tertiary student	13	63.7
Teaching staff compensation (% tertiary expenditure)	106	106
Enrolment	25	39.0
Enrolment in bachelor's or equivalent level (%)	43	31.7
Enrolment in masters, doctoral or equivalent (%)	36	46
Resources	46	10.1
Right teacher ratio in tertiary education	36	64.3
Researcher in higher education (%)	42	36
<b>Learning environment</b>		
Timely and academic freedom	11	61.1
Teachers in tertiary education, gender parity	28	66
Labour mobility rate	7	65.6
Academic freedom	34	61.5
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	106	106
Class attendance rate in tertiary education, wealth parity	106	106
Class attendance rate in tertiary education, location parity	106	106
<b>Outputs</b>		
Research	11	67
Educational attainment rate, bachelor's or equivalent	3	67.8
Educational attainment rate, master's or equivalent	18	51.4
Educational attainment rate, doctoral or equivalent	15	61.7
Employment	9	60.2
Labour force participation rate with advanced education	14	86
Unemployment rate with advanced education	13	64.7
Impact	31	63.1
University tertiary enrollment in R&D	11	86
OECD indicators per 100 personnel in higher education	49	37.0
<b>Government's contribution to economic growth</b>		
Impact	14	66
Share of GDP expenditure	11	60.0
GDP (% GDP)	21	34.3
OECD per researcher	42	30
Researchers per thousand labour force	20	67.5
Tertiary graduate from STEM programmes (%)	39	48.6
<b>Government's contribution to innovation</b>		
OECD performed by business enterprises (%)	18	32.4
OECD financed by business enterprises (%)	18	66.0
Researchers in business enterprises (%)	31	48.4
Firms that spend on R&D (%)	106	106
Quality of research innovation	16	60.0
High-skill employment (%)	106	106
Intellectual property payments (% total trade)	19	45.1
State of cluster development	14	65.0
<b>Science</b>		
Government R&D expenditure	11	60.0
Average documents per researcher	42	61.7
Citations per document	34	23.6
Patent applications (per 100 billion GDP)	18	72
<b>Government's contribution to innovation</b>		
Intellectual property receipts (% total trade)	11	64.3
Research design applications (per 100 billion GDP)	13	88.6
PCT applications (per 100 billion GDP)	19	62.5
Firms producing new goods and services (%)	106	106





# UNITED KINGDOM

	Rank	Value
<b>Consumer Innovation</b>	7	80.0
Treatment applications per 100 billion GDP	24	55.0
Cultural goods exports (% exports)	4	23.0
Printing and publishing output (% manufactured output)	35	50.1
<b>Health</b>	1	100.0
<b>Trade</b>	2	99.0
Rank of institutions' performance	1	100
Depth of innovative companies	10	65.4
ISO 9001 quality certificates (% GDP)	29	37.5
ISO 14001 environmental certificates (% GDP)	25	35.7
<b>Energy</b>	7	89.3
CERO forecast from abroad (%)	39	27.5
Coal reserves per storage volume deals (% GDP)	12	65.1
Computer software spending (% GDP)	13	46.7
<b>Government</b>	7	89.0
New business density per thousand population	6	77.0
Firms with new products/services (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>6</b>	<b>77.1</b>
<b>Infrastructure</b>	<b>41</b>	<b>66.7</b>
<b>Coverage</b>	<b>46</b>	<b>50.0</b>
30MHz mobile network coverage (% population)	17	60.0
Secure Internet servers per 1 million population	21	35.1
Investment in telecommunication services (% GDP)	128	11.3
<b>Speed</b>	<b>31</b>	<b>63.3</b>
Mobile upload and download speeds	46	26.0
Fixed broadband upload and download speeds	41	20
Fixed broadband subscriptions (y speed) per hundred people	12	61.4
<b>Availability</b>	<b>17</b>	<b>95</b>
Fixed broadband bandwidth (% Gbps per capita)	61	75.4
Mobile broadband basket (% Gbps per capita)	32	70.0
Internet and telephone competition	1	100
<b>Access</b>	<b>74</b>	<b>62.8</b>
<b>Subscribers</b>	<b>11</b>	<b>68.1</b>
Active mobile-broadband subscriptions per fixed-line inhabitants	30	47.0
International Internet bandwidth per user	12	61.8
Households with Internet access at home (%)	12	64.4
<b>Skills and employment</b>	<b>15</b>	<b>67.7</b>
Individuals with standard ICT skills (%)	8	75.0
Tertiary graduates from ICT programmes (%)	70	25.0
ICT employment (%)	8	60.0
<b>Usage</b>	<b>2</b>	<b>66.3</b>
<b>Services</b>	<b>7</b>	<b>61.2</b>
Government online services	6	65.0
Fixed broadband Internet traffic per subscriber	104	104
Mobile broadband Internet traffic per subscriber	106	106
Internet users (%)	12	64.0
<b>Commerce</b>	<b>5</b>	<b>61.0</b>
ICT/FIT patent applications (per 100,000 GDP)	19	66.7
E-participation	6	67.0
Internet activities by individuals (%)	14	64.6
Trade in digitally deliverable services (% total trade)	5	63.2
<b>ECONOMY</b>	<b>11</b>	<b>61.1</b>
<b>Economic Competitiveness</b>	<b>17</b>	<b>61</b>
<b>Manufacture Investment</b>	<b>19</b>	<b>61.1</b>
Overhead capital formation (% GDP)	119	36.0
Logistics performance	9	34.7
Transport productive capacity	22	43.7
Building quality control	115	60

	Rank	Value
<b>Business agility</b>	7	63.0
Time of starting a business	35	54.0
Recovery time	15	62.7
Entrepreneurial employee activity rate	15	60.0
Growth of corporate transactions	18	65.7
<b>Corporate openness</b>	<b>16</b>	<b>74</b>
<b>Trust and development</b>	<b>20</b>	<b>67.0</b>
Trade (% GDP)	107	21
High-technology trade (% total trade)	20	64.0
Market concentration	19	60.0
Market concentration	46	65.1
<b>Product openness</b>	<b>11</b>	<b>61.2</b>
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	82	40.0
Cost dynamics	1	100
<b>Financing and domestic value added</b>	<b>12</b>	<b>65.2</b>
<b>Financing and costs</b>	<b>11</b>	<b>76.3</b>
Domestic credit to private sector (% GDP)	11	60.1
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	43	77
Bank nonperforming loans (%)	13	65.0
<b>Unmet needs index</b>	<b>11</b>	<b>61.2</b>
Medium- and high-tech activities value added	17	58.5
Industry and services value added (% GDP)	27	60.0
Labour underutilization rate	50	76.7
Output per worker	25	37.0
<b>ENABLING ENVIRONMENT</b>	<b>17</b>	<b>76.3</b>
<b>Governance</b>	<b>19</b>	<b>63.3</b>
<b>Political environment</b>	<b>21</b>	<b>75.0</b>
Peace and stability	45	61.0
View and accountability	17	68.8
Quality of institutions	16	61.2
Rule of law	17	60.0
Control of corruption	12	64.2
Government effectiveness	16	68.8
<b>Socio-economic</b>	<b>23</b>	<b>73.9</b>
<b>Gender equity</b>	<b>29</b>	<b>58.0</b>
Female-to-male ratio in parliament	41	61.0
Female-to-male labour force participation	41	66
Female-to-male ratio in internal wage	37	65.1
<b>Government</b>	<b>29</b>	<b>67.7</b>
Social protection coverage (% population)	25	63.0
Adult literacy rate	106	106
Youth not in employment, education or training (%)	37	62.1
<b>Standard of living</b>	<b>21</b>	<b>63.0</b>
Poverty headcount ratio (% population)	31	74.5
GDP per capita	28	27.0
<b>Health and environment</b>	<b>16</b>	<b>71.6</b>
<b>Health</b>	<b>11</b>	<b>60.0</b>
Universal health coverage	1	67
Healthy life expectancy (years)	29	66.7
Under-five mortality rate	50	96
<b>Environmental performance</b>	<b>81</b>	<b>63.2</b>
Renewable energy consumption (%)	130	11.5
Household footprint per capita	106	70.0
Natural hazard exposure	22	70

\*All values are normalized to a scale from 0 (worst) to 100 (best).





# UNITED STATES

**GKI RANK** 3/154

**GKI SCORE** 70

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

United States is a leading performer in terms of its knowledge infrastructure. It ranks 3rd out of 154 countries in the Global Knowledge Index 2021 and 3rd out of the 61 countries with very high human development.

### AREAS OF STRENGTH

- + High-skilled employment (%)
- + Computer software spending (% GDP)
- + Secure Internet servers per 1 million population
- + Transport productive capacity
- + Domestic credit to private sector (% GDP)

### AREAS OF IMPROVEMENT

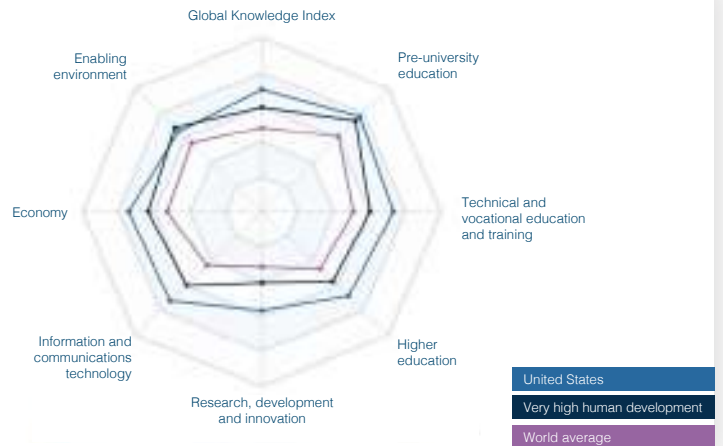
- ISO 14001 environmental certificates (% GDP)
- Ratio of high-skill TVET occupations earnings to average wage
- Natural hazard exposure
- Ecological footprint per capita
- Trade (% GDP)

### KEY INDICATORS

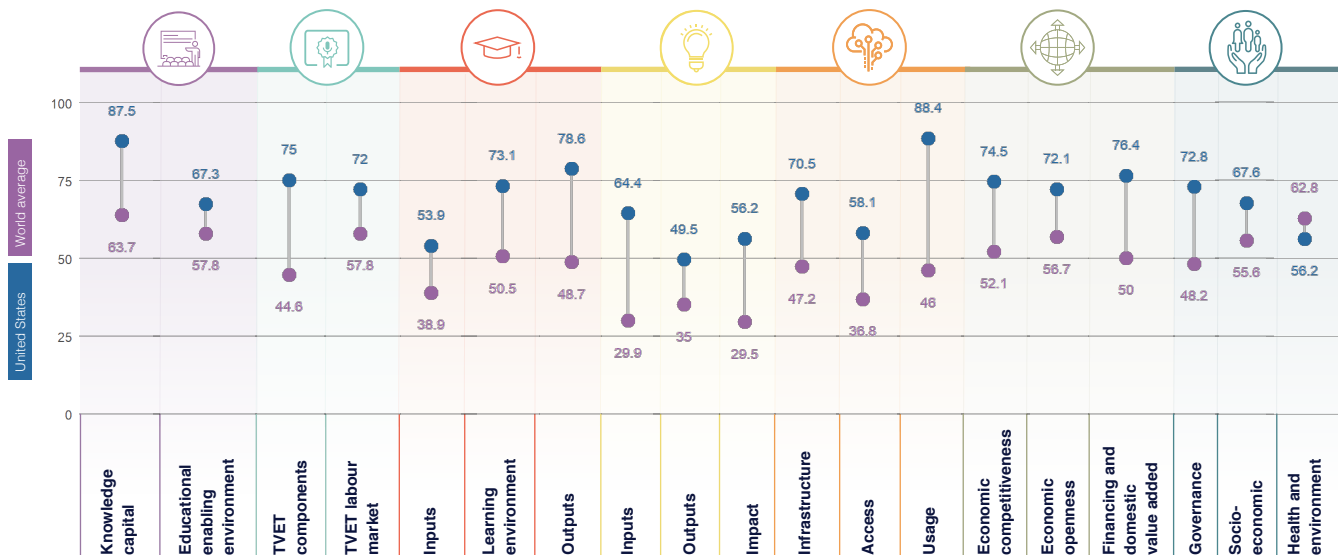
GDP US\$ billions	19,822.723
Population	331,002,647
HDI	0.926

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	30	77.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	1	73.5
HIGHER EDUCATION	5	68.5
RESEARCH, DEVELOPMENT AND INNOVATION	2	56.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	3	72.4
ECONOMY	6	74.3
ENABLING ENVIRONMENT	39	65.5



## GKI PILLARS





# UNITED STATES

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	39	77.4
Enrollment	6	87.5
Net enrolment rate in primary education	65	87.2
Net enrolment rate in lower secondary education	59	89.4
Net enrolment rate in upper secondary education	23	85.8
Completion	2	97.5
Years of compulsory education in primary and secondary	9	82.5
Completion rate in upper secondary education	9	85.7
Success rate rate in the last grade of lower secondary education	19	88.9
Completion	27	72.3
Assessment of 15-year-old students in math, science and reading	29	63.8
Learning-adjusted years of schooling	32	75.7
<b>Educational enabling environment</b>	88	87.3
Enrollment	39	41.9
Government expenditure on primary education (% GDP)	32	44
Government expenditure on secondary education (% GDP)	25	35.8
Government funding per primary student (% GDP per capita)	28	88.8
Government funding per secondary student (% GDP per capita)	40	35.8
Resources	116	116
Pupil-based teacher ratio in primary education	116	116
Pupil-based teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	116	116
Schools with access to computers in secondary education (%)	116	116
Early learning	116	116
Class attendance rate in early childhood education	116	116
Proportion of children who are developmentally on track	116	116
Proportion of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	11	81.1
Completion rate in upper secondary education, gender parity	13	90
Completion rate in upper secondary education, wealth parity	30	85.1
Completion rate in upper secondary education, location parity	116	116
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	3	79
Commence training and learning	15	80.2
Firms offering formal training (%)	116	116
Labour force with short-cycle tertiary education (%)	52	72.1
Participation rate in formal and non-formal education and training	8	80.4
TVET resources	1	109
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolling in postsecondary vocational programmes	1	109
TVET quality and infrastructure	39	48.9
Extent of staff training	6	72.3
Quality of vocational training	8	70.7
Ratio of high-skill TVET occupations earnings to average wage	86	15.3
Ratio of median-skill TVET occupations earnings to average wage	85	35.8
<b>TVET labour market</b>	84	79
Efficiency of the labour market	41	72.3
Firms considered well-integrated with workforce (%)	116	116
Employment educational mismatch (%)	50	30.1
Proportion of skilled production workers	116	116
Unemployment rate with vocational education	70	74.5
High TVET unemployment	80	31.5
Share of TVET occupations	81	81.1
Manufacturing employment (%)	84	24
Quality and infrastructure	9	55
Enrollment in vocational education, gender parity	116	116
Useable employment rate	8	80

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	13	83.8
Expenditure	36	11.9
Government expenditure per tertiary student	21	47.1
Teaching staff compensation (% tertiary expenditure)	62	28.8
Enrollment	17	38.8
Enrollment in bachelor's or equivalent level (%)	42	30.4
Enrollment in masters, doctoral or equivalent (%)	10	48.8
Resources	17	84.8
Rapit teacher ratio in tertiary education	34	84.5
Researcher in higher education (%)	116	116
<b>Learning environment</b>	13	71.1
Timely and academic freedom	17	84.2
Teachers in tertiary education, gender parity	3	86.1
Labour mobility rate	59	18.3
Academic freedom	26	80.1
Quality and infrastructure	9	77
Class attendance rate in tertiary education, gender parity	48	77
Class attendance rate in tertiary education, wealth parity	116	116
Class attendance rate in tertiary education, location parity	116	116
<b>Outputs</b>	2	76.8
Attainment	3	84
Educational attainment rate, bachelor's or equivalent	2	86.4
Educational attainment rate, master's or equivalent	17	53.8
Educational attainment rate, doctoral or equivalent	1	109
Employment	10	75.2
Labour force participation rate with advanced education	52	87.7
Unemployment rate with advanced education	88	84.8
Impact	3	75.7
University tertiary enrollment in R&D	4	75.7
CRIDE indicators per 100 personnel in higher education	116	116
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	3	104.1
Access to credit resources	10	11.1
GDP (% GDP)	9	57.2
GERD per researcher	7	73.7
Researchers per thousand labour force	20	54.8
Tertiary graduates from STEM programmes (%)	80	34.8
Quality and infrastructure	1	109
GERD performed by business enterprises (%)	7	86.8
GERD financed by business enterprises (%)	11	37.2
Researchers in business enterprises (%)	9	85.8
Firms that spend on R&D (%)	116	116
Quality and infrastructure	9	107
High-skilled employment (%)	1	109
Intellectual property payments (% total trade)	19	43.8
State of cluster development	5	74.8
<b>Outputs</b>	12	85.2
Access to credit resources	10	11.1
Average documents per researcher	55	53.8
Citations per document	88	28.2
Patent applications (per 100 billion GDP)	6	80.4
Quality and infrastructure	11	109
Intellectual property receipts (% total trade)	3	82.7
Research design applications (per 100 billion GDP)	81	18
PCT applications (per 100 billion GDP)	14	85.8
Firms producing new goods and services (%)	116	116



# UNITED STATES

	Rank	Value
<b>Consumer &amp; business credit</b>	10	89.0
Treatment applications per 100 million GDP	77	13.0
Cultural goods exports (% exports)	17	48.2
Printing and publishing output (% manufactured output)	33	35.1
<b>Energy</b>	4	76.3
<b>Finance</b>	25	67.5
Access to venture's provisions	1	100
Depth of innovative companies	2	75.5
ISO 9001 quality certificates (% GDP)	111	4
ISO 14001 environmental certificates (% GDP)	103	1.8
<b>Infrastructure</b>	5	86.5
CERD forecast from abroad (%)	57	13.0
Cost savings per strategic alliance deals (% GDP)	5	86.6
Computer software spending (% GDP)	1	100
<b>Government efficiency</b>	100	0.0
New business density per thousand population	106	106
Firms with new products/services (%)	106	106
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>3</b>	<b>72.8</b>
<b>Infrastructure</b>	12	70.5
<b>Coverage</b>	5	87.1
3G/4G mobile network coverage (% population)	17	80.0
Secure Internet servers per 1 million population	3	71.4
Investment in telecommunication services (% GDP)	63	21.6
<b>Quality</b>	20	65
Mobile upload and download speeds	27	37.5
Fixed broadband upload and download speeds	16	45.1
Fixed broadband subscriptions (by speed) per hundred people	18	36.5
<b>Availability</b>	11	71
Fixed broadband latency (% QM per capita)	29	68.8
Mobile broadband basket (% QM per capita)	10	64.0
Internet and telephone competition	1	100
<b>Access</b>	25	58.5
<b>Subscriptions</b>	17	60.0
Active mobile-broadband subscriptions per hundred inhabitants	6	67.4
International Internet bandwidth per user	45	45.4
Households with Internet access at home (%)	39	60.7
<b>Skills and employment</b>	25	65.4
Individuals with standard ICT skills (%)	104	106
Tertiary graduates from ICT programmes (%)	87	31.7
ICT employment (%)	60	67.1
<b>Usage</b>	3	68.4
<b>Services</b>	5	67.6
Government online services	7	54.7
Fixed broadband Internet traffic per subscription	104	106
Mobile broadband Internet traffic per subscription	106	106
Internet users (%)	28	60.0
<b>Commerce</b>	5	65
eTPU/T purchase applications (per 100 million GDP)	9	36.6
E-participation	1	100
Internet activities by individuals (%)	104	106
Trade in digitally deliverable services (% total trade)	6	75.2
<b>ECONOMY</b>	<b>6</b>	<b>74.3</b>
<b>Economic competitiveness</b>	5	74.3
<b>Infrastructure Investment</b>	4	74.0
Overhead capital formation (% GDP)	93	44.5
Logistics performance	13	72.1
Transport productive capacity	1	100
Building quality control	46	62.7

	Rank	Value
<b>Business agility</b>	20	74.1
Cost of starting a business	99	61.6
Recovery recovery rate	16	67.0
Entrepreneurial employee activity rate	21	45.0
Growth of corporate transactions	50	21.4
<b>Business openness</b>	27	62.3
<b>Trade and investment</b>	47	61.0
Trade (% GDP)	144	7.8
High-technology trade (% total trade)	17	68.0
Market concentration	12	61.7
Market concentration	21	54.0
<b>Product innovation</b>	10	70.0
Charitable financial openness	1	100
Foreign direct investment, net inflows (% GDP)	100	30
Cost dynamics	26	60.5
<b>Financing and domestic value added</b>	3	75.4
<b>Financing and costs</b>	2	83.0
Domestic credit to private sector (% GDP)	2	83.5
MSME financing gap (% GDP)	106	106
Tax and contribution rate (% profit)	75	70.0
Bank nonperforming loans (%)	11	60.5
<b>Unmet needs index</b>	9	67.1
Medium- and high-tech activities value added	14	55.2
Industry and services value added (% GDP)	12	77.1
Labour underutilization rate	6	61.6
Output per worker	9	62.0
<b>ENABLING ENVIRONMENT</b>	<b>14</b>	<b>66.5</b>
<b>Governance</b>	14	72.8
<b>Political environment</b>	31	50.0
Peace and stability	75	46.2
View and accountability	28	72.0
Quality of institutions	21	60.1
Rule of law	20	66.0
Control of corruption	26	62.7
Government effectiveness	22	67
<b>Socio-economic</b>	37	67.6
<b>Gender equity</b>	45	73.1
Female-to-male ratio in parliament	65	30
Female-to-male labour force participation	87	61.1
Female-to-male ratio in internal wage	1	100
<b>Gender equality</b>	55	73.0
Social protection coverage (% population)	41	75.4
Adult literacy rate	106	106
Youth not in employment, education or training (%)	50	75.0
<b>Standard of living</b>	31	60.0
Poverty headcount ratio (% population)	106	106
GDP per capita	9	69.0
<b>Health and environment</b>	128	50.2
<b>Health</b>	36	60.0
Universal health coverage	6	84
Healthy life expectancy (years)	66	71.0
Under-five mortality rate	42	65.1
<b>Environmental performance</b>	100	0.0
Renewable energy consumption (%)	119	60.5
Household footprint per capita	140	86
Natural hazard exposure	104	34

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 56/154

**GKI SCORE** 51.7

**WORLD AVERAGE** 48.4

# URUGUAY

## KEY INDICATORS

**GDP US\$ billions** 69.565  
**Population** 3,473,727  
**HDI** 0.817

## COUNTRY PERFORMANCE SUMMARY

Uruguay is a strong performer in terms of its knowledge infrastructure. It ranks 56th out of 154 countries in the Global Knowledge Index 2021 and 52nd out of the 61 countries with very high human development.

### AREAS OF STRENGTH

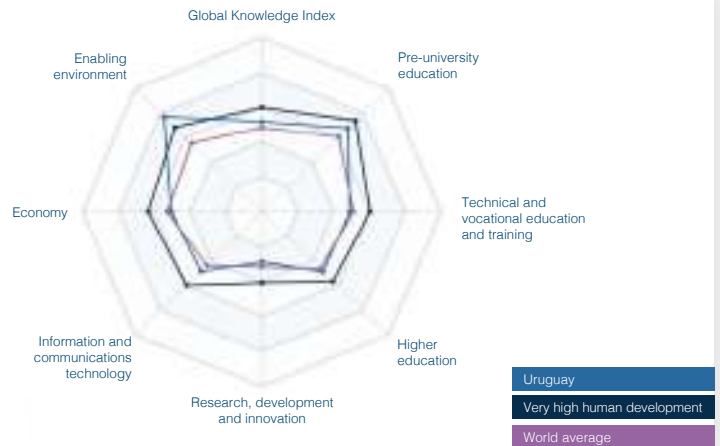
- + Academic freedom
- + Firms producing new goods and services (%)
- + Gross attendance ratio for tertiary education, location parity
- + Proportion of children with stimulating home learning environment
- + Peace and stability

### AREAS OF IMPROVEMENT

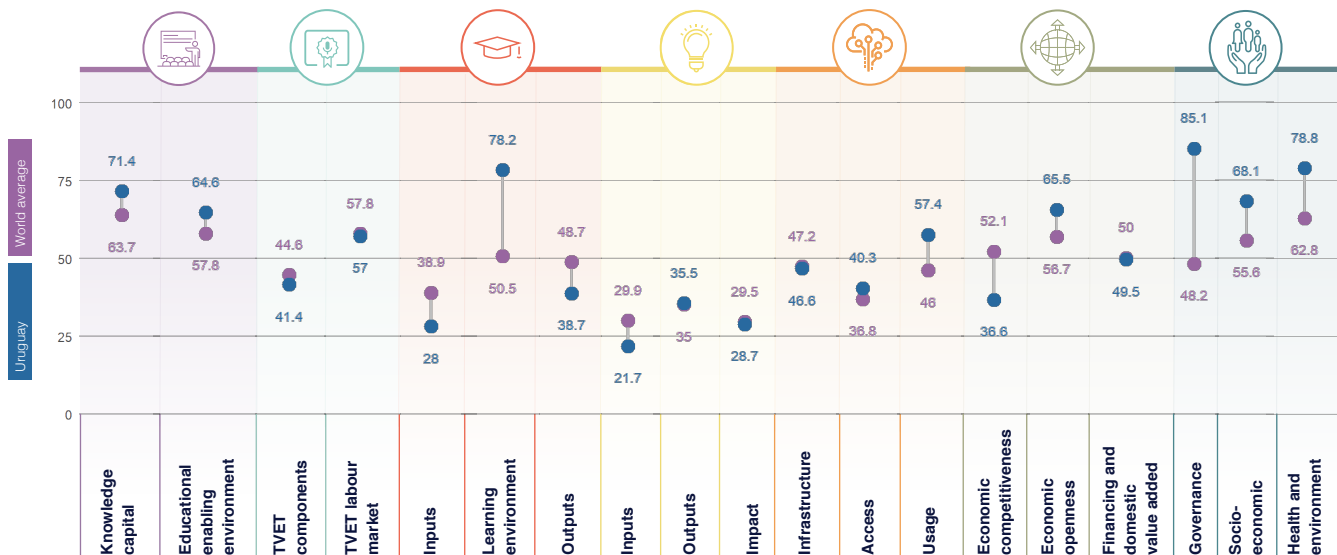
- Labour force participation rate with advanced education
- Teaching staff compensation (% tertiary expenditure)
- Researchers in business enterprises (%)
- Entrepreneurial employee activity rate
- Extent of corporate transparency

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	69	68
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	84	49.2
HIGHER EDUCATION	63	48.3
RESEARCH, DEVELOPMENT AND INNOVATION	85	28.6
INFORMATION AND COMMUNICATIONS TECHNOLOGY	67	48.1
ECONOMY	81	50.6
ENABLING ENVIRONMENT	15	77.3



## GKI PILLARS







# URUGUAY

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	72	71.4
Enrollment	41	81
Net enrolment rate in primary education	20	88.2
Net enrolment rate in lower secondary education	28	88.8
Net enrolment rate in upper secondary education	50	87.7
Completion	52	71.1
Years of compulsory education in primary and secondary	9	82.9
Completion rate in upper secondary education	50	42.0
Success rate rate in the last grade of lower secondary education	47	76.9
Completion	72	44.2
Assessment of 15-year-old students in math, science and reading	50	36.0
Learning-adjusted years of schooling	68	59.0
<b>Educational enabling environment</b>		
Expenditure	60	25.7
Government expenditure on primary education (% GDP)	84	24.2
Government expenditure on secondary education (% GDP)	84	25.4
Government funding per primary student (% GDP per capita)	78	22.8
Government funding per secondary student (% GDP per capita)	80	21.3
Resources	21	68.6
Pupil-based teacher ratio in primary education	7	90.0
Pupil-based teacher ratio in secondary education	106	119
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	22	71.8
Class attendance rate in early childhood education	28	84
Proportion of children who are developmentally on track	73	81.9
Proportion of children with stimulating home learning environments	8	86.3
Pupil-based teacher ratio in preprimary education	106	119
Quality and infrastructure	64	55.0
Completion rate in upper secondary education, gender parity	100	73.3
Completion rate in upper secondary education, wealth parity	87	17.0
Completion rate in upper secondary education, location parity	54	34.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communication and writing	11	71.1
Firms offering formal training (%)	79	66.5
Labour force with short-cycle tertiary education (%)	106	119
Participation rate in formal and non-formal education and training	24	7.7
TVET resources	61	55.4
Government expenditure on vocational education (%)	106	119
Share of students enrolled in secondary vocational programmes	32	29.4
Share of students enrolled in postsecondary vocational programmes	106	119
TVET quality and infrastructure	50	41.7
Extent of staff training	81	47.8
Quality of vocational training	37	59.0
Ratio of high-skill TVET occupations earnings to average wage	39	23.0
Ratio of median-skill TVET occupations earnings to average wage	30	30
<b>TVET labour market</b>		
Efficiency of the labour market	100	71.0
Firms considered with inappropriately educated workforce (%)	100	30.2
Employment educational mismatch (%)	73	56.0
Proportion of skilled production workers	81	88.1
Unemployment rate with vocational education	106	119
Real TVET unemployment	61	44.0
Share of TVET occupations	50	63.2
Manufacturing employment (%)	81	24.0
Quality and infrastructure	60	70.0
Enrollment in vocational education, gender parity	60	87.4
Useable employment rate	78	70.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
Inputs	117	28
Expenditure	100	11.1
Government expenditure per tertiary student	69	12.8
Teaching staff compensation (% tertiary expenditure)	78	31.8
Enrollment	60	11.1
Enrollment in bachelor's or equivalent level (%)	71	20.1
Enrollment in masters, doctoral or equivalent (%)	63	6.2
Resources	100	59.7
Rp/teacher ratio in tertiary education	61	76.1
Research in higher education (%)	67	37.0
<b>Learning environment</b>		
Timely and academic freedom	1	87.2
Teachers in tertiary education, gender parity	106	119
Labour mobility rate	106	119
Academic freedom	1	87.0
Quality and infrastructure	10	50.2
Class attendance rate in tertiary education, gender parity	62	78.0
Class attendance rate in tertiary education, wealth parity	14	81
Class attendance rate in tertiary education, location parity	3	38.0
<b>Outputs</b>		
Attainment	100	36.7
Educational attainment rate, bachelor's or equivalent	60	11.1
Educational attainment rate, master's or equivalent	67	7.6
Educational attainment rate, doctoral or equivalent	74	2.9
Employment	60	66.6
Labour force participation rate with advanced education	117	38.0
Unemployment rate with advanced education	21	82.0
Innovation	80	30.2
University tertiary enrollment in R&D	97	32.0
OECD students per 1000 personnel in higher education	106	119
<b>Government's contribution to innovation</b>		
Inputs	100	27.2
Government R&D expenditure	100	100
GDP (% GDP)	60	0.3
GERD per researcher	62	25.7
Researchers per thousand labour force	61	6.7
Tertiary graduates from STEM programmes (%)	60	21.6
Government's contribution to innovation	100	0
GERD performed by business enterprises (%)	60	2.8
GERD financed by business enterprises (%)	84	0.3
Researchers in business enterprises (%)	61	0.4
Firms that spend on R&D (%)	18	47.1
Quality and infrastructure	100	100
High-skill employment (%)	21	44
Intellectual property payments (% total trade)	49	21.0
State of cluster development	100	45.0
<b>Outputs</b>		
Government's contribution to innovation	100	100
Average documents per researcher	30	85.0
Citations per document	103	13.2
Patent applications (per 100 billion GDP)	88	38.0
Quality and infrastructure	100	100
Intellectual property receipts (% total trade)	40	17.1
Research design applications (per 100 billion GDP)	79	4
PCT applications (per 100 billion GDP)	65	51.5
Firms producing new goods and services (%)	3	80.0

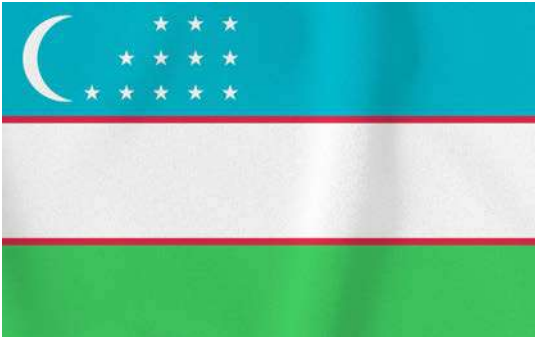


# URUGUAY

	Rank	Value
<b>Consumer Innovation Performance</b>	87	55.5
Treatment applications per 100 million GDP	41	38.5
Cultural goods exports (% exports)	108	3.8
Printing and publishing output (% manufactured output)	90	26.2
<b>Science</b>	75	25.2
<b>Health</b>	66	31.4
Access to institutions' premises	89	5.3
Depth of innovative companies	94	45.4
ISO 9001 quality certificates (% GDP)	13	61.1
ISO 14001 environmental certificates (% GDP)	29	25.0
<b>Energy</b>	97	19.9
CERO forecast from abroad (%)	95	14.1
Cost savings per strategic storage deals (% GDP)	85	5.4
Computer software spending (% GDP)	81	20.1
<b>Government Performance</b>	95	19.9
New business density per thousand population	85	6.1
Firms with new products/services (%)	84	88.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	67	46.2
<b>Infrastructure</b>	78	48.8
<b>Coverage</b>	88	41.2
30MHz mobile network coverage (% population)	82	84.0
Secure Internet servers per 1 million population	82	6.1
Investment in telecommunication services (% GDP)	69	31
<b>Quality</b>	100	32
Mobile upload and download speeds	81	21.0
Fixed-broadband upload and download speeds	94	13.4
Fixed-broadband subscriptions (by speed) per hundred people	41	58
<b>Availability</b>	95	65.4
Fixed broadband latency (% QM per capita)	71	29.2
Mobile broadband basket (% QM per capita)	83	86.4
Internet and telephony competition	108	54.2
<b>Access</b>	67	46.2
<b>Subscriptions</b>	100	100.0
Active mobile-broadband subscriptions per fixed-line inhabitants	42	42.0
International Internet bandwidth per user	85	46.4
Households with Internet access at home (%)	77	69.4
<b>Skills and employment</b>	75	27.5
Individuals with standard ICT skills (%)	104	19
Tertiary graduates from ICT programmes (%)	50	24.5
ICT employment (%)	45	21.2
<b>Usage</b>	29	67.4
<b>Services</b>	100	100.0
Government online services	31	84.1
Fixed broadband Internet traffic per subscription	100	21.2
Mobile broadband Internet traffic per subscription	85	12.6
Internet users (%)	43	60.4
<b>Commerce</b>	100	100.0
ICT/FIT purchase applications (per 100 million GDP)	45	50.5
E-participation	25	85.2
Internet activities by individuals (%)	104	19
Trade in digitally deliverable services (% total trade)	29	56.4
<b>ECONOMY</b>	81	63.8
<b>Economic Competitiveness</b>	133	26.8
<b>Infrastructure Investment</b>	100	100.0
Overhead capital formation (% GDP)	107	25.0
Logistics performance	66	42.1
Transport productive capacity	112	16.0
Building quality control	115	80

	Rank	Value
<b>Business Agility</b>	100	100.0
Cost of starting a business	80	89.6
Recovery recovery rate	50	48.2
Entrepreneurial employee activity rate	94	0.8
Growth of corporate transactions	118	9
<b>Customer experience</b>	47	85.8
<b>Trust and development</b>	100	100
Trade (% GDP)	117	16.0
High-technology trade (% total trade)	88	47
Market concentration	71	29.2
Market concentration	84	89.0
Product diversity	10	100.0
Climate financial openness	1	108
Foreign direct investment, net inflows (% GDP)	55	42.0
Cost dynamics	26	29.2
<b>Financing and domestic value added</b>	73	40.2
<b>Financing and costs</b>	100	100
Domestic credit to private sector (% GDP)	118	6.8
IMRS financing gap (% GDP)	20	29.0
Tax and contribution rate (% profit)	88	89.6
Bank nonperforming loans (%)	24	84
Unmet loan demand	90	111
Medium- and high-tech activities value added	85	21.5
Industry and services value added (% GDP)	81	85.0
Labour underutilization rate	112	40.8
Output per worker	55	19.0
<b>ENABLING ENVIRONMENT</b>	18	77.3
<b>Governance</b>	18	85.1
Political environment	9	83.7
Peace and stability	15	87.7
View and accountability	11	83.7
Quality of institutions	53	78.0
Rule of law	86	24
Control of corruption	21	80.4
Government effectiveness	28	75
<b>Socio-economic</b>	35	66.1
Gender equity	58	66.5
Female-to-male ratio in parliament	75	32
Female-to-male labour force participation	84	21.0
Female-to-male ratio in internal wage	1	100
Gender inequality	17	84.7
Social protection coverage (% population)	22	83.0
Adult literacy rate	100	100.0
Youth not in employment, education or training (%)	86	62.2
<b>Standard of living</b>	43	31
Poverty headcount ratio (% population)	10	84.5
GDP per capita	88	17.8
<b>Health and environment</b>	4	78.8
<b>Health</b>	11	81.0
Universal health coverage	25	60
Healthy life expectancy (years)	46	78
Under-five mortality rate	49	85.0
<b>Environmental performance</b>	17	95
Renewable energy consumption (%)	32	63
Household footprint per capita	104	194
Natural hazard exposure	11	83

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# UZBEKISTAN

KEY INDICATORS	
GDP US\$ billions	239.425
Population	33,469,199
HDI	0.72

**GKI RANK** 100/154

**GKI SCORE** 43.7  
**WORLD AVERAGE** 48.4

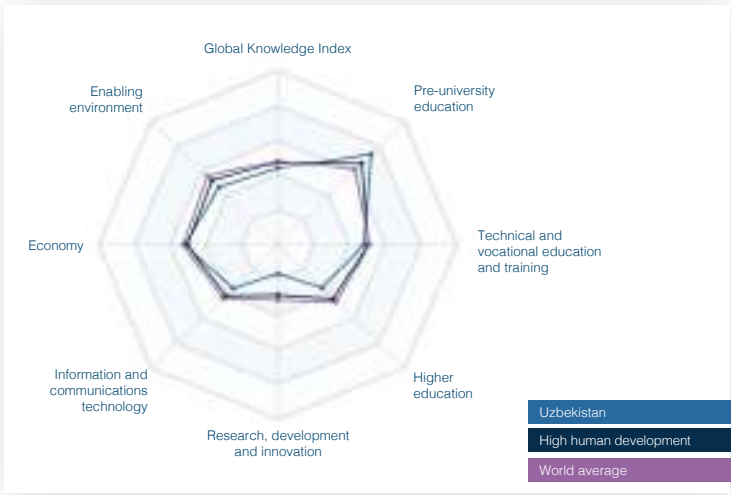
**COUNTRY PERFORMANCE SUMMARY**  
Uzbekistan is a modest performer in terms of its knowledge infrastructure. It ranks 100th out of 154 countries in the Global Knowledge Index 2021 and 34th out of the 39 countries with high human development.

- AREAS OF STRENGTH**
- + Adult literacy rate
  - + Ease of starting a business
  - + Tertiary graduates from STEM programmes (%)
  - + Gross fixed capital formation (% GDP)
  - + Firms constrained with inadequately educated workforce (%)

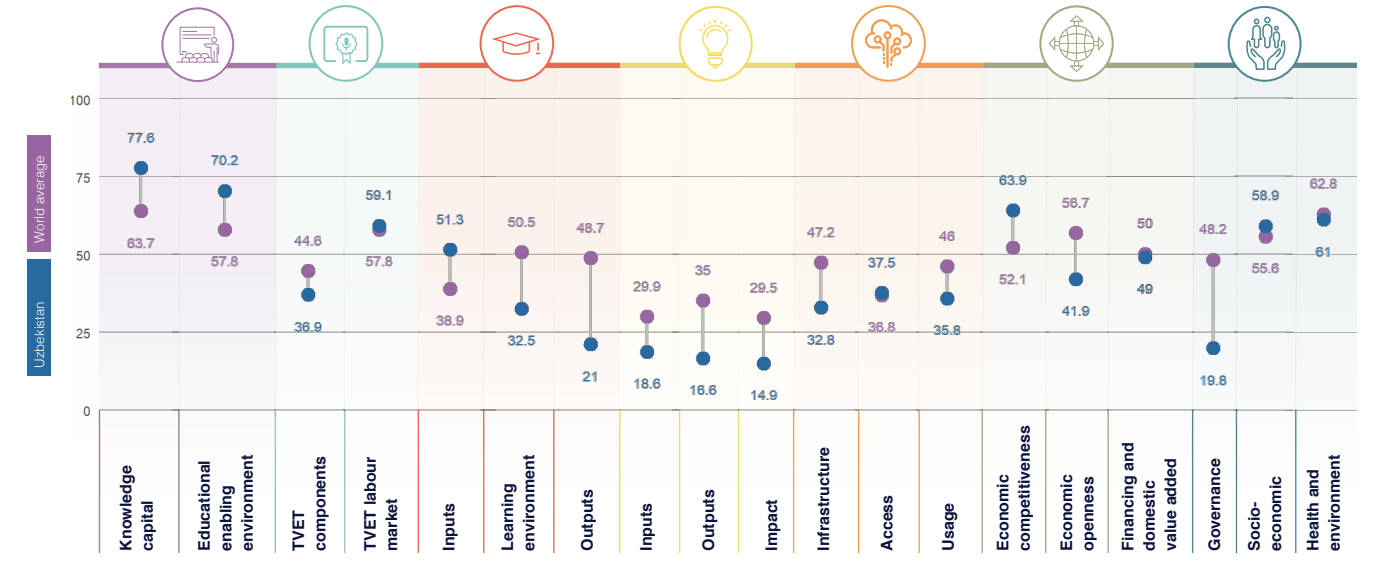
- AREAS OF IMPROVEMENT**
- Internet activities by individuals (%)
  - GERD per researcher
  - Citable documents per R&D personnel in higher education
  - Citations per document
  - Average documents per researcher

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	45	73.9
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	88	48
HIGHER EDUCATION	130	34.9
RESEARCH, DEVELOPMENT AND INNOVATION	147	16.7
INFORMATION AND COMMUNICATIONS TECHNOLOGY	101	35.4
ECONOMY	73	51.6
ENABLING ENVIRONMENT	114	46.6



## GKI PILLARS







# UZBEKISTAN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	48	73.9
Enrollment	88	89.2
Net enrolment rate in primary education	107	80.8
Net enrolment rate in lower secondary education	82	87.2
Net enrolment rate in upper secondary education	88	82.5
Completion	7	87.1
Years of compulsory education in primary and secondary	9	82.5
Completion rate in upper secondary education	14	85.7
Success rate rate in the last grade of lower secondary education	83	74.8
Completion	41	81.5
Assessment of 15-year-old students in math, science and reading	118	118
Learning-adjusted years of schooling	52	85.3
<b>Educational enabling environment</b>	<b>23</b>	<b>70.3</b>
Expenditure	12	82.5
Government expenditure on primary education (% GDP)	16	54.3
Government expenditure on secondary education (% GDP)	118	118
Government funding per primary student (% GDP per capita)	21	81.3
Government funding per secondary student (% GDP per capita)	118	118
Resources	88	80.5
Pupil-based teacher ratio in primary education	35	85.2
Pupil-based teacher ratio in secondary education	13	85.1
Schools with access to computers in primary education (%)	43	80.2
Schools with access to computers in secondary education (%)	111	85.8
Early learning	27	84.2
Class attendance rate in early childhood education	83	32.7
Proportion of children who are developmentally on track	118	118
Proportion of children with stimulating home learning environments	118	118
Pupil-based teacher ratio in preprimary education	6	85.9
Quality and infrastructure	118	118
Completion rate in upper secondary education, gender parity	118	118
Completion rate in upper secondary education, wealth parity	118	118
Completion rate in upper secondary education, location parity	118	118
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>113</b>	<b>86.8</b>
Companies training apprentices	118	118.4
Firms offering formal training (%)	109	118.4
Labour force with short-cycle tertiary education (%)	118	118
Participation rate in formal and non-formal education and training	118	118
TVET resources	11	84.4
Government expenditure on vocational education (%)	118	118
Share of students enrolled in secondary vocational programmes	95	54.4
Share of students enrolling in postsecondary vocational programmes	118	118
TVET quality and infrastructure	118	118
Extent of staff training	118	118
Quality of vocational training	118	118
Ratio of high-skill TVET occupations earnings to average wage	118	118
Ratio of median-skill TVET occupations earnings to average wage	118	118
<b>TVET labour market</b>	<b>75</b>	<b>80.5</b>
Efficiency of the labour market	81	81.3
Firms considered well-matched with workforce (%)	11	80.6
Employment educational mismatch (%)	118	118
Proportion of skilled production workers	108	33.1
Unemployment rate with vocational education	118	118
Real TVET unemployment	118	11.7
Share of TVET occupations	125	30.0
Manufacturing employment (%)	86	40.6
Quality and infrastructure	11	76.7
Enrollment in vocational education, gender parity	13	85.0
Useable employment rate	87	84

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>23</b>	<b>81.3</b>
Expenditure	18	21.5
Government expenditure per tertiary student	51	18.0
Teaching staff compensation (% tertiary expenditure)	88	44.0
Enrollment	118	118
Enrollment in bachelor's or equivalent level (%)	118	118
Enrollment in masters, doctoral or equivalent (%)	118	118
Resources	42	73.0
Rapiteacher ratio in tertiary education	52	78.0
Researchers in higher education (%)	30	83.1
<b>Learning environment</b>	<b>121</b>	<b>32.3</b>
Directly paid academic freedom	124	33.0
Teachers in tertiary education, gender parity	48	35.0
Labour mobility rate	114	0.8
Academic freedom	102	20.0
Quality and infrastructure	118	118
Class attendance rate in tertiary education, gender parity	118	118
Class attendance rate in tertiary education, wealth parity	118	118
Class attendance rate in tertiary education, location parity	118	118
<b>Outputs</b>	<b>181</b>	<b>21</b>
Attainment	41	41.7
Educational attainment rate, bachelor's or equivalent	55	41.7
Educational attainment rate, master's or equivalent	118	118
Educational attainment rate, doctoral or equivalent	118	118
Employment	118	118
Labour force participation rate with advanced education	118	118
Unemployment rate with advanced education	118	118
Impact	108	0.4
University tertiary enrollment in R&D	118	118
OECD indicators per 100 personnel in higher education	103	0.4
<b>INNOVATION, ENTREPRENEURSHIP AND BUSINESS SYSTEMS</b>		
<b>Inputs</b>	<b>122</b>	<b>18.2</b>
Access to credit resources	11	10.1
GDP (% GDP)	101	2.4
GERD per researcher	104	3.1
Researchers per thousand labour force	67	0.5
Tertiary graduates from STEM programmes (%)	7	88.2
<b>Quality of innovation environment</b>	<b>11</b>	<b>10.1</b>
GERD performed by business enterprises (%)	69	7.4
GERD financed by business enterprises (%)	42	52.0
Researchers in business enterprises (%)	57	15.4
Firms that spend on R&D (%)	100	7.5
Quality of innovation environment	102	10
High-skilled employment (%)	118	118
Intellectual property payments (% total trade)	58	10
State of startup development	118	118
<b>Outputs</b>	<b>108</b>	<b>18.2</b>
Access to credit resources	118	118
Average documents per researcher	111	9
Citations per document	102	3.8
Patent applications (per 100 billion GDP)	51	55.3
<b>Government intervention in innovation environment</b>	<b>118</b>	<b>118</b>
Intellectual property receipts (% total trade)	113	1.1
Research and development expenditure (per 100 billion GDP)	80	3.7
PCT applications (per 100 billion GDP)	104	15.0
Firms producing new goods and services (%)	67	28.0





# UZBEKISTAN

	Rank	Value
<b>Consumer electronics</b>	100	11.3
Treatment applications per 100 million GDP	87	23.7
Cultural goods exports (% exports)	87	4.8
Printing and publishing output (% manufactured output)	84	14.5
<b>Health</b>	100	10.0
<b>Trade</b>	100	1.0
Ratio of institutions' presence	104	104
Depth of innovative companies	104	104
ISO 9001 quality certificates (% GDP)	118	3.5
ISO 14001 environmental certificates (% GDP)	143	0.8
<b>Energy</b>	100	11.0
CERD forecast from abroad (%)	98	0.8
Cost savings per strategic storage deals (% GDP)	85	8.8
Computer software spending (% GDP)	104	104
<b>Government services</b>	90	10.0
New business density per thousand population	70	8
Firms with new products/services (%)	60	87.2
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	<b>101</b>	<b>25.8</b>
<b>Infrastructure</b>	113	30.8
<b>Coverage</b>	104	30.0
3G/4G mobile network coverage (% population)	112	32.1
Secure Internet servers per 1 million population	79	3.8
Investment in telecommunication services (% GDP)	94	23.0
<b>Speed</b>	80	10.1
Mobile upload and download speeds	108	4.8
Fixed broadband upload and download speeds	57	12
Fixed broadband subscriptions (by speed) per hundred people	80	13.8
<b>Availability</b>	100	11
Fixed broadband latency (% QM per capita)	89	77.8
Mobile broadband basket (% QM per capita)	80	50.7
Internet and telephony competition	144	25
<b>Access</b>	76	27.8
<b>Subscribers</b>	60	10.1
Active mobile-broadband subscriptions per fixed-line inhabitants	95	28.3
International Internet bandwidth per user	84	30.1
Households with Internet access at home (%)	68	83.7
<b>Skills and employment</b>	60	10.1
Individuals with standard ICT skills (%)	73	8
Tertiary graduates from ICT programmes (%)	43	30.7
ICT employment (%)	104	104
<b>Usage</b>	102	28.0
<b>Services</b>	80	11.0
Government online services	49	75.2
Fixed broadband Internet traffic per subscriber	87	8
Mobile broadband Internet traffic per subscriber	85	12.1
Internet users (%)	77	80.0
<b>Commerce</b>	100	10.0
ICT FDI patent applications (per 100 million GDP)	108	20.7
E-participation	49	81
Internet activities by individuals (%)	71	6.4
Trade in digitally deliverable services (% total trade)	100	12.0
<b>ECONOMY</b>	<b>73</b>	<b>87.8</b>
<b>Economic competitiveness</b>	23	11.0
FDI/total GDP investment	47	14.0
Overhead capital formation (% GDP)	9	80.4
Logistics performance	66	39.4
Transport productive capacity	100	21.1
Building quality control	75	73.3

	Rank	Value
<b>Business agility</b>	90	10.1
Cost of starting a business	7	86.2
Recovery recovery rate	85	37.4
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	11	85.7
<b>Employee openness</b>	122	41.0
<b>Trust and development</b>	10	24.0
<b>Trade (% GDP)</b>	89	24.7
High-technology trade (% total trade)	87	42.0
Market concentration	88	88.2
Market concentration	100	80.1
Product diversity	143	21.1
Climate financial openness	86	16.4
Foreign direct investment, net inflows (% GDP)	85	47.7
Cost dynamics	104	104
<b>Financing and domestic value added</b>	83	40
<b>Financing and costs</b>	10	10.1
Domestic credit to private sector (% GDP)	87	13.5
MSME financing gap (% GDP)	59	80.0
Tax and contribution rate (% profit)	80	76
Bank nonperforming loans (%)	33	80.1
Unmet loan demand	10	10.0
Medium- and high-tech activities value added	89	27.1
Industry and services value added (% GDP)	100	30.2
Labour underutilization rate	87	10.0
Output per worker	111	0.4
<b>ENABLING ENVIRONMENT</b>	<b>114</b>	<b>40.8</b>
<b>Governance</b>	126	10.8
Political environment	100	10.0
Peace and stability	100	30.2
View and accountability	147	6.8
Quality of institutions	101	21.2
Rule of law	108	13.0
Control of corruption	104	15.0
Government effectiveness	100	34.1
<b>Socio-economic</b>	89	50.0
Gender equity	75	80.1
Female-to-male ratio in parliament	47	48.5
Female-to-male labour force participation	114	87.8
Female-to-male ratio in internal wage	81	85
Gender inequality	89	57.3
Social protection coverage (% population)	87	41
Adult literacy rate	1	100
Youth not in employment, education or training (%)	86	81
Standard of living	84	11.2
Poverty headcount ratio (% population)	30	80.7
GDP per capita	100	0.7
<b>Health and environment</b>	108	81
Health	81	96
Universal health coverage	65	75
Healthy life expectancy (years)	82	88.0
Under-five mortality rate	87	80.0
Environmental performance	110	80.1
Renewable energy consumption (%)	141	1.5
Household footprint per capita	82	88.0
Natural hazard exposure	100	40

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# VENEZUELA

## (BOLIVARIAN REPUBLIC OF)

### KEY INDICATORS

GDP US\$ billions	n/a
Population	28,435,943
HDI	0.711

**GKI RANK** 126/154

**GKI SCORE** 36.7

**WORLD AVERAGE** 48.4

### COUNTRY PERFORMANCE SUMMARY

Venezuela (Bolivarian Republic of) is a weak performer in terms of its knowledge infrastructure. It ranks 126th out of 154 countries in the Global Knowledge Index 2021 and 39th out of the 39 countries with high human development.

### AREAS OF STRENGTH

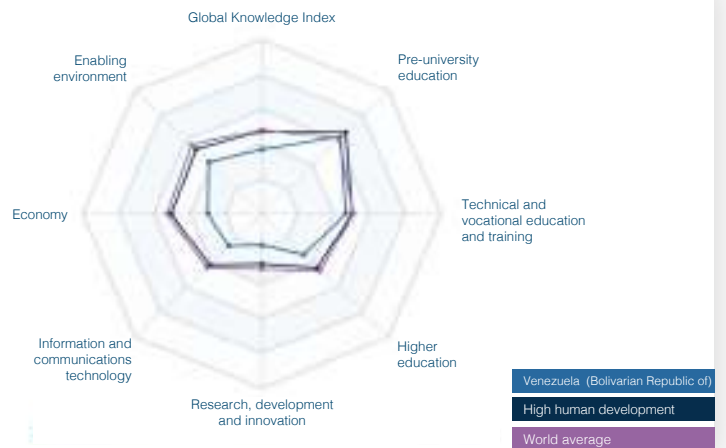
- + Investment in telecommunication services (% GDP)
- + Gross attendance ratio for tertiary education, location parity
- + Enrolment in vocational education, gender parity
- + Firms offering formal training (%)
- + Firms that spend on R&D (%)

### AREAS OF IMPROVEMENT

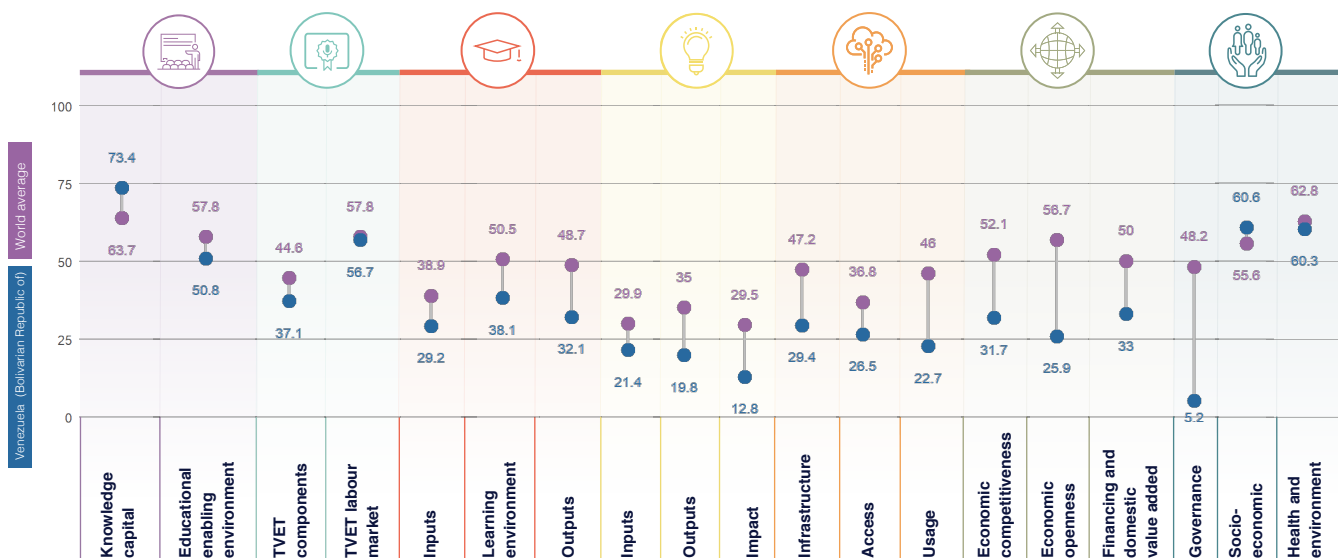
- Labour force participation rate with advanced education
- Cultural goods exports (% exports)
- Ease of starting a business
- Chinn-Ito financial openness
- Rule of law

### SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	89	62.1
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	96	46.9
HIGHER EDUCATION	136	33.1
RESEARCH, DEVELOPMENT AND INNOVATION	143	18
INFORMATION AND COMMUNICATIONS TECHNOLOGY	121	26.2
ECONOMY	153	30.2
ENABLING ENVIRONMENT	126	42



### GKI PILLARS





# VENEZUELA (BOLIVARIAN REPUBLIC OF)

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	88	62.1
Enrollment	84	73.4
Net enrolment rate in primary education	100	74.7
Net enrolment rate in lower secondary education	100	70.0
Net enrolment rate in upper secondary education	89	80.4
Completion	82	75
Completion	79	72.2
Years of compulsory education in primary and secondary	28	88.6
Completion rate in upper secondary education	90	72.7
Success rate rate in the last grade of lower secondary education	87	83.2
Completion	100	100
Assessment of 15-year-old students in math, science and reading	100	100
Learning-adjusted years of schooling	100	100
<b>Educational enabling environment</b>	<b>100</b>	<b>80.8</b>
Expenditure	87	52.0
Government expenditure on primary education (% GDP)	29	46.0
Government expenditure on secondary education (% GDP)	81	21.3
Government funding per primary student (% GDP per capita)	49	42.9
Government funding per secondary student (% GDP per capita)	89	20.2
Resources	100	100
Pupil-based teacher ratio in primary education	100	100
Pupil-based teacher ratio in secondary education	100	100
Schools with access to computers in primary education (%)	100	100
Schools with access to computers in secondary education (%)	100	100
Early learning	110	40.0
Class attendance rate in early childhood education	72	49.3
Proportion of children who are developmentally on track	100	100
Proportion of children with stimulating home learning environments	100	100
Pupil-based teacher ratio in preprimary education	100	100
Quality and infrastructure	80	75.0
Completion rate in upper secondary education, gender parity	81	84.7
Completion rate in upper secondary education, wealth parity	35	73.0
Completion rate in upper secondary education, location parity	100	100
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>	<b>118</b>	<b>37.0</b>
Companies training apprentices	91	33.0
Firms offering formal training (%)	18	70
Labour force with short-cycle tertiary education (%)	91	85.1
Participation rate in formal and non-formal education and training	48	19.0
TVET resources	100	100
Government expenditure on vocational education (%)	100	100
Share of students enrolled in secondary vocational programmes	89	8.8
Share of students enrolled in postsecondary vocational programmes	100	100
TVET quality and infrastructure	39	47.4
Extent of staff training	100	45.4
Quality of vocational training	57	54.4
Ratio of high-skill TVET occupations earnings to average wage	100	100
Ratio of median-skill TVET occupations earnings to average wage	100	100
<b>TVET labour market</b>	<b>89</b>	<b>86.7</b>
Efficiency of the labour market	100	52.0
Firms considered well-integrated into workforce (%)	77	54.2
Employment educational mismatch (%)	75	56.2
Proportion of skilled production workers	100	34.1
Unemployment rate with vocational education	30	85.4
Real TVET unemployment	100	34.0
Share of TVET occupations	100	41.7
Manufacturing employment (%)	100	29.0
Quality and infrastructure	30	35.1
Enrollment in vocational education, gender parity	30	80.0
Useable employment rate	87	55.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>	<b>118</b>	<b>28.2</b>
Expenditure	100	100
Government expenditure per tertiary student	100	100
Teaching staff compensation (% tertiary expenditure)	100	100
Enrollment	100	100
Enrollment in bachelor's or equivalent level (%)	100	100
Enrollment in masters, doctoral or equivalent (%)	100	100
Resources	100	100
Rap teacher ratio in tertiary education	100	100
Researchers in higher education (%)	82	28.2
<b>Learning environment</b>	<b>121</b>	<b>38.1</b>
<b>Quality and academic freedom</b>	<b>104</b>	<b>31</b>
Teachers in tertiary education, gender parity	100	100
Labour mobility rate	100	100
Academic freedom	128	21
<b>Quality and infrastructure</b>	<b>27</b>	<b>65.1</b>
Class attendance rate in tertiary education, gender parity	68	72.0
Class attendance rate in tertiary education, wealth parity	100	100
Class attendance rate in tertiary education, location parity	8	37.8
<b>Outputs</b>	<b>126</b>	<b>32.1</b>
Attainment	80	35
Educational attainment rate, bachelor's or equivalent	80	36.0
Educational attainment rate, master's or equivalent	79	3.8
Educational attainment rate, doctoral or equivalent	100	100
Employment	100	100
Labour force participation rate with advanced education	100	8
Unemployment rate with advanced education	62	88.0
Impact	94	32.1
University tertiary enrollment in R&D	100	35.1
CRIDE indicators per 100 personnel in higher education	100	100
<b>INNOVATION, KNOWLEDGE AND SKILLS</b>		
<b>Inputs</b>	<b>104</b>	<b>21.4</b>
Government R&D expenditure	91	100
GDP (% GDP)	70	6.8
GERD per researcher	21	44.8
Researchers per thousand labour force	70	4.2
Tertiary graduates from STEM programmes (%)	100	100
<b>Quality and infrastructure</b>	<b>10</b>	<b>100</b>
GERD performed by business enterprises (%)	100	100
GERD financed by business enterprises (%)	100	100
Researchers in business enterprises (%)	79	0.6
Firms that spend on R&D (%)	18	47.1
<b>Quality and infrastructure</b>	<b>100</b>	<b>10.1</b>
High-skill employment (%)	100	100
Intellectual property payments (% total trade)	49	83.0
State of cluster development	141	25.0
<b>Outputs</b>	<b>117</b>	<b>18.8</b>
<b>Quality and infrastructure</b>	<b>100</b>	<b>100</b>
Average documents per researcher	100	33.0
Citations per document	87	26.0
Patent applications (per 100 billion GDP)	100	100
<b>Quality and infrastructure</b>	<b>100</b>	<b>100</b>
Intellectual property receipts (% total trade)	117	6
Research design applications (per 100 billion GDP)	100	100
PCT applications (per 100 billion GDP)	100	100
Firms producing new goods and services (%)	88	41.7





# VENEZUELA (BOLIVARIAN REPUBLIC OF)

	Rank	Value
<b>Business environment</b>	100	5.0
Trademark applications per 100 million GDP	106	108
Cultural goods exports (% exports)	143	8
Printing and publishing output (% manufactured output)	106	108
<b>Energy</b>	100	10.0
<b>Trade</b>	100	10.0
Access to investors' protection	68	12.2
Depth of innovative companies	118	40.5
ISO 9001 quality certificates (% GDP)	131	1.8
ISO 14001 environmental certificates (% GDP)	141	0.8
<b>Logistics</b>	100	10.0
CERD freedom from abuse (%)	106	108
Cost of letters per storage of letters deals (% GDP)	102	8
Computer software spending (% GDP)	75	37
<b>Government efficiency</b>	100	10.0
New business density per thousand population	106	108
Firms with one or more advisers (%)	118	13.8
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	121	26.2
<b>Infrastructure</b>	100	26.4
<b>Coverage</b>	11	17.3
30MHz mobile network coverage (% population)	112	80.0
Secure Internet servers per 1 million population	90	2.4
Investment in telecommunication services (% GDP)	1	100
<b>Quality</b>	101	1.1
Mobile speed and download speeds	112	0.2
Fixed broadband upload and download speeds	114	0.2
Fixed broadband subscriptions (y speed) per hundred people	100	3.7
<b>Availability</b>	106	108
Fixed broadband basket (% GNI per capita)	106	108
Mobile broadband basket (% GNI per capita)	106	108
Internet and telephone competition	106	108
<b>Access</b>	106	26.5
<b>Subscriptions</b>	111	20.5
Active mobile-broadband subscriptions per fixed-line inhabitants	112	20.8
International Internet bandwidth per user	104	21.5
Households with Internet access at home (%)	90	33.4
<b>Skills and employment</b>	106	108
Individuals with standard ICT skills (%)	106	108
Tertiary graduates from ICT programmes (%)	106	108
ICT employment (%)	106	108
<b>Usage</b>	106	27.7
<b>Services</b>	106	31
Government online services	105	31.8
Fixed broadband Internet traffic per subscriber	85	4.1
Mobile broadband Internet traffic per subscriber	112	1.8
Internet users (%)	88	54.6
<b>Commerce</b>	107	12.5
ICT FDI patent applications (per 100 million GDP)	106	108
E-participation	143	23.8
Internet activities by individuals (%)	106	108
Trade in digitally deliverable services (% total trade)	122	20.0
<b>ECONOMY</b>	100	30.2
<b>Economic competitiveness</b>	143	31.7
<b>REGISTRATION</b>	100	41.5
Overhead capital formation (% GDP)	85	48.7
Logistics performance	125	30.3
Transport productive capacity	95	30.5
Building quality control	80	20

	Rank	Value
<b>Business agility</b>	102	10
Cost of starting a business	100	52.4
Recovery recovery time	143	5.8
Entrepreneurial employee activity rate	77	3.8
Growth of corporate transactions	111	14.5
<b>Business openness</b>	102	26.0
Trade and investment	111	41.1
Trade (% GDP)	118	17.7
High-technology trade (% total trade)	106	108
Market concentration	143	29.8
Market concentration	106	26.0
Product diversity	106	10.0
Charitable financial openness	128	8
Foreign direct investment, net inflows (% GDP)	124	31.8
Cost dynamics	128	8
<b>Financing and domestic value added</b>	142	33
<b>Financing and costs</b>	106	21.2
Domestic credit to private sector (% GDP)	100	12.5
IMRE financing gap (% GDP)	105	12.0
Tax and contribution rate (% profit)	152	33.8
Bank nonperforming loans (%)	106	108
Unmet loan demand	10	10.7
Medium- and high-tech activities value added	41	40.1
Industry and services value added (% GDP)	55	85.0
Labour underutilization rate	101	38.0
Output per worker	80	11.3
<b>ENABLING ENVIRONMENT</b>	126	42
<b>GOVERNANCE</b>	102	5.2
Political environment	100	0.1
Peace and stability	100	0.4
View and accountability	146	7.2
Quality of institutions	102	2.1
Rule of law	104	8
Control of corruption	152	3.8
Government effectiveness	100	2.4
<b>Socio-economic</b>	82	60.8
Gender equity	99	80.1
Female-to-male ratio in parliament	89	28.5
Female-to-male labour force participation	101	81.8
Female-to-male ratio in internal wage	1	100
Gender inequality	81	87.2
Social protection coverage (% population)	80	82.0
Adult literacy rate	39	84.5
Youth not in employment, education or training (%)	100	85.2
<b>Standard of living</b>	37	83.8
Poverty headcount ratio (% population)	85	83.0
GDP per capita	106	108
<b>Health and environment</b>	164	60.3
Health	88	71.1
Universal health coverage	55	74
Healthy life expectancy (years)	81	81.7
Under-five mortality rate	99	80.7
Environmental performance	117	80.6
Renewable energy consumption (%)	100	15.1
Household footprint per capita	72	88.8
Natural hazard exposure	128	30

\*All values are normalized to a scale from 0 (worst) to 100 (best).





**GKI RANK** 66/154

**GKI SCORE** 49.6

**WORLD AVERAGE** 48.4

# VIET NAM

## KEY INDICATORS

**GDP US\$ billions** 798.209  
**Population** 97,338,583  
**HDI** 0.704

## COUNTRY PERFORMANCE SUMMARY

Viet Nam is a moderate performer in terms of its knowledge infrastructure. It ranks 66th out of 154 countries in the Global Knowledge Index 2021 and 9th out of the 39 countries with high human development.

### AREAS OF STRENGTH

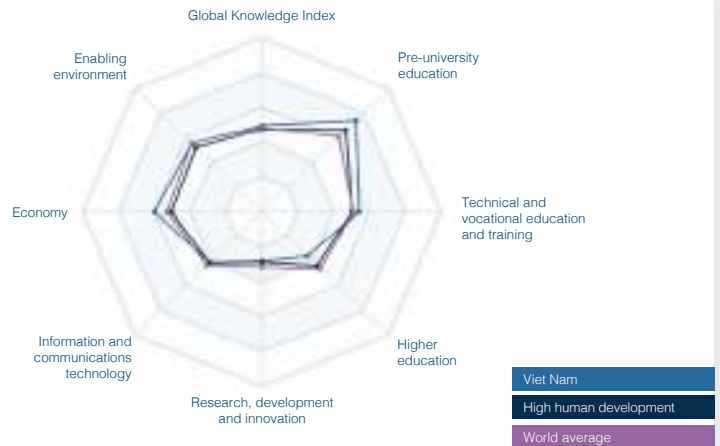
- + Labour underutilization rate
- + Labour force with short-cycle tertiary education (%)
- + Manufacturing employment (%)
- + High-technology trade (% total trade)
- + Trade (% GDP)

### AREAS OF IMPROVEMENT

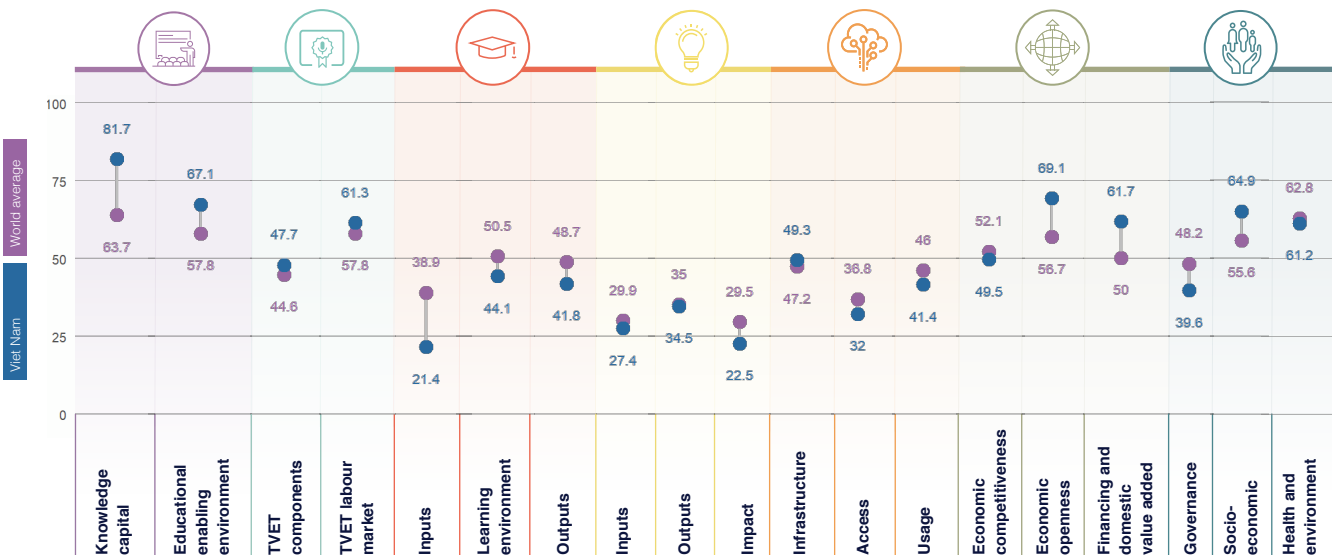
- Natural hazard exposure
- Average documents per researcher
- Trade in digitally deliverable services (% total trade)
- Participation rate in formal and non-formal education and training
- Investment in telecommunication services (% GDP)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	40	74.4
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	59	54.5
HIGHER EDUCATION	126	35.8
RESEARCH, DEVELOPMENT AND INNOVATION	90	28.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	84	40.9
ECONOMY	46	60.1
ENABLING ENVIRONMENT	70	55.2



## GKI PILLARS





# VIET NAM

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revised life capital	22	81.7
Enrollment	30	83.5
Net enrolment rate in primary education	25	85.5
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	52	83.7
Years of compulsory education in primary and secondary	67	69.5
Completion rate in upper secondary education	80	50.0
Success rate rate in the last grade of lower secondary education	28	81.2
Completion	8	73.0
Assessment of 15-year-old students in math, science and reading	116	116
Learning-adjusted years of schooling	30	79.0
<b>Educational enabling environment</b>		
Expenditure	32	42.5
Government expenditure on primary education (% GDP)	88	35.2
Government expenditure on secondary education (% GDP)	29	41.8
Government funding per primary student (% GDP per capita)	32	81.8
Government funding per secondary student (% GDP per capita)	116	116
Resources	81	81.5
Full-time teacher ratio in primary education	44	83.4
Full-time teacher ratio in secondary education	116	116
Schools with access to computers in primary education (%)	1	100
Schools with access to computers in secondary education (%)	1	100
Early learning	31	73.7
Class attendance rate in early childhood education	69	43.9
Proportion of children who are developmentally on track	93	65.2
Proportion of children with stimulating home learning environments	39	75.5
Full-time teacher ratio in preprimary education	25	81.3
Quality and infrastructure	81	81.7
Completion rate in upper secondary education, gender parity	87	82.0
Completion rate in upper secondary education, wealth parity	85	82
Completion rate in upper secondary education, location parity	83	82.3
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	88	41.4
Firms offering formal training (%)	67	26.9
Labour force with short-cycle tertiary education (%)	5	54.0
Participation rate in formal and non-formal education and training	83	8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	47	34
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolled in postsecondary vocational programmes	1	100
<b>TVET quality and infrastructure</b>		
Extent of staff training	73	49.4
Quality of vocational training	100	44
Ratio of high-skill TVET occupations earnings to average wage	84	79.7
Ratio of medium-skill TVET occupations earnings to average wage	30	49.3
<b>TVET labour market</b>		
Efficiency of the labour market	88	76.2
Firms considered well matched with workforce (%)	15	89.0
Employment educational mismatch (%)	43	72.0
Proportion of skilled production workers	77	81
Unemployment rate with vocational education	7	82.4
Real TVET unemployment	88	81
Share of TVET occupations	100	44.0
Manufacturing employment (%)	8	81.2
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	116	116
Useable employment rate	113	44.6

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	88	115.5
Government expenditure per tertiary student	94	7.3
Teaching staff compensation (% tertiary expenditure)	73	17.7
Enrollment	88	111.1
Enrollment in bachelor's or equivalent level (%)	62	18.2
Enrollment in masters, doctoral or equivalent (%)	113	4.1
<b>Resources</b>		
Full-time teacher ratio in tertiary education	108	58.0
Research staff in higher education (%)	82	29
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	11	94
Labour mobility rate	113	1.5
Academic freedom	118	27.7
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	14	82.0
Class attendance rate in tertiary education, wealth parity	42	53.5
Class attendance rate in tertiary education, location parity	54	5.4
<b>Outputs</b>		
Attainment	88	116.6
Educational attainment rate, bachelor's or equivalent	15	24.1
Educational attainment rate, master's or equivalent	88	9.8
Educational attainment rate, doctoral or equivalent	72	3.8
Employment	11	83.0
Labour force participation rate with advanced education	7	80.2
Unemployment rate with advanced education	36	88.0
<b>Input</b>		
University tertiary enrollment in FTE	67	40
CRIDE students per FTE personnel in higher education	88	9.8
<b>Employment, productivity and services trade</b>		
Exports	18	27.4
<b>Quality and infrastructure</b>		
GDPI (% GDP)	60	16.5
GERD per researcher	88	8.8
Researchers per thousand labour force	88	7.5
Tertiary graduates from STEM programmes (%)	98	43.0
<b>Quality and infrastructure</b>		
GERD performed by business enterprises (%)	43	10.8
GERD financed by business enterprises (%)	8	78.3
Researchers in business enterprises (%)	47	25.1
Firms that spend on R&D (%)	41	31.0
<b>Quality and infrastructure</b>		
High-skill employment (%)	88	23.5
Intellectual property payments (% total trade)	116	116
State of double development	42	82.0
<b>Inputs</b>		
<b>Quality and infrastructure</b>		
Average documents per researcher	108	13.4
Citations per document	28	34.2
Patent applications (per 100 billion GDP)	58	84.5
<b>Quality and infrastructure</b>		
Intellectual property receipts (% total trade)	116	116
Research design applications (per 100 billion GDP)	88	17.3
PCT applications (per 100 billion GDP)	108	38.5
Firms producing new goods and services (%)	67	28.0



# VIET NAM

	Rank	Value
<b>Consumer Electronics</b>	95	97.9
Treatment applications per 100 million GDP	10	60.7
Cultural goods exports (% exports)	35	27.4
Printing and publishing output (% manufactured output)	52	15.4
<b>Media</b>	100	65.5
<b>Books</b>	35	17.1
Books or e-books per capita	36	16.6
Depth of innovative companies	60	21.5
ISO 9001 quality certificates (% GDP)	69	16.9
ISO 14001 environmental certificates (% GDP)	74	16.4
<b>Software</b>	95	97.9
CERD licensed from abroad (%)	72	6.8
Joint ventures per strategic industry deals (% GDP)	76	7.4
Computer software spending (% GDP)	40	22.5
<b>Government Services</b>	100	60.0
New business density per thousand population	65	5.5
Firms with one or more patents (%)	100	60.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	85	62.9
<b>Infrastructure</b>	65	66.3
<b>Coverage</b>	100	36.1
3G/4G mobile network coverage (% population)	21	60.6
Secure Internet servers per 1 million population	59	90.4
Investment in telecommunication services (% GDP)	144	1
<b>Speed</b>	39	22.0
Mobile upload and download speeds	21	23.6
Fixed broadband upload and download speeds	30	23.0
Fixed broadband subscriptions (by speed) per hundred people	58	37.4
<b>Availability</b>	60	76
Fixed broadband latency (% QM per capita)	67	70.7
Mobile broadband latency (% QM per capita)	60	69.2
Internet and telephony competition	1	100
<b>Access</b>	63	22
<b>Subscriptions</b>	60	60
Active mobile-broadband subscriptions per fixed-line inhabitants	70	34.0
International Internet bandwidth per user	60	65.1
Households with Internet access at home (%)	66	34.0
<b>Skills and employment</b>	100	11.1
Individuals with standard ICT skills (%)	71	6.7
Tertiary graduates from ICT programmes (%)	100	14.0
ICT employment (%)	69	6.7
<b>Usage</b>	90	41.4
<b>Services</b>	60	60
Government online services	70	65.0
Fixed broadband Internet traffic per subscriber	14	43.0
Mobile broadband Internet traffic per subscriber	60	14.8
Internet users (%)	76	66.7
<b>Commerce</b>	110	31.5
ICT FDI positive applications (per 100 million GDP)	65	21.4
E-participation	69	70.2
Internet activities by individuals (%)	100	19
Trade in digitally deliverable services (% total trade)	100	2.8
<b>ECONOMY</b>	81	90.5
<b>Economic Competitiveness</b>	84	60.5
<b>Infrastructure Investment</b>	60	60.0
Overhead capital formation (% GDP)	64	62.8
Logistics performance	30	56.6
Transport productive capacity	60	23.3
Building quality control	47	60

	Rank	Value
<b>Business Agility</b>	100	41.0
Ease of starting a business	99	60.1
Recovery recovery rate	117	23.1
Entrepreneurial employee activity rate	77	3.8
Growth of corporate transactions	66	21.4
<b>Corporate Governance</b>	23	65.5
<b>Trade and Investment</b>	2	60.1
Trade (% GDP)	7	62.6
High-technology trade (% total trade)	4	66.5
Market concentration	49	62.9
Market concentration	75	60.0
<b>Product Innovation</b>	61	60.0
China's financial openness	66	41.7
Foreign direct investment, net inflows (% GDP)	20	66
Cost dynamics	60	60
<b>Financing and domestic value added</b>	23	61.7
<b>Financing and costs</b>	11	73.0
Domestic credit to private sector (% GDP)	14	62.6
MSME financing gap (% GDP)	33	27.0
Tax and contribution rate (% profit)	65	69.9
Bank nonperforming loans (%)	17	64.0
<b>Unmet needs index</b>	100	60.0
Medium- and high-tech activities value added	36	45.7
Industry and services value added (% GDP)	115	61
Labour underutilization rate	2	67
Output per worker	119	6
<b>ENABLING ENVIRONMENT</b>	79	64.3
<b>Governance</b>	60	30.6
<b>Political environment</b>	100	26.4
Peace and stability	75	44.6
View and accountability	108	12.1
Quality of institutions	71	60.0
Rule of law	76	48.9
Control of corruption	66	42.3
Government effectiveness	60	61.0
<b>Socio-economic</b>	44	64.3
<b>Gender equity</b>	41	23.6
Female-to-male ratio in parliament	55	40.4
Female-to-male labour force participation	26	67.4
Female-to-male ratio in internal wage	66	60.7
<b>Gender balance</b>	69	71.0
Social protection coverage (% population)	77	37
Adult literacy rate	49	64.6
Youth not in employment, education or training (%)	32	64.1
<b>Standard of living</b>	60	60.1
Poverty headcount ratio (% population)	60	61.0
GDP per capita	100	6.8
<b>Health and environment</b>	99	61.2
<b>Health</b>	71	36.7
Universal health coverage	51	75
Healthy life expectancy (years)	77	70.9
Under-five mortality rate	66	64.4
<b>Environmental performance</b>	100	46.7
Renewable energy consumption (%)	75	24.4
Household footprint per capita	70	66.6
Natural hazard exposure	145	20

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 150/154

**GKI SCORE** 28.6

**WORLD AVERAGE** 48.4

# YEMEN

## COUNTRY PERFORMANCE SUMMARY

Yemen is a weak performer in terms of its knowledge infrastructure. It ranks 150th out of 154 countries in the Global Knowledge Index 2021 and 23rd out of the 27 countries with low human development.

### KEY INDICATORS

**GDP** US\$ billions ..... n/a  
**Population** ..... 29,825,968  
**HDI** ..... 0.47

### AREAS OF STRENGTH

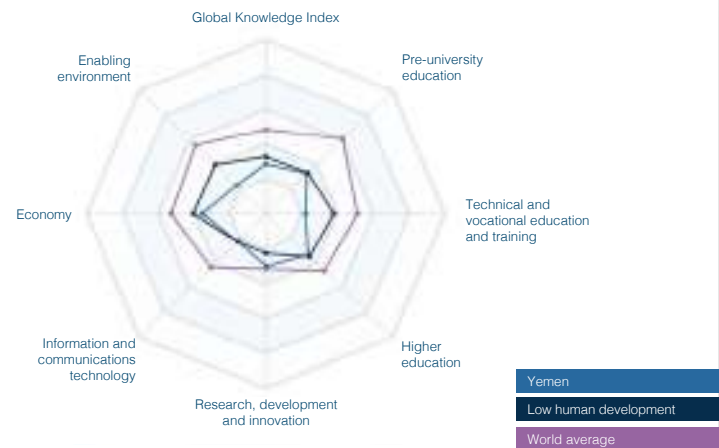
- + Ecological footprint per capita
- + Intellectual property payments (% total trade)
- + Labour force participation rate with advanced education
- + Government expenditure on primary education (% of GDP)
- + Tax and contribution rate (% profit)

### AREAS OF IMPROVEMENT

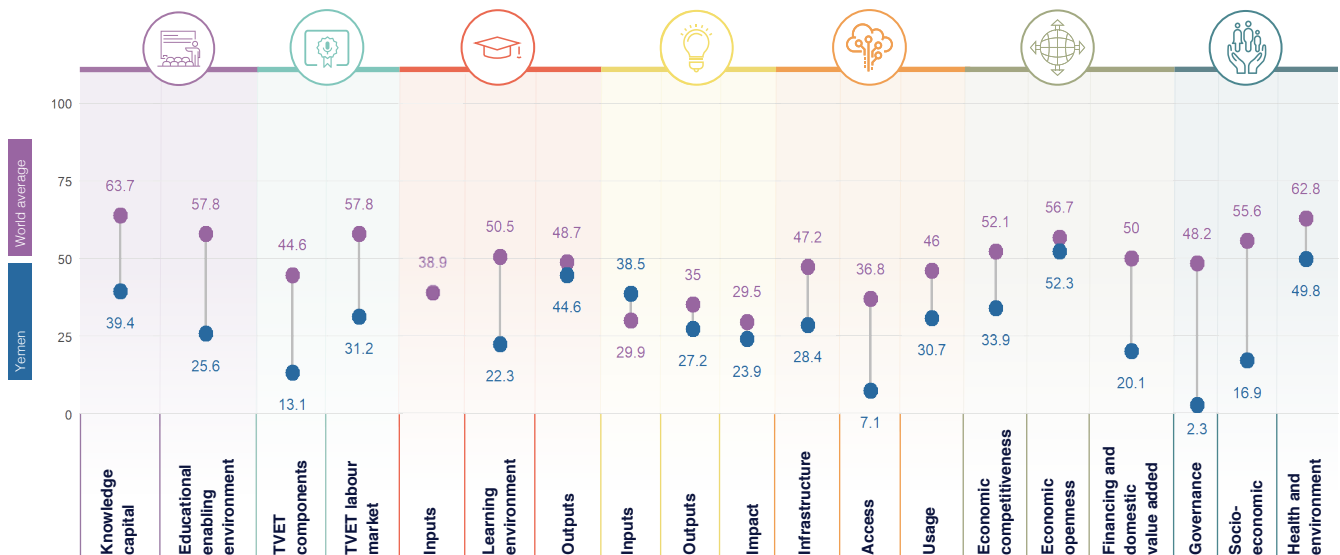
- Extent of corporate transparency
- MSME financing gap (% GDP)
- Government effectiveness
- Female-to-male ratio in parliament
- Youth not in employment, education or training (%)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	143	32.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	154	22.2
HIGHER EDUCATION	132	33.4
RESEARCH, DEVELOPMENT AND INNOVATION	79	29.9
INFORMATION AND COMMUNICATIONS TECHNOLOGY	142	22.1
ECONOMY	148	35.5
ENABLING ENVIRONMENT	154	23



## GKI PILLARS







# YEMEN

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	122	26.4
Enrollment	101	41.1
Net enrolment rate in primary education	105	82.5
Net enrolment rate in lower secondary education	113	80.4
Net enrolment rate in upper secondary education	117	34.5
Completion	111	51.5
Years of compulsory education in primary and secondary	47	63.2
Completion rate in upper secondary education	89	44.0
Success rate rate in the last grade of lower secondary education	118	27.4
Completion	142	10.0
Assessment of 15-year-old students in math, science and reading	106	109
Learning-adjusted years of schooling	142	10.0
<b>Educational enabling environment</b>		
Expenditure	85	12.7
Government expenditure on primary education (% GDP)	13	62.0
Government expenditure on secondary education (% GDP)	112	11.7
Government funding per primary student (% GDP per capita)	47	43.5
Government funding per secondary student (% GDP per capita)	100	13.0
Resources	106	109
Pupil-based teacher ratio in primary education	106	109
Pupil-based teacher ratio in secondary education	106	109
Schools with access to computers in primary education (%)	106	109
Schools with access to computers in secondary education (%)	106	109
Early learning	104	0
Class attendance rate in early childhood education	103	0
Proportion of children who are developmentally on track	106	109
Presence of children with stimulating home learning environments	106	109
Pupil-based teacher ratio in preprimary education	106	109
Quality and infrastructure	100	41.0
Completion rate in upper secondary education, gender parity	117	64.4
Completion rate in upper secondary education, wealth parity	80	30
Completion rate in upper secondary education, location parity	76	50.0
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications technology	111	0.0
Firms offering formal training (%)	118	36
Labour force with short-cycle tertiary education (%)	106	109
Participation rate in formal and non-formal education and training	85	1.8
<b>TVET resources</b>		
Government expenditure on vocational education (%)	106	109
Share of students enrolled in secondary vocational programmes	158	0.4
Share of students enrolled in postsecondary vocational programmes	106	109
<b>TVET quality and infrastructure</b>		
Extent of staff training	144	31.6
Quality of vocational training	137	26.1
Ratio of high-skil TVET occupations earnings to average wage	106	109
Ratio of medium-skill TVET occupations earnings to average wage	106	109
<b>TVET labour market</b>		
Efficiency of the labour market	107	41.0
Firms considered well-integrated educated workforce (%)	87	49.1
Employment educational mismatch (%)	85	45.2
Presence of skilled graduate workers	113	18.0
Unemployment rate with vocational education	100	35
Real TVET unemployment	100	30.0
Share of TVET occupations	117	25.1
Manufacturing employment (%)	138	10.6
Quality and infrastructure	101	11.4
Enrollment in vocational education, gender parity	120	5.8
Useable employment rate	100	40.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	106	109
Government expenditure per tertiary student	106	109
Teaching staff compensation (% tertiary expenditure)	106	109
Enrollment	100	109
Enrollment in bachelor's or equivalent level (%)	106	109
Enrollment in masters, doctoral or equivalent (%)	106	109
Resources	106	109
Ratios/teacher ratio in tertiary education	106	109
Researchers in higher education (%)	106	109
<b>Learning environment</b>		
<b>Directly and academic freedom</b>		
Teachers in tertiary education, gender parity	106	109
Labour mobility rate	89	35
Academic freedom	126	12.0
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	81	54.0
Class attendance rate in tertiary education, wealth parity	90	30
Class attendance rate in tertiary education, location parity	47	9.5
<b>Outputs</b>		
Skilled labour	106	109
Educational attainment rate, bachelor's or equivalent	106	109
Educational attainment rate, master's or equivalent	106	109
Educational attainment rate, doctoral or equivalent	106	109
Employment	75	31.4
Labour force participation rate with advanced education	11	87.0
Unemployment rate with advanced education	116	55.7
<b>Impact</b>		
University tertiary enrollment in R&D	144	17.7
OECD indicators per 100 personnel in higher education	106	109
<b>Government's contribution and economic role</b>		
Exports	87	22.2
Government contribution	106	109
GDP (% GDP)	106	109
GERD per researcher	106	109
Researchers per thousand labour force	106	109
Tertiary graduates from STEM programmes (%)	106	109
<b>Government's contribution and economic role</b>		
GERD performed by business enterprises (%)	106	109
GERD financed by business enterprises (%)	106	109
Researchers in business enterprises (%)	106	109
Firms that spend on R&D (%)	80	11.0
Quality of business environment	75	13.2
High-skilled employment (%)	106	109
Intellectual property payments (% total trade)	1	609
State of digital development	134	10.0
<b>Support</b>		
Government contribution	106	109
Average documents per researcher	106	109
Citations per document	38	23.0
Patent applications (per 100 billion GDP)	106	109
<b>Government's contribution and economic role</b>		
Intellectual property receipts (% total trade)	89	9
Research and development expenditure (per 100 billion GDP)	106	109
PCT applications (per 100 billion GDP)	106	109
Firms producing new goods and services (%)	40	54.1



# YEMEN

	Rank	Value
<b>Business environment</b>	107	0
Treatment applications (per 100 million GDP)	106	106
Cultural goods exports (% exports)	103	1.4
Printing and publishing output (% manufactured output)	70	10.0
<b>Energy</b>	89	10.0
<b>Finance</b>	100	10.0
Access to investors' protection	101	0
Depth of innovative companies	110	41
ISO 9001 quality certificates (% GDP)	108	1.1
ISO 14001 environmental certificates (% GDP)	110	1.2
<b>Infrastructure</b>	100	0
CERD received from abroad (%)	106	106
Cost indexes per storage volume deals (% GDP)	107	10.8
Computer software spending (% GDP)	80	4.1
<b>International trade</b>	100	10.0
New business density per thousand population	106	106
Firms with new products/services (%)	87	10.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	140	21.1
<b>Infrastructure</b>	102	10.4
<b>Coverage</b>	101	10.0
30MHz mobile network coverage (% population)	108	10.0
Secure Internet servers per 1 million population	101	0.2
Investment in telecommunication services (% GDP)	106	106
<b>Speed</b>	106	106
Mobile spread and download speeds	106	106
Fixed broadband upload and download speeds	106	106
Fixed broadband subscriptions (y speed) per hundred people	106	106
<b>Availability</b>	107	10.0
Fixed broadband latency (% QM per capita)	80	10.0
Mobile broadband basket (% QM per capita)	142	10.0
Internet and telephony competition	143	10.7
<b>Access</b>	100	7.1
<b>Subscriptions</b>	100	1.1
Active mobile broadband subscriptions per hundred inhabitants	102	1.4
International Internet bandwidth per user	141	10.0
Households with Internet access at home (%)	144	0
<b>Skills and employment</b>	100	10
Individuals with standard ICT skills (%)	106	106
Tertiary graduates from ICT programmes (%)	106	106
ICT employment (%)	106	106
<b>Usage</b>	100	10.7
<b>Services</b>	100	10.0
Government online services	104	10.4
Fixed broadband Internet traffic per subscription	106	106
Mobile broadband Internet traffic per subscription	106	106
Internet users (%)	104	10.7
<b>Commerce</b>	100	10.0
ICT FDI patent applications (per 100 million GDP)	106	106
E-participation	100	10
Internet activities by individuals (%)	106	106
Trade in digitally deliverable services (% total trade)	80	10.7
<b>ECONOMY</b>	140	10.0
<b>Economic complexity indexes</b>	143	10.0
<b>Manufacturing</b>	141	10.0
Overhead capital formation (% GDP)	106	106
Logistics performance	100	10.0
Transport productive capacity	100	10.0
Building quality control	104	10

	Rank	Value
<b>Business agility</b>	140	10.0
Cost of starting a business	102	10.0
Recovery recovery rate	110	10.0
Entrepreneurial employee activity rate	106	106
Growth of corporate transactions	110	0
<b>Customer experience</b>	80	10.0
<b>Trade and investment</b>	100	10.0
Trade (% GDP)	106	106
High-technology trade (% total trade)	70	10.0
Market concentration	144	10.7
Market concentration	108	10.0
Product diversity	11	10.1
Contract financial openness	1	100
Foreign direct investment, net inflows (% GDP)	140	10.0
Cost dynamics	80	10
<b>Financing and domestic value added</b>	104	10.0
<b>Financing and costs</b>	100	10.0
Domestic credit to private sector (% GDP)	100	1
MSME financing gap (% GDP)	100	0
Tax and contribution rate (% profit)	81	10.1
Bank nonperforming loans (%)	106	106
Unsecured loans ratio	106	10.0
Medium- and high-tech activities value added	105	10.1
Industry and services value added (% GDP)	100	10.0
Labour underutilization rate	141	10.0
Output per worker	108	10.0
<b>ENABLING ENVIRONMENT</b>	104	10
<b>Governance</b>	104	10.0
Political environment	104	10.0
Peace and stability	100	10.0
View and accountability	102	10.0
Quality of institutions	104	10.0
Rule of law	100	10.0
Control of corruption	104	10.0
Government effectiveness	100	10.0
<b>Socio-economic</b>	104	10.0
Gender equity	104	10.0
Female-to-male ratio in parliament	100	10.0
Female-to-male labour force participation	100	10.0
Female-to-male ratio in internal wage	106	106
Gender inequality	100	10.0
Social protection coverage (% population)	71	10.0
Adult literacy rate	106	106
Youth not in employment, education or training (%)	100	10.0
Standard of living	100	10.0
Poverty headcount ratio (% population)	110	10.0
GDP per capita	106	106
<b>Health and environment</b>	140	10.0
<b>Health</b>	100	10.0
Universal health coverage	100	10.0
Healthy life expectancy (years)	100	10.0
Under-five mortality rate	100	10.0
Environmental performance	70	10.0
Renewable energy consumption (%)	100	10.0
Household footprint per capita	1	100
Natural hazard exposure	70	10

\*All values are normalized to a scale from 0 (worst) to 100 (best).



**GKI RANK** 127/154

**GKI SCORE** 36.6

**WORLD AVERAGE** 48.4

# ZAMBIA

## COUNTRY PERFORMANCE SUMMARY

Zambia is a weak performer in terms of its knowledge infrastructure. It ranks 127th out of 154 countries in the Global Knowledge Index 2021 and 21st out of the 27 countries with medium human development.

### KEY INDICATORS

**GDP** US\$ billions ..... **60.116**  
**Population** ..... **18,383,956**  
**HDI** ..... **0.584**

### AREAS OF STRENGTH

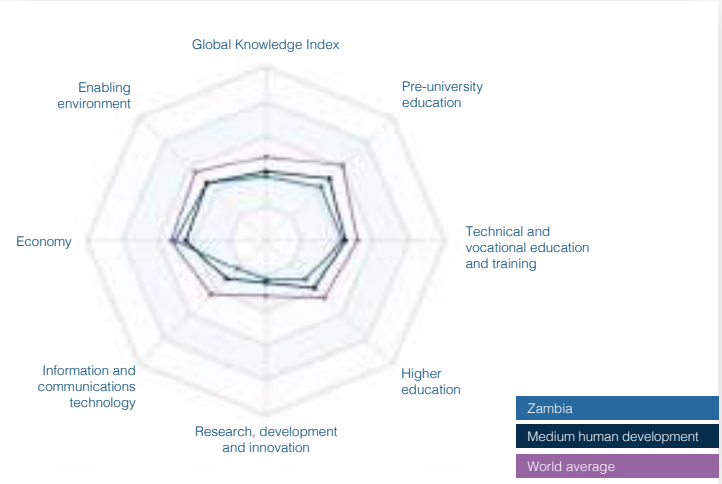
- + Investment in telecommunication services (% GDP)
- + Ratio of high-skill TVET occupations earnings to average wage
- + Renewable energy consumption (%)
- + Tax and contribution rate (% profit)
- + Gross fixed capital formation (% GDP)

### AREAS OF IMPROVEMENT

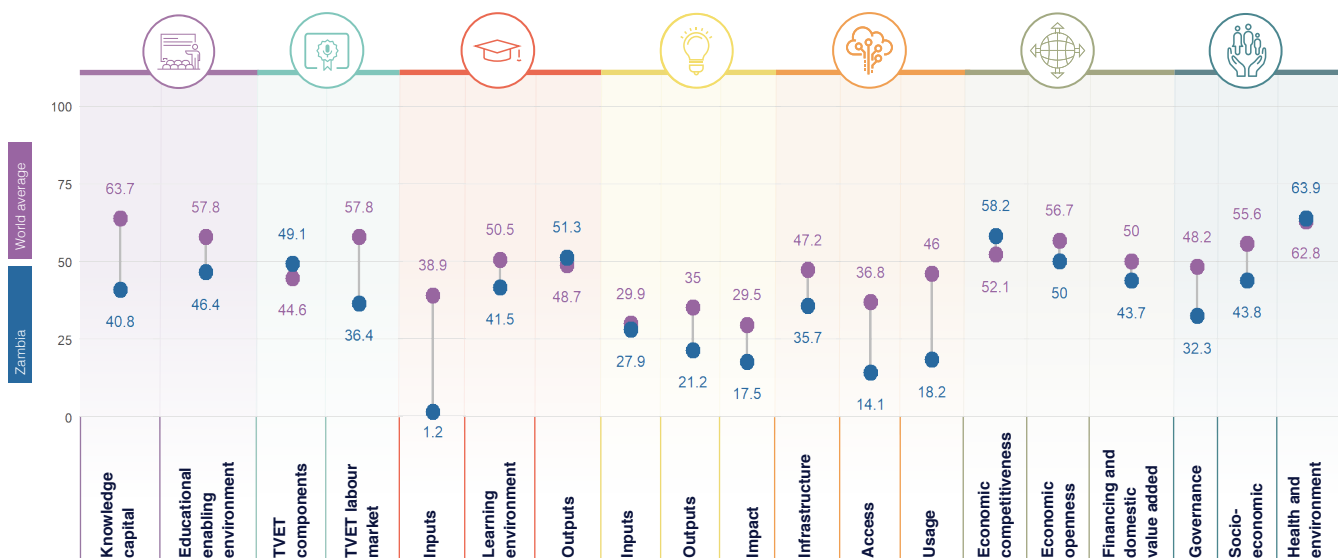
- Product concentration
- Completion rate in upper secondary education, wealth parity
- Debt dynamics
- Gross attendance ratio for tertiary education, location parity
- Intellectual property receipts (% total trade)

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	122	43.6
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	119	42.7
HIGHER EDUCATION	141	31.3
RESEARCH, DEVELOPMENT AND INNOVATION	123	22.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	140	22.6
ECONOMY	80	50.6
ENABLING ENVIRONMENT	113	46.7



## GKI PILLARS





# ZAMBIA

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Revolving capital	122	43.4
Enrollment	125	54.7
Net enrolment rate in primary education	124	54.7
Net enrolment rate in lower secondary education	116	116
Net enrolment rate in upper secondary education	116	116
Completion	125	41
Years of compulsory education in primary and secondary	126	53.8
Completion rate in upper secondary education	100	30
Success rate rate in the last grade of lower secondary education	113	26.1
Completion	121	32.7
Assessment of Grade 6 students in math, science and reading	116	116
Learning-adjusted years of schooling	128	25.7
<b>Educational enabling environment</b>		
Expenditure	59	14.5
Government expenditure on primary education (% GDP)	11	52.6
Government expenditure on secondary education (% GDP)	59	14.1
Government funding per primary student (% GDP per capita)	81	22.3
Government funding per secondary student (% GDP per capita)	116	116
Resources	81	21.1
Pupil-based teacher ratio in primary education	75	21.2
Pupil-based teacher ratio in secondary education	71	22.5
Schools with access to computers in primary education (%)	47	25.4
Schools with access to computers in secondary education (%)	116	116
Early learning	116	116
Class attendance rate in early childhood education	116	116
Proportion of children who are developmentally on track	116	116
Presence of children with stimulating home learning environments	116	116
Pupil-based teacher ratio in preprimary education	116	116
Quality and infrastructure	111	11.2
Completion rate in upper secondary education, gender parity	89	21.0
Completion rate in upper secondary education, wealth parity	117	2.3
Completion rate in upper secondary education, location parity	104	27.5
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications marketing	11	41.4
Firms offering formal training (%)	45	44.9
Labour force with short-cycle tertiary education (%)	42	70
Participation rate in formal and non-formal education and training	62	4.2
<b>TVET resources</b>		
Government expenditure on vocational education (%)	116	116
Share of students enrolled in secondary vocational programmes	116	116
Share of students enrolled in postsecondary vocational programmes	116	116
<b>TVET quality and infrastructure</b>		
Extent of staff training	110	43.3
Quality of vocational training	117	41
Ratio of high-skil TVET occupations earnings to average wage	1	100
Ratio of medium-skill TVET occupations earnings to average wage	79	50.0
<b>TVET labour market</b>		
Efficiency of the labour market	89	11.4
Firms considered well matched with workforce (%)	21	81
Employment educational mismatch (%)	85	80.6
Presence of skilled production workers	87	58.3
Unemployment rate with vocational education	80	65.2
Real TVET unemployment	116	116
Share of TVET occupations	142	11.5
Manufacturing employment (%)	98	25.5
<b>Quality and infrastructure</b>		
Enrollment in vocational education, gender parity	116	116
Useable employment rate	100	22.4

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	124	1.1
Government expenditure per tertiary student	116	116
Teaching staff compensation (% tertiary expenditure)	84	1.2
<b>Enrollment</b>		
Enrollment in bachelor's or equivalent level (%)	116	116
Enrollment in masters, doctoral or equivalent (%)	116	116
<b>Resources</b>		
Pupil-teacher ratio in tertiary education	116	116
Researcher in higher education (%)	116	116
<b>Learning environment</b>		
<b>Quality and infrastructure</b>		
Teachers in tertiary education, gender parity	116	116
Labour mobility rate	116	116
Academic freedom	100	52.0
<b>Quality and infrastructure</b>		
Class attendance rate in tertiary education, gender parity	49	37.1
Class attendance rate in tertiary education, wealth parity	73	10.5
Class attendance rate in tertiary education, location parity	36	6
<b>Outputs</b>		
<b>Enrollment</b>		
Educational attainment rate, bachelor's or equivalent	116	116
Educational attainment rate, master's or equivalent	116	116
Educational attainment rate, doctoral or equivalent	116	116
<b>Employment</b>		
Labour force participation rate with advanced education	73	72
Unemployment rate with advanced education	87	32.1
<b>Impact</b>		
University tertiary enrollment in R&D	108	32.2
OECD students per 1000 personnel in higher education	116	116
<b>Government expenditure and economic data</b>		
<b>Inputs</b>		
Government expenditure	11	27.2
Government expenditure	116	116
GDP (% GDP)	116	116
GERD per researcher	116	116
Researchers per thousand labour force	116	116
Tertiary graduates from RTOs programmes (%)	116	116
<b>Government expenditure and economic data</b>		
<b>Government expenditure</b>		
GERD performed by business enterprises (%)	116	116
GERD financed by business enterprises (%)	116	116
Researchers in business enterprises (%)	116	116
Firms that spend on R&D (%)	49	22.0
<b>Quality and infrastructure</b>		
High-skilled employment (%)	42	24.0
Intellectual property payments (% total trade)	81	5
State of cluster development	16	41.7
<b>Outputs</b>		
<b>Government expenditure</b>		
Average documents per researcher	116	116
Citations per document	115	51
Patent applications (per 100 billion GDP)	99	37.5
<b>Government expenditure and economic data</b>		
<b>Government expenditure</b>		
Intellectual property receipts (% total trade)	117	6
Research and development expenditure (per 100 billion GDP)	44	11.5
PCT applications (per 100 billion GDP)	121	35.0
Firms producing new goods and services (%)	79	24.8



# ZAMBIA

	Rank	Value
<b>Consumer electronics</b>	111	10.1
Treatment applications per 100 million GDP	70	22.9
Cultural goods exports (% exports)	113	3.4
Printing and publishing output (% manufactured output)	196	1.9
<b>Media</b>	130	17.5
<b>Books</b>	107	11.1
Books or institutions possession	86	5.3
Depth of innovative companies	80	45.0
ISO 9001 quality certificates (% GDP)	134	1.3
ISO 14001 environmental certificates (% GDP)	123	1.3
<b>Software</b>	111	1.8
CERD licensed from abroad (%)	116	1.9
Joint ventures per strategic industry deals (% GDP)	86	5.3
Computer software spending (% GDP)	113	1.8
<b>Government services</b>	86	10.0
New business density per thousand population	89	5.4
Firms with one or more patents (%)	72	84.0
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	146	22.3
<b>Infrastructure</b>	114	30.7
<b>Coverage</b>	107	14.0
3G/4G mobile network coverage (% population)	113	63.0
Secure Internet servers per 1 million population	127	1
Investment in telecommunication services (% GDP)	1	100
<b>Speed</b>	100	6.8
Mobile internet and download speeds	86	6.6
Fixed broadband upload and download speeds	90	4.7
Fixed broadband subscriptions (y speed) per hundred people	121	0.3
<b>Availability</b>	100	47.7
Fixed broadband bandwidth (% Gbps per capita)	128	80.9
Mobile broadband basket (% Gbps per capita)	116	42
Internet and telephony competition	131	30
<b>Access</b>	134	16.5
<b>Subscribers</b>	101	23.3
Active mobile-broadband subscriptions per fixed-line inhabitants	90	23.0
International Internet bandwidth per user	123	25.7
Households with Internet access at home (%)	126	17.0
<b>Skills and employment</b>	109	9.8
Individuals with standard ICT skills (%)	114	19
Tertiary graduates from ICT programmes (%)	116	19
ICT employment (%)	80	3.8
<b>Usage</b>	112	10.2
<b>Services</b>	101	10.0
Government online services	144	25.0
Fixed broadband internet traffic per subscription	90	3.8
Mobile broadband internet traffic per subscription	116	1.9
Internet users (%)	141	14.0
<b>Commerce</b>	100	21.7
ICT/FIT patent applications (per 100,000 GDP)	116	1.9
E-participation	100	31
Internet activities by individuals (%)	116	1.9
Trade in digitally deliverable services (% total trade)	137	12.0
<b>ECONOMY</b>	81	63.8
<b>Economic complexity metrics</b>	73	55.2
<b>Manufacture innovation</b>	107	10.0
Overhead capital formation (% GDP)	10	81.1
Logistics performance	109	35.2
Transport productive capacity	123	15.2
Building quality control	80	86.7

	Rank	Value
<b>Business agility</b>	81	63.8
Ease of starting a business	101	84.0
Recovery recovery rate	42	55.4
Entrepreneurial employee activity rate	116	1.9
Growth of corporate transactions	79	57.1
<b>Corporate openness</b>	88	30
Trade and investment	141	43.0
Trade (% GDP)	80	21.3
High-technology trade (% total trade)	102	27.0
Market concentration	147	27.5
Market concentration	113	60.0
Product diversity	11	101.7
Climate financial openness	1	100
Foreign direct investment, net inflows (% GDP)	75	47.0
Out dynamics	124	35.0
<b>Financing and domestic value added</b>	113	40.7
Financing and loans	100	21.0
Domestic credit to private sector (% GDP)	101	4.9
IMRS financing gap (% GDP)	85	87.0
Tax and contribution rate (% profit)	9	82.0
Bank nonperforming loans (%)	100	80.0
Unmet loan demand	111	13.7
Medium- and high-tech activities value added	100	11.3
Industry and services value added (% GDP)	21	71.4
Labour underutilization rate	110	46
Output per worker	108	3.0
<b>ENABLING ENVIRONMENT</b>	113	46.7
<b>Governance</b>	103	32.3
Political environment	81	38.0
Peace and stability	75	42.0
View and accountability	88	34.6
Quality of institutions	102	25.0
Rule of law	112	26.9
Control of corruption	114	26.4
Government effectiveness	125	21.1
<b>Socio-economic</b>	118	45.8
Gender equity	81	83.0
Female-to-male ratio in parliament	121	17.7
Female-to-male labour force participation	21	88.0
Female-to-male ratio in internal wage	85	84.0
Gender inequality	102	30
Social protection coverage (% population)	89	22.4
Adult literacy rate	79	80.0
Youth not in employment, education or training (%)	90	50.0
Standard of living	118	12.0
Poverty headcount ratio (% population)	100	25.0
GDP per capita	130	2.4
<b>Health and environment</b>	73	63.8
Health	101	65.1
Universal health coverage	115	35
Healthy life expectancy (years)	141	28
Under-five mortality rate	104	48.2
Environmental performance	1	101.0
Renewable energy consumption (%)	8	86.0
Household footprint per capita	11	87.1
Natural hazard exposure	55	60

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# ZIMBABWE

**GKI RANK** 130/154

**GKI SCORE** 35.1

**WORLD AVERAGE** 48.4

## COUNTRY PERFORMANCE SUMMARY

Zimbabwe is a weak performer in terms of its knowledge infrastructure. It ranks 130th out of 154 countries in the Global Knowledge Index 2021 and 23rd out of the 27 countries with medium human development.

### AREAS OF STRENGTH

- + Gross attendance ratio for tertiary education, gender parity
- + Ratio of medium-skill TVET occupations earnings to average wage
- + Researchers in higher education (%)
- + Cultural goods exports (% exports)
- + Renewable energy consumption (%)

### AREAS OF IMPROVEMENT

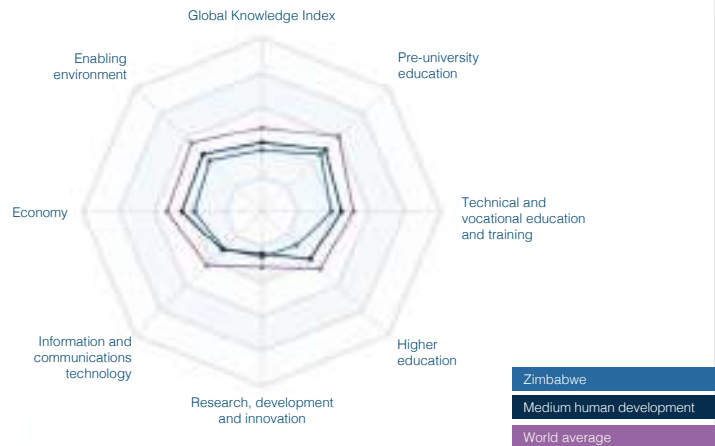
- Trademark applications (per 100 billion GDP)
- Gross fixed capital formation (% GDP)
- Industry and services value added (% GDP)
- Mobile broadband basket (% GNI per capita)
- Gross attendance ratio for tertiary education, location parity

### KEY INDICATORS

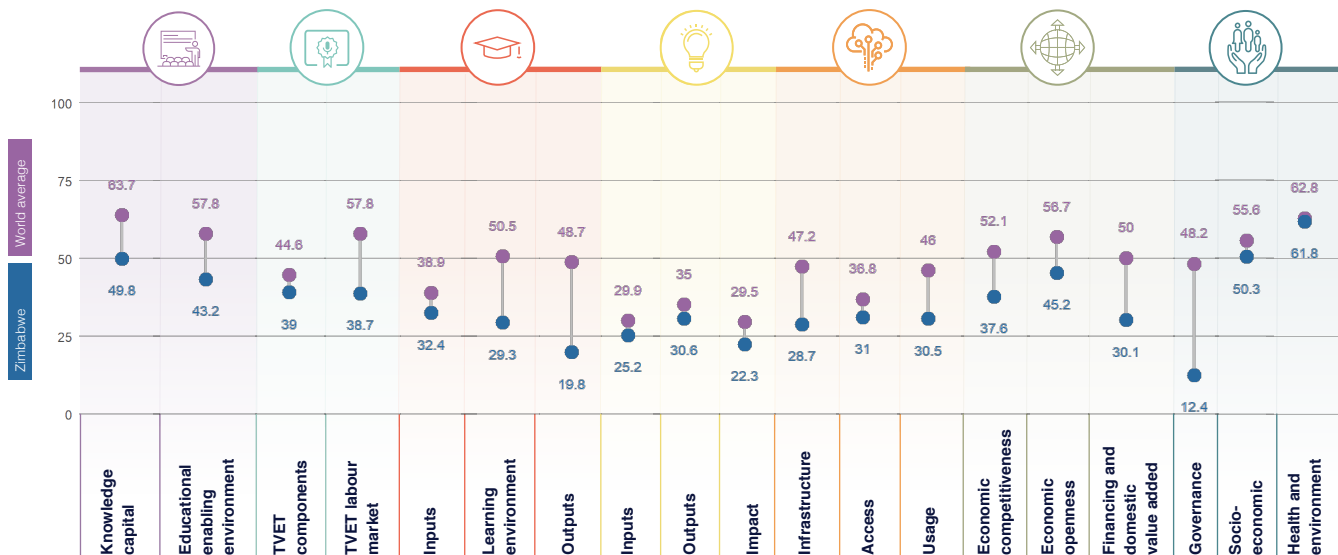
**GDP US\$ billions** 37,725  
**Population** 14,862,927  
**HDI** 0.571

## SECTORAL INDICES

	RANK	VALUE
PRE-UNIVERSITY EDUCATION	118	46.5
TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING	131	38.9
HIGHER EDUCATION	148	27.2
RESEARCH, DEVELOPMENT AND INNOVATION	103	26
INFORMATION AND COMMUNICATIONS TECHNOLOGY	113	30.1
ECONOMY	141	37.6
ENABLING ENVIRONMENT	131	41.5



## GKI PILLARS





# ZIMBABWE

	Rank	Value
<b>PRE-UNIVERSITY EDUCATION</b>		
Knowledge capital	117	46.3
Enrolment	110	80.7
Net enrolment rate in primary education	100	83.5
Net enrolment rate in lower secondary education	47	80.0
Net enrolment rate in upper secondary education	110	44.6
Completion	100	37.0
Years of compulsory education in primary and secondary	100	83.8
Completion rate in upper secondary education	100	6.7
Success rate rate in the last grade of lower secondary education	104	82.1
Completion	81	43.5
Assessment of 15-year-old students in math, science and reading	106	106
Learning-adjusted years of schooling	88	45.3
<b>Educational enabling environment</b>		
Expenditure	37	40.0
Government expenditure on primary education (% GDP)	11	84.3
Government expenditure on secondary education (% GDP)	85	20.7
Government funding per primary student (% GDP per capita)	72	33.8
Government funding per secondary student (% GDP per capita)	43	36.1
Resources	66	51.1
Pupil-based teacher ratio in primary education	80	80.7
Pupil-based teacher ratio in secondary education	80	86.1
Schools with access to computers in primary education (%)	71	33.1
Schools with access to computers in secondary education (%)	75	51.6
Early learning	109	40.0
Class attendance rate in early childhood education	23	57.7
Proportion of children who are developmentally on track	40	54.2
Proportion of children with stimulating home learning environments	97	26.6
Pupil-based teacher ratio in preprimary education	75	47.8
Quality and infrastructure	110	31.0
Completion rate in upper secondary education, gender parity	100	30.7
Completion rate in upper secondary education, wealth parity	110	2.3
Completion rate in upper secondary education, location parity	110	30.7
<b>TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING</b>		
<b>TVET occupations</b>		
Communications training and learning	87	33.0
Firms offering formal training (%)	76	31.7
Labour force with short-cycle tertiary education (%)	83	35.7
Participation rate in formal and non-formal education and training	106	106
TVET enrolment	106	37.3
Government expenditure on vocational education (%)	41	27.0
Share of students enrolled in secondary vocational programmes	108	108
Share of students enrolled in postsecondary vocational programmes	106	106
TVET quality and infrastructure	30	54.0
Extent of staff training	81	47.4
Quality of vocational training	104	43.8
Ratio of high-skill TVET occupations earnings to average wage	10	57.4
Ratio of medium-skill TVET occupations earnings to average wage	6	60.0
<b>TVET labour market</b>		
Efficiency of the labour market	30	33.0
Firms considered with inappropriately educated workforce (%)	8	31
Employment educational mismatch (%)	72	56.0
Proportion of skilled production workers	10	81.4
Unemployment rate with vocational education	106	52.0
Real TVET unemployment	100	11.0
Share of TVET occupations	147	11.5
Manufacturing employment (%)	110	24.4
Quality and infrastructure	141	27.0
Enrolment in vocational education, gender parity	106	106
Useable employment rate	105	27.0

	Rank	Value
<b>HIGHER EDUCATION</b>		
<b>Inputs</b>		
Expenditure	101	11.5
Government expenditure per tertiary student	73	11.5
Teaching staff compensation (% tertiary expenditure)	106	106
Enrolment	110	43
Enrolment in bachelor's or equivalent level (%)	110	42
Enrolment in masters, doctoral or equivalent (%)	104	4.6
Resources	11	81.1
Ratios/teacher ratio in tertiary education	77	71.1
Researcher in higher education (%)	7	81.1
<b>Learning environment</b>		
<b>Quality and academic freedom</b>		
Teachers in tertiary education, gender parity	94	42.0
Labour mobility rate	100	1.6
Academic freedom	108	20.1
<b>Equity and inclusiveness</b>		
Class attendance rate in tertiary education, gender parity	2	80
Class attendance rate in tertiary education, wealth parity	74	10.0
Class attendance rate in tertiary education, location parity	76	6
<b>Outputs</b>		
Skilled labour	101	34
Educational attainment rate, bachelor's or equivalent	80	6.3
Educational attainment rate, master's or equivalent	88	2.3
Educational attainment rate, doctoral or equivalent	82	1.6
Employment	100	20.0
Labour force participation rate with advanced education	107	22.0
Unemployment rate with advanced education	102	50.4
<b>Impact</b>		
University tertiary enrolment in R&D	104	30
CRIDE students per 1000 personnel in higher education	87	10.0
<b>Government expenditure and financing</b>		
Income	14	33.3
Share of GDP expenditure	11	33.3
GDP (% GDP)	106	106
GERD per researcher	106	106
Researchers per thousand labour force	80	1.2
Tertiary graduates from STEM programmes (%)	10	88.8
<b>Government expenditure and financing</b>		
GERD performed by business enterprises (%)	106	106
GERD financed by business enterprises (%)	106	106
Researchers in business enterprises (%)	106	106
Firms that spend on R&D (%)	54	24.0
Quality of research environment	100	100
High-skill employment (%)	83	24.4
Intellectual property payments (% total trade)	114	1.7
State of cluster development	100	31.4
<b>Outputs</b>		
<b>Government expenditure and financing</b>		
Average documents per researcher	78	40
Citations per document	80	10
Patent applications (per 100 billion GDP)	100	33.0
<b>Government expenditure and financing</b>		
Intellectual property receipts (% total trade)	74	8.3
Research and development expenditure (per 100 billion GDP)	106	106
PCT applications (per 100 billion GDP)	88	45.1
Firms producing new goods and services (%)	77	24.0





# ZIMBABWE

	Rank	Value
<b>Consumer electronics</b>	87	45.3
Television applications per 100 million GDP	122	1.3
Cultural goods exports (% exports)	91	46.5
Printing and publishing output (% manufactured output)	80	11.1
<b>Energy</b>	119	32.1
<b>Energy</b>	100	41.1
Renewable installations' proportion	103	9
Depth of innovative companies	79	30
ISO 9001 quality certificates (% GDP)	148	0.4
ISO 14001 environmental certificates (% GDP)	100	2.2
<b>Finance</b>	99	39.9
CERD received from abroad (%)	116	114
Joint ventures per strategic industry deals (% GDP)	95	19.6
Computer software spending (% GDP)	80	17.0
<b>Government services</b>	106	36
New business density per thousand population	80	40.5
Firms with new products/services (%)	81	37.5
<b>INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	111	36.2
<b>Infrastructure</b>	122	25.7
<b>Coverage</b>	104	32.1
3G/4G mobile network coverage (% population)	125	24.1
Secure Internet servers per 1 million population	117	1.4
Investment in telecommunication services (% GDP)	17	42.0
<b>Quality</b>	100	41.7
Mobile upload and download speeds	100	0.1
Fixed-broadband upload and download speeds	80	0.2
Fixed-broadband subscriptions (by speed) per hundred people	116	0.7
<b>Availability</b>	141	41.0
Fixed broadband bandwidth (% Gbps per capita)	113	88.6
Mobile broadband basket (% Gbps per capita)	152	0.2
Internet and telephony competition	118	80
<b>Access</b>	84	21
<b>Subscriptions</b>	111	21.0
Active mobile-broadband subscriptions per hundred inhabitants	100	25.1
International Internet bandwidth per user	89	25.4
Households with Internet access at home (%)	100	30.9
<b>Skills and employment</b>	97	21.1
Individuals with standard ICT skills (%)	114	19
Tertiary graduates from ICT programmes (%)	17	40.9
ICT employment (%)	100	0.8
<b>Usage</b>	122	26.0
<b>Services</b>	100	21.4
Government online services	102	27.8
Fixed broadband Internet traffic per subscription	72	10.0
Mobile broadband Internet traffic per subscription	113	1.3
Internet users (%)	100	21
<b>Commerce</b>	100	21.7
ICT/FIT patent applications (per 100,000 GDP)	114	19
E-participation	113	45.2
Internet activities by individuals (%)	114	19
Trade in digitally deliverable services (% total trade)	85	34.2
<b>ECONOMY</b>	141	37.9
<b>Economic competitiveness</b>	131	37.8
<b>Efficiency</b>	141	22.5
Overhead capital formation (% GDP)	144	0.7
Logistics performance	145	20
Transport productive capacity	104	20.0
Building quality control	80	46.7

	Rank	Value
<b>Business agility</b>	100	44.2
Ease of starting a business	100	30
Recovery recovery rate	100	19
Entrepreneurial employee activity rate	114	114
Growth of corporate transactions	89	42.0
<b>Customer experience</b>	128	40.2
Trust and dissatisfaction	100	40.7
Tax (% GDP)	141	0.8
High-technology trade (% total trade)	124	21.0
Market concentration	114	43.6
Market concentration	117	41.0
Product diversity	90	41.0
Climate financial openness	84	41.7
Foreign direct investment, net inflows (% GDP)	85	30.2
Cost dynamics	80	20
<b>Financing and domestic value added</b>	140	30.1
<b>Financing and costs</b>	107	26.1
Domestic credit to private sector (% GDP)	148	1.5
IMRS financing gap (% GDP)	114	114
Tax and contribution rate (% profit)	80	76
Bank nonperforming loans (%)	114	114
Unmet loan demand	147	21.1
Medium- and high-tech activities value added	75	24.0
Industry and services value added (% GDP)	152	15.2
Labour underutilisation rate	120	40.0
Output per worker	100	1.8
<b>ENABLING ENVIRONMENT</b>	121	41.5
<b>Governance</b>	148	12.4
<b>Political environment</b>	117	12.5
Peace and stability	101	15.2
View and accountability	100	17.4
Quality of institutions	146	12.5
Rule of law	147	7.7
Control of corruption	145	10.1
Government effectiveness	145	10.6
<b>Socio-economic</b>	87	30.3
<b>Gender equity</b>	20	71
Female-to-male ratio in parliament	40	40.7
Female-to-male labour force participation	30	46.7
Female-to-male ratio in internal wage	80	79.7
<b>Government</b>	80	22.0
Social protection coverage (% population)	110	13.0
Adult literacy rate	79	45.8
Youth not in employment, education or training (%)	80	45.2
<b>Standard of living</b>	107	23.0
Poverty headcount ratio (% population)	100	40.2
GDP per capita	124	1.8
<b>Health and environment</b>	82	41.8
<b>Health</b>	100	41
Universal health coverage	117	34
Healthy life expectancy (years)	147	29.0
Under-five mortality rate	100	54.3
<b>Environmental performance</b>	15	17.7
Renewable energy consumption (%)	11	44.4
Household footprint per capita	27	46.6
Natural resource exposure	80	52

\*All values are normalized to a scale from 0 (worst) to 100 (best).



# DEFINITIONS

## Pre-university education

### 1.1. Net enrolment rate in primary education\*

Total net enrolment rate, primary, both sexes (%)

Total number of students of the official age group for primary education who are enrolled, expressed as a percentage of the corresponding population. This variable measures the actual school participation of official school age population for primary education.

*UNESCO Institute for Statistics, UIS Database*

### 1.2. Net enrolment rate in lower secondary education

Total net enrolment rate, lower secondary, both sexes (%)

Total number of students of the official age group for lower secondary education who are enrolled, expressed as a percentage of the corresponding population. This variable measures the actual school participation of official school age population for lower secondary education.

*UNESCO Institute for Statistics, UIS Database*

### 1.3. Net enrolment rate in upper secondary education

Total net enrolment rate, upper secondary, both sexes (%)

Total number of students of the official age group for upper secondary education who are enrolled, expressed as a percentage of the corresponding population. This variable measures the actual school participation of official school age population for upper secondary education.

*UNESCO Institute for Statistics, UIS Database*

### 1.4. Years of compulsory education in primary and secondary

Number of years of compulsory primary and secondary education guaranteed in legal frameworks

The number of years of primary and secondary education to which children are legally entitled should ideally be the number of grades of primary and secondary education which young people are expected to have completed before being legally eligible to leave school. Compulsory education is the number of years or age span during which children are legally obliged to attend school.

*UNESCO Institute for Statistics, UIS Database*

### 1.5. Completion rate in upper secondary education

Completion rate, upper secondary education, both sexes (%)

Percentage of a cohort of children or young people aged 3-5 years above the intended age for the last grade of upper secondary education who have completed that grade. Individuals are assigned completion age group based on actual or assumed age at the beginning of the school year. The intended age for the last grade of upper secondary education is the age at which pupils would

enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade.

*UNESCO Institute for Statistics, UIS Database*

### 1.6. Gross intake ratio to the last grade of lower secondary education

Gross intake ratio, last grade of lower secondary general education, both sexes (%)

Total number of new entrants into the last grade of lower secondary general education, regardless of age, expressed as a percentage of the population at the intended entrance age to the last grade of lower secondary general education. The intended entrance age to the last grade is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade.

*UNESCO Institute for Statistics, UIS Database*

### 1.7. Assessment of 15-year-old students in math, science and reading

Assessment of 15-year-old students in mathematics, science and reading

The OECD Programme for International Student Assessment (PISA) assesses the extent to which 15-year-old students near the end of their compulsory education have acquired key knowledge and skills that are essential for full participation in modern societies. The assessment focuses on the core school subjects of science, reading and mathematics, in addition to students' proficiency in an innovative domain. PISA does not just ascertain whether students can reproduce knowledge; it also examines how well students can extrapolate knowledge from what they have learned and apply it in unfamiliar settings, both in and outside of school. The scores are calculated in each year so that the mean is 500 and the standard deviation 100. This variable is calculated by considering the average of the mean score of 15-year-old students in mathematics, science and literature literacy.

*Index team calculations based on Organisation for Economic Co-operation and Development, Programme for International Student Assessment*

### 1.8. Learning-adjusted years of schooling

Learning-adjusted years of schooling

Learning-adjusted years of school are calculated by multiplying the estimates of expected years of school by the ratio of most recent harmonized test scores to 625, where 625 corresponds to advanced attainment on the TIMSS (Trends in International Mathematics and Science Study) test, based on the methodology in Filmer et al., 2018. The objective of this index is to compare years of schooling across countries, while adjusting by the amount of learning that takes place during those years.

*World Bank, Human Capital Index*

### 1.9. Government expenditure on primary education (% GDP)

Government expenditure on primary education as a percentage of GDP (%)

Total general (local, regional and central) government expenditure on primary education (current, capital and transfers), expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. The variable is reported as a three-year average.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database*

### 1.10. Government expenditure on secondary education (% GDP)

Government expenditure on secondary education as a percentage of GDP (%)

Total general (local, regional and central) government expenditure on secondary education (current, capital and transfers), expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. The variable is reported as a three-year average.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database*

### 1.11. Government funding per primary student (% GDP per capita)\*

Initial government funding per primary student as a percentage of GDP per capita

Total initial funding from government (central, regional, local) for primary education per student enrolled at that level in a given year. The results are expressed as a percentage of GDP per capita.

*UNESCO Institute for Statistics, UIS Database*

### 1.12. Government funding per secondary student (% GDP per capita)

Initial government funding per secondary student as a percentage of GDP per capita

Total initial funding from government (central, regional, local) for secondary education per student enrolled at that level in a given year. The results are expressed as a percentage of GDP per capita.

*UNESCO Institute for Statistics, UIS Database*

### 1.13. Pupil-trained teacher ratio in primary education\*

Pupil-trained teacher ratio in primary education (headcount basis)

Average number of pupils per trained teacher in primary education based on headcounts of both pupils and teachers in a given academic year. A trained teacher is one who has re-

ceived at least the minimum organized pedagogical teacher training pre-service and in-service required for teaching at the relevant level in a given country in a given academic year.

*UNESCO Institute for Statistics, UIS Database*

### 1.14. Pupil-trained teacher ratio in secondary education\*

Pupil-trained teacher ratio in secondary education (headcount basis)

Average number of pupils per trained teacher in secondary education based on headcounts of both pupils and teachers in a given academic year. A trained teacher is one who has received at least the minimum organized pedagogical teacher training pre-service and in-service required for teaching at the relevant level in a given country in a given academic year.

*UNESCO Institute for Statistics, UIS Database*

### 1.15. Schools with access to computers in primary education (%)

Proportion of primary schools with access to computers for pedagogical purposes (%)

This variable measures the use of computers to support course delivery or independent teaching and learning needs in primary education. This may include activities using computers or the Internet to meet information needs for research purposes; develop presentations; perform hands-on exercises and experiments; share information; and participate in online discussion forums for educational purposes. A computer is a programmable electronic device that can store, retrieve and process data, as well as share information in a highly-structured manner. It performs high-speed mathematical or logical operations according to a set of instructions or algorithms. Computers include the following types: (i) a desktop computer usually remains fixed in one place; normally the user is placed in front of it, behind the keyboard; (ii) a laptop computer is small enough to carry and usually enables the same tasks as a desktop computer; it includes notebooks and netbooks but does not include tablets and similar handheld devices; and (iii) a tablet (or similar handheld computer) is a computer that is integrated into a flat touch screen, operated by touching the screen rather than using a physical keyboard.

*UNESCO Institute for Statistics, UIS Database*

### 1.16. Schools with access to computers in secondary education (%)

Proportion of secondary schools with access to computers for pedagogical purposes (%)

This variable measures the use of computers to support course delivery or independent teaching and learning needs in secondary education. This may include activities using computers or the Internet to meet information needs for research purposes; develop presentations; perform hands-on exercises and experiments; share information; and participate in online discussion forums for educational purposes. A computer is a programmable electronic

device that can store, retrieve and process data, as well as share information in a highly-structured manner. It performs high-speed mathematical or logical operations according to a set of instructions or algorithms. Computers include the following types: (i) a desktop computer usually remains fixed in one place; normally the user is placed in front of it, behind the keyboard; (ii) a laptop computer is small enough to carry and usually enables the same tasks as a desktop computer; it includes notebooks and netbooks but does not include tablets and similar handheld devices; and (iii) a tablet (or similar handheld computer) is a computer that is integrated into a flat touch screen, operated by touching the screen rather than using a physical keyboard.

*UNESCO Institute for Statistics, UIS Database*

#### **1.17. Gross enrolment ratio in early childhood education**

Gross enrolment ratio, early childhood education, both sexes (%)

Total enrolment in early childhood education regardless of age expressed as a percentage of the population of the official age.

*UNESCO Institute for Statistics, UIS Database*

#### **1.18. Proportion of children who are developmentally on track**

Proportion of children aged 24-59 months who are developmentally on track in health, learning and psychosocial well-being, both sexes (%)

This variable measures the proportion of children aged 24-59 months who have achieved the minimum number of milestones expected, defined as follows: (i) health - gross motor development, fine motor development and self-care; (ii) learning expressive language - literacy, numeracy, pre-writing and executive functioning; and (iii) psychosocial well-being - emotional skills, social skills, internalizing behavior and externalizing behavior.

*UNESCO Institute for Statistics, UIS Database*

#### **1.19. Proportion of children with stimulating home learning environments**

Percentage of children under 5 years with positive and stimulating home learning environments, both sexes (%)

Percentage of children aged 36-59 months who live in households where their mother, father or other adult household members engage with them in the following types of activities: reading or looking at picture books; telling stories; singing songs; taking children outside the home; playing; and naming, counting and/or drawing. The variable aims to evaluate learning environment to ensure that it promotes and does not harm children's development.

*UNESCO Institute for Statistics, UIS Database*

#### **1.20. Pupil-trained teacher ratio in pre-primary education\***

Pupil-trained teacher ratio in pre-primary education (headcount basis)

Average number of pupils per trained teacher in pre-pri-

mary education based on headcounts of both pupils and teachers in a given academic year. A trained teacher is one who has received at least the minimum organized pedagogical teacher training pre-service and in-service required for teaching at the relevant level in a given country in a given academic year.

*UNESCO Institute for Statistics, UIS Database*

#### **1.21. Completion rate in upper secondary education, gender parity**

Completion rate, upper secondary education, adjusted gender parity index (GPIA)

Percentage of a cohort of children or young people aged 3-5 years above the intended age for the last grade of upper secondary education who have completed that grade. The intended age for the last grade of upper secondary education is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade. The gender parity index represents the ratio of the variable value for one group (females) to that of the other (males). A value of exactly one indicates parity between the two groups.

*Index team calculations UNESCO Institute for Statistics, UIS Database*

#### **1.22. Completion rate in upper secondary education, wealth parity**

Completion rate, upper secondary education, adjusted wealth parity index (WPIA)

Percentage of a cohort of children or young people aged 3-5 years above the intended age for the last grade of upper secondary education who have completed that grade. The intended age for the last grade of upper secondary education is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade. Wealth parity index represents the ratio of the variable value for one group (bottom wealth quintiles) to that of the other (top wealth quintiles). Typically, the likely more disadvantaged group, bottom wealth quintiles, is the numerator. A value of exactly one indicates parity between the two groups.

*UNESCO Institute for Statistics, UIS Database*

#### **1.23. Completion rate in upper secondary education, location parity**

Completion rate, upper secondary education, adjusted location parity index (LPIA)

Percentage of a cohort of children or young people aged 3-5 years above the intended age for the last grade of upper secondary education who have completed that grade. The intended age for the last grade of upper secondary education is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade. Location parity index represents the ratio of the variable value (rural) for one group to that of the other (urban). Typically, the likely more disadvantaged group, rural, is the numerator. A value of exactly one indicates parity between the two groups.

*UNESCO Institute for Statistics, UIS Database*

## Technical and vocational education and training

### 2.1. Firms offering formal training (%)

Percent of firms offering formal training (%)

The percentage of firms offering formal training programs for their permanent, full-time employees.

*World Bank, Enterprise Surveys*

### 2.2. Labour force with short-cycle tertiary education (%)

Labour force participation rate with short-cycle tertiary education (%)

Labour force as a percent of the working age population. It measures the labour force participation rate for persons who attained a short-cycle tertiary education level. Education levels are classified in line with the International Standard Classification of Education (ISCED).

*Index team calculations based on International Labour Organization, ILOSTAT*

### 2.3. Participation rate in formal and non-formal education and training

Participation in formal and non-formal education training in the previous 12 months, youths and adults, both sexes (%)

Percentage of youth and adults (15-24 years and 25-64 years) participating in formal or non-formal education or training in the last 12 months as a percentage of the population of the same age bracket. Formal education and training is defined as education provided by the system of schools, colleges, universities and other formal educational institutions that normally constitutes a continuous 'ladder' of full-time education for children and young people, generally beginning at the age of five to seven and continuing to up to 20 or 25 years old. Non-formal education and training is defined as any organized and sustained learning activities that do not correspond exactly to the above definition of formal education.

*UNESCO Institute for Statistics, UIS database*

### 2.4. Government expenditure on vocational education (%)

Government expenditure on secondary and post-secondary non-tertiary vocational education as % of total government expenditure

Government expenditure on secondary and post-secondary non-tertiary vocational education, expressed as a percentage of total government expenditure on all sectors. Expenditure on education refers to expenditure on core educational goods and services, such as teaching staff, school buildings, or schoolbooks and teaching materials and peripheral educational goods and services such as ancillary services, general administration and other activities. The variable is reported as a three-year average.

*Index team calculations based on UNESCO Institute for Statistics, UIS database*

### 2.5. Share of students enrolled in secondary vocational programmes

Share of all students in secondary education enrolled in vocational programmes, both sexes (%)

Total number of students enrolled in vocational programmes in secondary education, expressed as a percentage of the total number of students enrolled in all programmes (vocational and general) at that level. Enrolment count should include all types of schools and education institutions, including public, private and all other institutions that provide organized educational programmes. Vocational education refers to education that is designed for learners to acquire the knowledge, skills and competencies specific to a particular occupation or trade or class of occupations or trades.

*UNESCO Institute for Statistics, UIS database*

### 2.6. Share of students enrolled in post-secondary vocational programmes\*

Share of all students in post-secondary non-tertiary education enrolled in vocational programmes, both sexes (%)

Total number of students enrolled in vocational programmes in post-secondary non-tertiary education, expressed as a percentage of the total number of students enrolled in all programmes (vocational and general) at that level. See variable 2.5 for more info.

*UNESCO Institute for Statistics, UIS database*

### 2.7. Extent of staff training

Extent of staff training

Based on response to the survey question: In your country, to what extent do companies invest in training and employee development? [1 = not at all; 7 = to a great extent].

*World Economic Forum, Executive Opinion Survey*

### 2.8. Quality of vocational training

Quality of vocational training

Based on response to the survey question: In your country, how do you assess the quality of vocational training? [1 = not at all; 7 = to a great extent].

*World Economic Forum, Executive Opinion Survey*

### 2.9. Ratio of high-skill TVET occupations' earnings to average wage\*

Mean nominal monthly earnings for high-skill TVET occupations relative to total average wage

The earnings of employees relate to the gross remuneration in cash and in kind paid to employees, as a rule at regular intervals, for time worked or work done together with remuneration for time not worked, such as annual vacation, other type of paid leave or holidays. High-skill TVET occupations comprise technicians and associate professionals according to the International Standard Classification of Occupations (ISCO 08,3).

*Index team calculations based on International Labour Organization, ILOSTAT*



## 2.10. Ratio of medium-skill TVET occupations' earnings to average wage\*

Mean nominal monthly earnings for medium-skill TVET occupations relative to total average wage

The earnings of employees relate to the gross remuneration in cash and in kind paid to employees, as a rule at regular intervals, for time worked or work done together with remuneration for time not worked, such as annual vacation, other type of paid leave or holidays. Medium-skill TVET occupations comprise clerical support workers (ISCO-08,4), craft and related trade workers (ISCO-08,7) and plant and machine operators and assemblers (ISCO-08,8) according to the International Standard Classification of Occupations.

*Index team calculations based on International Labour Organization, ILOSTAT*

## 2.11. Firms constrained with inadequately educated workforce (%)

Percent of firms identifying an inadequately educated workforce as a major constraint

Based on response to the survey question: To what degree is an inadequately educated workforce an obstacle to the current operations of this establishment? The computation of the variable is based on the rating of the obstacle as a potential constraint to the current operations of the establishment.

*World Bank, Enterprise Surveys*

## 2.12. Employment educational mismatch (%)

Proportion of employees who are over or undereducated

This variable is based on a 'normative' way of defining workers mismatch by educational level. That is, it is based on a standard level of education required in each occupation, and all workers who do not have that standard level are considered mismatched. The variable is calculated by summing the number of workers who are under-educated with the number of workers who are over-educated. The sum is divided by the total number of workers.

*Index team calculations based on International Labour Organization, ILOSTAT*

## 2.13. Proportion of skilled production workers

Proportion of skilled workers (out of all production workers) (%)

Skilled workers comprise workers in highly skilled production jobs, professionals whose tasks require extensive theoretical and technical knowledge, and workers in semi-skilled production jobs, technicians whose tasks require some level of mechanical or technical knowledge. 'All production workers' refers to the former two categories, in addition to workers in unskilled production jobs, whose tasks involve no specialized knowledge. This variable is computed using data from manufacturing firms only.

*World Bank, Enterprise Surveys*

## 2.14. Unemployment rate with vocational education

Unemployment rate among individuals with upper secondary, post-secondary non-tertiary, and short-cycle tertiary education

The unemployed comprise all persons of working age who were: a) without work during the reference period, i.e. were not in paid employment or self-employment; b) currently available for work, i.e. were available for paid employment or self-employment during the reference period; and c) seeking work, i.e. had taken specific steps in a specified recent period to seek paid employment or self-employment. Data are disaggregated by level of education, which refers to the highest level of education completed, classified according to the International Standard Classification of Education (ISCED). Education levels considered for this variable are upper secondary education (ISCED-11,3), post-secondary non-tertiary education (ISCED-11,4) and short-cycle tertiary education (ISCED-11,5).

*Index team calculations based on International Labour Organization, ILOSTAT*

## 2.15. Share of TVET occupations

Share of TVET occupations as a percentage of total employment

This variable measures the share of workers in TVET occupations among all workers. TVET occupations are categorized according to the International Standard Classification of Occupations (ISCO). This variable comprises technicians and associate professionals (ISCO-08,3), clerical support workers (ISCO-08,4), craft and related trades workers (ISCO-08,7) and plant and machine operators and assemblers (ISCO-08,8).

*Index team calculations based on International Labour Organization, ILOSTAT*

## 2.16. Manufacturing employment (%)

Manufacturing employment as a proportion of total employment (%)

This variable conveys the share of employment in manufacturing. Employment in manufacturing is defined based on the International Standard Industrial Classification of All Economic Activities (ISIC). Employment refers to all persons of working age who, during a specified brief period, were in paid employment (whether at work or with a job but not at work) or in self-employment (whether at work or with an enterprise but not at work).

*International Labour Organization, ILOSTAT*

## 2.17. Enrolment in vocational education, gender parity

15- to 24-year-olds enrolled in vocational education, adjusted gender parity

Percentage of young people aged 15-24 years participating in technical or vocational education either in formal or non-formal (e.g. work-based or other settings) education, on a given date or during a specified period. The gender parity index represents the ratio of the variable value for one group (females) to that of the other (males). A value of exactly one indicates parity between the two groups.

*Index team calculations based on UNESCO Institute for Statistics, UIS database*

## 2.18. Vulnerable employment rate

Vulnerable employment as a percentage of total employment (%)

The employed comprise all persons of working age who, during a specified brief period, were in one of the following categories: a) paid employment (whether at work or with a job but not at work); or b) self-employment (whether at work or with an enterprise but not at work). Data are disaggregated by status in employment according to the latest version of the International Standard Classification of Status in Employment (ICSE-93). Vulnerable employment refers to the sum of contributing family workers and own-account workers. It is computed as a percentage of total employment.

*Index team calculations based on International Labour Organization, ILOSTAT*

## Higher education

### 3.1. Government expenditure per tertiary student\*

Government expenditure per student in tertiary education (constant PPP\$)

Total general (local, regional and central) government expenditure per student in tertiary education, expressed in purchasing power parity (PPP) dollars at constant prices. Expenditure on education refers to expenditure on core educational goods and services, such as teaching staff, school buildings, or schoolbooks and teaching materials and peripheral educational goods and services such as ancillary services, general administration and other activities. This variable is calculated by dividing government expenditure on tertiary education in constant PPP\$ by the number of students enrolled in all tertiary education programmes.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database*

### 3.2. Teaching staff compensation (% tertiary expenditure)\*

Teaching staff compensation as a percentage of total expenditure in tertiary public institutions (%)

Teacher compensation expressed as a percentage of direct expenditure in public educational institutions (instructional and non-instructional) of the tertiary level of education. Financial aid to students and other transfers are excluded from direct expenditure. Staff compensation includes salaries, contributions by employers for staff retirement programmes and other allowances and benefits.

*UNESCO Institute for Statistics, UIS Database*

### 3.3. Enrolment in bachelor's or equivalent level (%)

Share of population of 18- to 24-year-olds enrolled in ISCED 6 (%)

This variable is calculated by dividing the number of individuals officially registered in tertiary education ISCED 6 programmes regardless of age by the number of individuals aged between 18-24 years. Programmes at ISCED level 6 refer to bachelor's levels or equivalent which are

often designed to provide participants with intermediate academic and/or professional knowledge, skills and competencies, leading to a first degree or equivalent qualification.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database and United Nations Department of Economic and Social Affairs, World Population Prospects*

### 3.4. Enrolment in master's, doctoral or equivalent (%)

Share of population of 22- to 40-year-olds enrolled in ISCED 7 and 8 (%)

This variable is calculated by dividing the number of individuals officially registered in tertiary education ISCED 7 and 8 programmes regardless of age by the number of individuals aged between 22-40 years. Programmes at ISCED 7 and 8 refer respectively to master's or equivalent levels, which are often designed to provide participants with advanced academic and/or professional knowledge, skills and competencies, leading to a second degree or equivalent qualification; and doctoral or equivalent level, designed primarily to lead to an advanced research qualification.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database and United Nations Department of Economic and Social Affairs, World Population Prospects*

### 3.5. Pupil-teacher ratio in tertiary education

Pupil-teacher ratio in tertiary education

Average number of pupils per teacher in tertiary education in a given academic year

*Index team calculations based on UNESCO Institute for Statistics, UIS Database*

### 3.6. Researchers in higher education (%)

Researchers (FTE) in higher education (%)

Researchers refers to all professionals engaged in the conception or creation of new knowledge (who conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods) broken down by the sectors they are employed in (business enterprise, government, higher education and private non-profit organizations). In the context of R&D statistics, the higher education sector comprises: (i) all universities, colleges of technology and other institutions providing formal tertiary education programmes (i.e. ISCED levels 5, 6, 7, or 8), whatever their source of finance or legal status; and (ii) all research institutes, centres, experimental stations and clinics that have their R&D activities under the direct control of, or are administered by, tertiary education institutions. The full-time equivalent (FTE) of R&D personnel is defined as the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group.

*UNESCO Institute for Statistics, UIS Database*

### 3.7. Teachers in tertiary education, gender parity

Female-to-male ratio of teachers in tertiary education

Teachers refers to all persons employed full-time or part-time in an official capacity to guide and direct the learning experience of pupils and students, irrespective of their qualifications or the delivery mechanism, i.e. face-to-face and/or at a distance. This definition excludes educational personnel who have no active teaching duties (e.g. headmasters, headmistresses or principals who do not teach) or who work occasionally or in a voluntary capacity in educational institutions. This variable measures the level of gender representation in the teaching profession rather than the effectiveness and quality of teaching.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database*

### 3.8. Inbound mobility rate\*

Inbound mobility rate, both sexes (%)

Number of students from abroad studying in a given country, expressed as a percentage of total tertiary enrolment in that country.

*UNESCO Institute for Statistics, UIS Database*

### 3.9. Academic freedom

Academic Freedom Index

Academic freedom is understood as the right of academics, without constriction by prescribed doctrine, to freedom of teaching and discussion, freedom in carrying out research and disseminating and publishing the results thereof, freedom to express freely their opinion about the institution or system in which they work, freedom from institutional censorship and freedom to participate in professional or representative academic bodies. The Academic Freedom Index is designed to provide an aggregated measure of the following 5 dimensions: freedom to research and teach, freedom of academic exchange and dissemination, institutional autonomy, campus integrity and freedom of academic and cultural expression. The variable ranges from 0 (low) to 1 (high).

*Coppedge, Michael et.al. (2021). "V-Dem Codebook v11.1" Varieties of Democracy Project*

### 3.10. Gross attendance ratio for tertiary education, gender parity

Gross attendance ratio for tertiary education, adjusted gender parity index (GPIA)

Number of students attending a given level of education at any time during the reference academic year, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age. The gender parity index represents the ratio of the variable value for one group (females) to that of the other (males). A value of exactly one indicates parity between the two groups.

*UNESCO Institute for Statistics, UIS Database*

### 3.11. Gross attendance ratio for tertiary education, wealth parity

Gross attendance ratio for tertiary education, adjusted wealth parity index (WPIA)

Number of students attending a given level of education at any time during the reference academic year, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age. Wealth parity index represents the ratio of the variable value for one group (bottom wealth quintiles) to that of the other (top wealth quintiles). Typically, the likely more disadvantaged group, bottom wealth quintiles, is the numerator. A value of exactly one indicates parity between the two groups.

*UNESCO Institute for Statistics, UIS Database*

### 3.12. Gross attendance ratio for tertiary education, location parity

Gross attendance ratio for tertiary education, adjusted location parity index (LPIA)

Number of students attending a given level of education at any time during the reference academic year, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age. Location parity index represents the ratio of the variable value (rural) for one group to that of the other (urban). Typically, the likely more disadvantaged group, rural, is the numerator. A value of exactly one indicates parity between the two groups.

*UNESCO Institute for Statistics, UIS Database*

### 3.13. Educational attainment rate, bachelor's or equivalent

Educational attainment rate, completed bachelor's or equivalent, population 25+ years

Distribution of the population aged 25 years and above according to the highest level of education attained or completed. This variable is usually presented for age groups of at least 25 years and older in order to ensure that the majority of the population has completed their education. Younger age groups are often still enrolled in the education system. This variable measures the percentage of the population who have completed at least their bachelor's. Education levels are defined according to ISCED.

*UNESCO Institute for Statistics, UIS Database*

### 3.14. Educational attainment rate, master's or equivalent

Educational attainment rate, completed master's or equivalent, population 25+ years

Distribution of the population aged 25 years and above according to the highest level of education attained or completed. This variable is usually presented for age groups of at least 25 years and older in order to ensure that the majority of the population has completed their education. Younger age groups are often still enrolled in the education system. This variable measures the percentage

of the population who have completed at least their master's. Education levels are defined according to ISCED. UNESCO Institute for Statistics, UIS Database

### 3.15. Educational attainment rate, doctoral or equivalent\*

Educational attainment rate, completed doctoral or equivalent, population 25+ years

Distribution of the population aged 25 years and above according to the highest level of education attained or completed. This variable is usually presented for age groups of at least 25 years and older in order to ensure that the majority of the population has completed their education. Younger age groups are often still enrolled in the education system. This variable measures the percentage of the population who have completed at least their doctoral or equivalent. Education levels are defined according to ISCED.

*UNESCO Institute for Statistics, UIS Database*

### 3.16. Labour force participation rate with advanced education

Labour force participation rate with advanced education (% of total labour force) (15+)

The labour force participation rate with an advanced level of education (ISCED 5, 6, 7 and 8) is the labour force with an advanced level education as a percent of the working age population with an advanced level of education. The labour force comprises all persons of working age who furnish the supply of labour for the production of goods and services during a specified time-reference period. It refers to the sum of all persons of working age who are employed and those who are unemployed; while advanced education comprises short-cycle tertiary education, a bachelor's degree or equivalent education level, a master's degree or equivalent education level, or doctoral degree or equivalent education level according to ISCED.

*International Labour Organization, ILOSTAT*

### 3.17. Unemployment rate with advanced education

Unemployment rate with advanced education (% of total labour force with advanced education) (15+)

The percentage of the labour force with an advanced level of education (ISCED 5, 6, 7 and 8) who are unemployed. The unemployment rate is the number of persons who are unemployed as a percent of the total number of employed and unemployed persons (i.e., the labour force). The unemployed comprise all persons of working age who were: a) without work during the reference period, i.e. were not in paid employment or self-employment; b) currently available for work, i.e. were available for paid employment or self-employment during the reference period; and c) seeking work, i.e. had taken specific steps in a specified recent period to seek paid employment or self-employment.

*International Labour Organization, ILOSTAT*

### 3.18. University-industry collaboration in R&D

University-industry collaboration in R&D

Based on response to the survey question: In your coun-

try, to what extent do business and universities collaborate on research and development (R&D)? [1 =do not collaborate at all; 7 = collaborate extensively].

*World Economic Forum, Executive Opinion Survey*

### 3.19. Citable documents per R&D personnel in higher education\*

Citable documents normalized by total R&D personnel in higher education (FTE)

Citable documents refers to the number of citable documents published by a journal in the three previous years (selected year documents are excluded). Exclusively articles, reviews and conference papers are considered. Total R&D personnel (FTE) in higher education refers to all persons engaged directly in R&D, whether employed by the statistical unit or external contributors fully integrated into the statistical unit's R&D activities, as well as those providing direct services for the R&D activities (such as R&D managers, administrators, technicians and clerical staff) in higher education. In the context of R&D statistics, the higher education sector comprises: (i) all universities, colleges of technology and other institutions providing formal tertiary education programmes (i.e. ISCED levels 5, 6, 7, or 8), whatever their source of finance or legal status; and (ii) all research institutes, centres, experimental stations and clinics that have their R&D activities under the direct control of, or are administered by, tertiary education institutions.

*Index team calculations based on Scimago Journal, Scimago Journal and Country Rank and UNESCO Institute for Statistics, UIS Database*

## Research, development and innovation

### 4.1. GERD (% GDP)

GERD as a percentage of GDP

Gross domestic expenditure on R&D (GERD) as a percentage of GDP is the total intramural expenditure on R&D performed in the national territory during a specific reference period expressed as a percentage of GDP of the national territory.

*UNESCO Institute for Statistics, UIS Database*

### 4.2. GERD per researcher\*

GERD per researcher, FTE (in thousand PPP\$ constant prices, 2005)

Total intramural expenditure on R&D performed during a specific reference period per researcher, expressed in purchasing power parity (PPP) dollars at constant prices. See variable 3.6 for the definition of FTE researchers.

*UNESCO Institute for Statistics, UIS Database*

### 4.3. Researchers per thousand labour force

Researchers per thousand labour force (FTE)

Researchers refers to the number of professionals engaged in the conception or creation of new knowledge



(who conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods) during a given year expressed as a proportion of a labour force of 1,000 people. The labour force comprises all persons of working age who furnish the supply of labour for the production of goods and services during a specified time-reference period. It refers to the sum of all persons of working age who are employed and those who are unemployed.

*UNESCO Institute for Statistics, UIS Database*

#### 4.4. Tertiary graduates from STEM programmes (%)

Percentage of graduates from science, technology, engineering and mathematics programmes in tertiary education, both sexes (%)

Refers to the percentage of students who have successfully graduated from tertiary education in information and communication technologies, natural sciences, mathematics and statistics or engineering, manufacturing and construction programmes in a given academic year. Education programmes and related qualifications are classified according to ISCED.

*UNESCO Institute for Statistics, UIS Database*

#### 4.5. GERD performed by business enterprises (%)\*

GERD performed by business enterprises as a percentage of GDP

GERD performed by business enterprises as a percentage of GDP is the total intramural expenditure on R&D performed during a specific reference period corresponding to business enterprise, independent of the source of funds, as a percentage of GDP. In the context of R&D statistics, the business enterprise sector comprises: (i) all resident corporations, including not only legally incorporated enterprises, regardless of the residence of their shareholders. This group includes all other types of quasi corporations, i.e. units capable of generating a profit or other financial gain for their owners, recognized by law as separate legal entities from their owners, and set up for purposes of engaging in market production at prices that are economically significant; (ii) the unincorporated branches of non-resident enterprises are deemed to be resident because they are engaged in production on the economic territory on a long-term basis; and (iii) all resident non-profit institutions (NPIs) that are market producers of goods or services or serve business. This sector comprises both private and public enterprises.

*UNESCO Institute for Statistics, UIS Database*

#### 4.6. GERD financed by business enterprises (%)

GERD financed by business enterprises %

Refers to the total intramural expenditure on R&D performed during a specific reference period financed by business enterprise as a percentage of total gross expenditure on R&D. See variable 4.5 for the definition of business enterprises.

*UNESCO Institute for Statistics, UIS Database*

#### 4.7. Researchers in business enterprises (%)

Researchers (FTE) in business enterprises %

Researchers refers to professionals engaged in the conception or creation of new knowledge (who conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods) employed by business enterprises. See variable 3.6 for the definition of FTE researchers and variable 4.6 for the definition of business enterprises.

*UNESCO Institute for Statistics, UIS Database*

#### 4.8. Firms that spend on R&D (%)

Percentage of firms that spend on research and development

The percentage of firms that spent on formal research and development activities during the last fiscal year out of all firms in the manufacturing and services sectors. This corresponds to formal (registered) firms classified with ISIC codes 15-37, 45, 50-52, 55, 60-64 and 72 (ISIC Rev.3.1) companies.

*World Bank, Enterprise Surveys*

#### 4.9. High-skilled employment (%)

High-skilled employment share as a percentage of the total number of employed people (%)

The employed comprise all persons of working age who, during a specified brief period, were in one of the following categories: a) paid employment (whether at work or with a job but not at work); or b) self-employment (whether at work or with an enterprise but not at work). The working-age population is defined as all persons aged 15 and older. High skill employment refers to occupation 1, Managers; and 2, Professionals based on the International Standard Classification of Occupation (ISCO-08). Total employed people refer to employment in all occupation levels.

*Index team calculations based on International Labour Organization, ILOSTAT*

#### 4.10. Intellectual property payments (% total trade)\*

Intellectual property payments, % of total trade

Charges for the use of intellectual property (credit) are payments between non-residents and residents for the authorized use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs including trade secrets and franchises) and for the use, through licensing agreements, of produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast). Total trade is the sum of exports and imports of goods and services excluding trade in government goods and services divided by two.

*Index team calculations based on International Monetary Fund, Balance of Payments and International Investment Position Statistics*

#### 4.11. State of cluster development

State of cluster development

Based on response to the survey question: In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services and specialized institutions in a particular field)? [1 = non-existent; 7 = widespread in many fields].

*World Economic Forum, Executive Opinion Survey*

#### 4.12. Average documents per researcher\*\*

Average documents per researcher (FTE)

Average published documents per researcher. See variable 3.6 for the definition of FTE and variable 3.19 for the definition of citable documents.

*Index team calculations based on UNESCO Institute for Statistics, UIS Database and Scimago Journal, Scimago Journal & Country Rank*

#### 4.13. Citations per document\*

Citations per document

Average number of citations per document published in a specific year.

*Scimago Journal, Scimago Journal and Country Rank*

#### 4.14. Patent applications (per 100 billion GDP)\*\*

Patent resident applications per 100 billion US\$ GDP (2017 PPP)

This variable measures the total count of resident patent applications filed under the Patent Cooperation Treaty (PCT), by priority date and inventor nationality, using fractional count if an application is filed by multiple inventors per 100 billion PPP\$ GDP constant.

*World Intellectual Property Organization, Intellectual Property Statistics Data Center*

#### 4.15. Intellectual property receipts (% total trade)\*\*\*

Intellectual property receipts, % of total trade

Charges for the use of intellectual property not included elsewhere receipts (% of total trade) according to the Extended Balance of Payments Services Classification EB-OPS 2010. Receipts are between residents and non-residents for the use of proprietary rights (such as patents, trademarks, copyrights, industrial processes and designs including trade secrets, franchises), and for licenses to reproduce or distribute (or both) intellectual property embodied in produced originals or prototypes (such as copyrights on books and manuscripts, computer software, cinematographic works and sound recordings) and related rights (such as for live performances and television, cable, or satellite broadcast). Total trade is the sum of exports and imports of goods and services excluding trade in government goods and services divided by two.

*Index team calculations based on International Monetary Fund, Balance of Payments and International Investment Position Statistics*

#### 4.16- Industrial design applications (per 100 billion GDP)\*

Industrial design resident applications per 100 billion US\$ GDP (2017 PPP)

Refers to the number of designs contained in industrial design applications filed at a given national or regional office per 100 billion PPP\$ GDP constant. Data refer to industrial design application design counts – the number of designs contained in applications – and include designs contained in resident industrial design applications filed at both the national office and the regional office, where applicable. Resident design counts refers to the number of designs contained in applications filed with the IP office of – or at an office acting on behalf of – the state or jurisdiction in which the applicant has residence. For example, an application filed with the Japan Patent Office (JPO) by a resident of Japan is considered a resident application for Japan. Similarly, an application filed with the Office for Harmonization in the Internal Market (OHIM) by an applicant who resides in any of the OHIM member states, such as Italy, is considered as a resident application for that member state (Italy).

*World Intellectual Property Organization, Intellectual Property Statistics Data Center*

#### 4.17. PCT applications (per 100 billion GDP)\*\*

PCT applications per 100 billion US\$ GDP (2017 PPP)

This variable measures the total count of applications filed under the Patent Cooperation Treaty (PCT), by priority date and inventor nationality, using fractional count if an application is filed by multiple inventors per 100 billion PPP\$ GDP constant.

*Index team calculations based on World Intellectual Property Organization, Intellectual Property Statistics Data Center and World Bank, World Development Indicators*

#### 4.18. Firms producing new goods and services (%)

Percent of firms producing new goods and services

Refers to the percentage of firms that introduced new or significantly improved products or services over the last three years.

*World Bank, Enterprise Surveys*

#### 4.19. Trademark applications (per 100 billion GDP)\*

Trademark resident applications per 100 billion US\$ GDP (2017 PPP)

Trademark applications filed are applications to register a trademark with a national or regional Intellectual Property (IP) offices and designations received by relevant offices through the Madrid System. A trademark is a sign which identifies certain goods or services as those produced or provided by a specific person or enterprise. It provides protection to the owner by ensuring the exclusive right to use it to identify goods or services, or to authorize another to use it in return for payment. A resident filing refers to an application filed in the country by its own resident. Trademark application class counts refers to the number of classes specified in resident trademark applications

and include those filed at both the national office and the regional office, where applicable. This variable is reported per 100 billion PPP\$ GDP constant.

*World Intellectual Property Organization, Intellectual Property Statistics Data Center*

#### 4.20. Cultural goods exports (% exports)\*\*

Share of exports of cultural goods as a percentage of total goods exported

The value of exported cultural goods expressed as percentage of the value of all exported goods. Cultural goods refer to consumer goods that convey ideas, symbols and ways of life, i.e. books, magazines, multimedia products, software, recordings, films, videos, audio-visual programmes, crafts and fashion.

*UNESCO Institute for Statistics, UIS Database*

#### 4.21. Printing and publishing output (% manufactured output)\*

Printing and publishing as a percentage of manufactured total output

Measures gross output of printing and publishing as percentage of gross output of total manufacturing industries. The printing activities include, print products, such as newspapers, books, periodicals, business forms, greeting cards, and other materials and perform support activities, such as bookbinding, plate-making services and data imaging. Publishing involves financial, technical, artistic, legal and marketing activities, among others.

*Index team calculations based on United Nations Industrial Development Organization Statistics, INDSTAT 2 2021, ISIC Revision 3*

#### 4.22. Research institutions prominence\*\*\*

Research institutions prominence

Measures the prominence and standing of private and public research institutions. The score is computed as the sum of the inverse ranks of all research institutions in a country included in the Scimago Institutions Rankings (SIR). Research Institutions comprises private and public universities, governmental agencies, corporate entities and health institutes.

*World Economic Forum, Global Competitiveness Index based on Scimago, Institutions Rankings*

#### 4.23. Growth of innovative companies

Growth of innovative companies

Based on response to the survey question: In your country, to what extent do new companies with innovative ideas grow rapidly? [1 = not at all; 7 = to a great extent].

*World Economic Forum, Executive Opinion Survey*

#### 4.24. ISO 9001 quality certificates (% GDP)\*

ISO 9001 quality management certificates (per billion PPP\$ GDP)

ISO 9001 is defined as the international standard that

specifies requirements for a quality management system (QMS). It can be used by any organization, large or small, regardless of its field of activity. GDP data are expressed in billion 2017 US purchasing power parity (PPP) dollars.

*Index team calculations based on International Organization for Standardization, ISO Survey Data and International Monetary Fund, World Economic Outlook Database*

#### 4.25. ISO 14001 environmental certificates (% GDP)\*

ISO 14001 environmental certificates (per billion PPP\$ GDP)

ISO 14001 is defined as the international standard that specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance. It can be used by any organization, large or small, regardless of its field of activity. GDP data are expressed in billion 2017 US purchasing power parity (PPP) dollars.

*Index team calculations based on International Organization for Standardization, ISO Survey Data and International Monetary Fund, World Economic Outlook Database*

#### 4.26. GERD financed from abroad (%)

GERD financed by the rest of the world (abroad) (%)

Total intramural expenditure on R&D performed during a specific reference period, financed by 'the rest of the world' as a percentage of total gross expenditure on R&D.

*UNESCO Institute for Statistics, UIS database*

#### 4.27. Joint ventures per strategic alliance deals (% GDP)\*

Joint ventures/strategic alliances per billion PPP\$ GDP

Number of deals, fractional counting (per billion PPP\$ GDP). It is from Thomson Reuters data on joint ventures/strategic alliance deals, per deal, with details on the country of origin of partner firms, among others. For each year, each participating nation of each company in a deal (n countries per deal) receives, per deal, a score equivalent to 1/n (with the effect that all country scores add up to the number of deals reported that year). The data are reported per billion PPP\$ GDP.

*Cornell University, INSEAD, and WIPO, The Global Innovation Index datasets based on Thomson Reuters, Thomson One Banker Private Equity, SDC Platinum database and International Monetary Fund World Economic Outlook Database*

#### 4.28. Computer software spending (% GDP)

Total computer software spending (% of GDP)

Computer software spending includes the total value of purchased or leased packaged software such as operating systems, database systems, programming tools, utilities and applications. It excludes expenditures for internal software development and outsourced custom software development. The data are a combination of actual figures and estimates. Data are reported as a percentage of GDP.

*Cornell University, INSEAD, and WIPO, The Global Inno-*



vation Index datasets based on Thomson Reuters, Thomson One Banker Private Equity, SDC Platinum database and International Monetary Fund World Economic Outlook Database

#### 4.29. New business density per thousand population\*

New business density per thousand population

The number of newly registered firms with limited liability per 1,000 working-age people (ages 15-64) per calendar year.

*World Bank, Entrepreneurship Survey and Database*

#### 4.30. Firms with new product/service (%)

Percentage of firms whose new product/service is also new to the main market

Percentage of firms that introduced new or significantly improved products or services over the last three years that were also new for the firms' main product and services market.

*World Bank, Enterprise Surveys*

### Information and communications technology

#### 5.1. 3G/4G mobile network coverage (% population)

Percentage of the population covered by at least 3G/4G mobile networks (%)

Percentage of the population covered by at least an LTE/WiMAX mobile network refers to the percentage of inhabitants that live within range of LTE/LTE-Advanced; mobile WiMAX/WirelessMAN or other more advanced mobile-cellular networks; irrespective of whether or not they are subscribers. It excludes people covered only by HSPA; UMTS; EV-DO and previous 3G technologies; and also excludes fixed WiMAX coverage. Percentage of the population covered by at least a 3G mobile network refers to the percentage of inhabitants that are within range of at least a 3G mobile-cellular signal; irrespective of whether or not they are subscribers. This variable measures the equal-weighted average of the variables 'percentage of the population covered by at least an LTE/WiMAX mobile network' and 'percentage of the population covered by at least a 3G mobile network'.

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

#### 5.2. Secure Internet servers per 1 million population\*\*\*

Secure Internet servers (per 1 million people)

Secure servers are servers using encryption technology in Internet transactions. The number of secure Internet servers, from the Netcraft Secure Server Survey, indicates how many companies conduct encrypted transactions over the Internet. The survey examines the use of encrypted transactions through extensive automated exploration, tallying the number of websites using a secure socket layer (SSL). Data are divided by the mid-year population and multiplied by one million. The Internet provides access to

the worldwide network. Broadband refers to technologies that provide Internet speeds of at least 256 (Kbit/s) a second of upstream and downstream capacity and includes digital subscriber lines, cable modems, satellite broadband Internet, fiber-to-home Internet access, Ethernet local access networks and wireless area networks.

*World Bank, World Development Indicators based on Netcraft and World Bank population estimates*

#### 5.3. Investment in telecommunication services (% GDP)\*

Annual investment in telecommunication services (% of GDP)

Annual investment in telecom services refers to the investment during the financial year made by entities providing telecommunication networks and/ or services (including fixed, mobile and Internet services, as well as the transmission of TV signals) for acquiring or upgrading fixed assets (usually referred to as CAPEX), less disinvestment owing to disposals of fixed assets. Fixed assets should include tangible assets such as buildings and networks and non-tangible assets such as computer software and intellectual property. The variable is a measure of investment made by entities providing telecommunication networks and/or services in the country and includes expenditure on initial installations and additions to existing installations where the usage is expected to be over an extended period of time. It excludes expenditure on fees for operating licenses and the use of radio spectrum, scaled by GDP in current US\$. This variable is reported as a three-year average.

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ ICT Indicators Database and World Bank, World Development Indicators*

#### 5.4. Mobile upload and download speeds

Average mobile upload and download speeds

This variable measures the equal-weighted average of the variables 'average mobile upload speed' and 'average mobile download speed'. The upload and download speed averages are based on Ookla's analysis of Speedtest data. A faster speed is a positive variable for better performance. The underlying data unit is Mbps. Linear transformation of data values to scale 0-100 where 100=most inclusive environment.

*Index team calculations based on The Economist Intelligence Unit, The Inclusive Internet Index*

#### 5.5. Fixed-broadband upload and download speeds

Average fixed broadband upload and download speeds

This variable measures the equal-weighted average of the variables 'average fixed-broadband upload speed' and 'average fixed broadband download speed'. Averages for all years are based on Ookla's analysis of Speedtest data collected between Oct 1st – Sep 30th of each calendar year. The underlying data unit is Mbps. Linear transformation of data values to scale 0-100 where 100=most inclusive environment.

*Index team calculations based on The Economist Intelligence Unit, The Inclusive Internet Index*



## 5.6. Fixed-broadband subscriptions by speed per hundred people

Fixed broadband subscriptions (weighted by speed) per 100 people

Fixed-broadband subscriptions by speed tier captures the average speed of fixed (wired)-broadband Internet subscriptions. It is derived from data on the number of subscriptions with a maximum speed below 2 Mbit/s ('slow' data are speed tier), between 2 and 10 Mbit/s ('medium' speed tier) and equal to or above 10 Mbit/s ('fast' speed tier). To combine both the speed (quality) and penetration (quantity) dimensions the 'fixed-broadband subscriptions (weighted by speed) per 100 population' variable refers to the weighted sum of subscriptions by speed tier (slow, medium and fast) divided by total population. It is computed as follows:  $((0.1 \times \text{slow} + 0.35 \times \text{medium} + \text{fast}) / \text{population}) \times 100$ .

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

## 5.7. Fixed broadband basket (% GNI per capita)\*\*

Fixed broadband basket, 5 GB, as a percentage of GNI per capita

Fixed broadband price basket (5GB) refers to the cheapest plan providing at least 5GB of monthly high-speed data (equal to or above 256 Kbit/s) over a 30-day (or four weeks) period of time from the operator with the largest market share in each economy. The variable is reported as a percentage of GNI per capita.

*International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

## 5.8. Mobile broadband basket (% GNI per capita)\*\*

Data-only mobile broadband basket, 1.5 GB, as a percentage of GNI per capita

Based on a monthly data usage of a minimum of 1.5 GB. For plans that limit the monthly amount of data transferred by including data volume caps below 1.5 GB, the cost for the additional bytes is added to the basket. The data-only mobile broadband basket is based on the most common contract modality (prepaid or postpaid) in the economy in question, i.e. if more than 50 per cent of subscriptions are prepaid, then prepaid is selected. Otherwise, a postpaid plan is selected. The variable is reported as a percentage of GNI per capita.

*International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

## 5.9. Internet and telephony competition

Level of Internet and telephony competition

Measures the level of competition in 17 categories of ICT services, including fixed wireless broadband, Internet services, international fixed long distance calls and international gateways. For each economy, the level of competition in each of the categories is assessed as follows: monopoly, partial competition and full competition. The index is calculated as the average of points obtained in each of the 17 categories for which data are available. A

monopoly reflects that the service provided is exclusive to one operator and scores 0. Partial competition, scoring one, means that the regulatory framework limits the number of licenses and a full competition, assigned a score of two, where any company can be licensed to provide the service (categories with no data available are excluded from the computation and the total is allocated to the number of categories in the country).

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication Regulatory Database*

## 5.10. Active mobile-broadband subscriptions per hundred inhabitants

Active mobile broadband subscriptions per 100 inhabitants

Active mobile-broadband subscriptions refers to the sum of active handset-based and computer-based (USB/dongles mobile-broadband subscriptions to the public Internet. It covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets. Subscriptions must include a recurring subscription fee or pass a usage requirement – users must have accessed the Internet in the last three months. The variable is reported per 100 inhabitants.

*International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

## 5.11. International Internet bandwidth per user\*\*

International Internet bandwidth per Internet user (Kb/s)

International Internet bandwidth refers to the total used capacity of international Internet bandwidth in Kbits per second (Kbits/s). It is measured as the sum of the used capacity of all Internet exchanges (locations where Internet traffic is exchanged) offering international bandwidth. If capacity is asymmetric (i.e. with more incoming [downlink] than outgoing [uplink] capacity); then the incoming (downlink) capacity should be provided.

*International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

## 5.12. Households with Internet access at home (%)

Estimated proportion of households with Internet access at home

This variable includes both; estimates and survey data corresponding to the proportion of households with Internet. The Internet is a world-wide public computer network. It provides access to a number of communication services including the World Wide Web and carries email; news; entertainment and data files. Access is not assumed to be only via a computer - it may also be by mobile phone; games machine; digital TV etc. The proportion of households with Internet access at home is calculated by dividing the number of in-scope households with Internet access by the total number of in-scope households.

*International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

### 5.13. Individuals with standard ICT skills (%)

Individuals with standard ICT skills (%)

This variable refers to ICT skills, defined as having undertaken certain computer-related activities in the last three months. Standard skills refer to the average of the values among the following four computer-based activities within a country: (i) using basic arithmetic formula in a spreadsheet; (ii) connecting and installing new devices; (iii) creating electronic presentations with presentation software; and (iv) finding, downloading, installing and configuring software.

*International Telecommunication Union, Digital Development Dashboard*

### 5.14. Tertiary graduates from ICT programmes (%)\*

Percentage of graduates from tertiary education graduating from information and communication technologies programmes, both sexes (%)

A graduate is defined as a 'person who, during the reference school or academic year, has successfully completed an education programme'. The field of education refers to the branch or area of content covered by an educational programme, course or module. According to the ISCED fields of education and training; ICTs cover: computer use; database and network design and administration; and software and applications development and analysis.

*UNESCO Institute for Statistics, UIS Database*

### 5.15. ICT employment (%)

ICT employment, % of total employment

Employment refers to all persons of working age who, during a specified brief period, were in the following categories: a) paid employment (whether at work or with a job but not at work); or b) self-employment (whether at work or with an enterprise but not at work). Data are disaggregated by economic activity and occupation, according to the latest versions of the ISIC and ISCO, respectively. economic activity corresponds to information and communication (J) and occupation corresponds to skill levels 3 and 4; technicians and associate professionals, and clerical support workers.

*Index team calculations based on International Labour Organization, ILOSTAT*

### 5.16. Government online services

Government Online Service Index

This index assesses e-government development at the national level, based on data collected from an independent survey questionnaire that assesses the national online presence of all 193 United Nations Member States. The survey questionnaire assesses a number of features related to online service delivery, including whole-of-government approaches, open government data, e-participation, multi-channel service delivery, mobile services, usage up-take, digital divide as well as innovative partnerships through the use of ICT.

*United Nations Department of Economic and Social Affairs, UN e-Government Knowledgebase*

### 5.17. Fixed broadband Internet traffic per subscription\*

Fixed (wired)-broadband Internet traffic per fixed broadband subscription (GB)

The fixed (wired)- broadband Internet traffic (exabytes) refers to traffic generated by fixed-broadband subscribers measured at the end-user access point. It should be measured adding up download and upload traffic. This should exclude wholesale traffic; walled garden; and IPTV and cable TV traffic. This variable reflects the average fixed-broadband Internet traffic in GB per fixed-broadband subscriber per month.

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

### 5.18. Mobile broadband Internet traffic per subscription

Mobile broadband Internet traffic per mobile broadband subscription (GB)

Mobile-broadband Internet traffic (exabytes) refers to broadband traffic volumes originated from 3G networks or other more advanced mobile-networks; including 3G upgrades; and evolutions or equivalent standards in terms of data transmission speeds. Traffic should be collected and aggregated for all 3G or more advanced mobile networks within the country. Download and upload traffic should be added up and reported together. Traffic should be measured at the end-user access point. Wholesale and walled-garden traffic should be excluded. This variable reflects the average mobile-broadband Internet traffic in GB per active mobile-broadband subscriber per month.

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

### 5.19. Internet users (%)

Internet users (%)

Internet users refers to the percent of total population who use the Internet. This includes those using the Internet from any device (including mobile phones) in the last 12 months. This variable can include both; estimates and survey data corresponding to the proportion of individuals using the Internet, based on results from national household surveys. The number should reflect the total population of the country; or at least individuals of five years and older. If this number is not available (i.e. target population reflects a more limited age group) an estimate for the entire population should be produced. If no survey data are available at all; an estimate is provided specifying in detail the methodology that has been applied to calculate the estimate.

*International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

### 5.20. ICT PCT patent applications (per 100 billion GDP)\*\*

ICT PCT patents applications per 100 billion US\$ GDP (2017 PPP)

Refers to the number of applications for information and communication technology-related patents filed under

the Patent Cooperation Treaty (PCT) per 100 billion PPP\$ GDP constant. Information and communications technology-related patents include seven categories: audio-visual technology, basic communication processes, computer technology, digital communication, IT methods for management, semiconductors and telecommunications.

*Index team calculations based on World Intellectual Property Organization, Intellectual Property Statistics Data Center and World Bank, World Development Indicators*

### 5.21. E-participation

#### E-participation Index

A country's E-participation Index (EPI) reflects its e-participation mechanisms that are deployed by the government as compared to all other countries. The purpose of this measure is not to prescribe any specific practice, but rather to offer insight into how different countries are using online tools in promoting interaction between the government and its people, as well as among the people, for the benefit of all. As the EPI is a qualitative assessment based on the availability and relevance of participatory services available on government websites, the comparative ranking of countries is for illustrative purposes and should serve only as a variable of the broad trends in promoting citizen engagement. The variable measures the use of online services to facilitate provision of information by governments to citizens (e-information), interaction with stakeholders (e-consultation) and engagement in decision-making processes (e-decision-making).

*United Nations Department of Economic and Social Affairs, UN e-Government Knowledgebase*

### 5.22. Internet activities by individuals (%)

#### Internet activities undertaken by individuals (%)

Refers to the proportion of individuals who undertook one or more activities using the Internet for private (defined as non-work) purposes from any location in the last three months. The variable is computed by calculating the average of the following activities: Internet banking, reading or downloading newspapers, magazines or electronic books in a digital format, getting information about goods or services, getting information from general government organizations, interacting with general government organizations, purchasing or ordering goods or services, seeking health information (on injury, disease, nutrition, etc.), using services related to travel or travel-related accommodation and doing a formal online course.

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

### 5.23. Trade in digitally deliverable services (% total trade)

#### International trade in digitally deliverable services

Digitally-deliverable services are an aggregation of insurance and pension services, financial services, charges for the use of intellectual property, telecommunications, computer and information services, other business services and audiovisual and related services. The digitally-deliverable services series is based on the concept of potentially ICT-enabled services as developed by UNCTAD. Trade refers to the sum of exports and imports.

*Index team calculations based on United Nations Conference on Trade and Development, UNCTADSTAT*

## Economy

### 6.1. Gross fixed capital formation (% GDP)

#### Gross fixed capital formation (% of GDP)

Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains and so on); plant, machinery and equipment purchases; and the construction of roads, railways and the like, including schools, offices, hospitals, private residential dwellings and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. The variable is reported as a percentage of GDP.

*World Bank, World Development Indicators*

### 6.2. Logistics performance

#### Logistics Performance Index

The international Logistics Performance Index (LPI) is a summary indicator of logistics sector performance, combining data on six core performance components into a single aggregate measure. The missing values are replaced with the country mean response for each question, adjusted by the respondent's average deviation from the country mean in the answered questions. The six core components are the: (i) efficiency of customs and border clearance, rated from 'very low' to 'very high'; (ii) quality of trade and transport infrastructure, rated from 'very low' to 'very high'; (iii) ease of arranging competitively priced shipments, rated from 'very difficult' to 'very easy'; (iv) competence and quality of logistics services, rated from 'very low' to 'very high'; (v) ability to track and trace consignments, rated from 'very low' to 'very high'; and (vi) frequency with which shipments reach consignees within scheduled or expected delivery times, rated from 'hardly ever' to 'nearly always'. The Index ranges from one to five, with a higher score representing better performance.

*World Bank/International Bank for Reconstruction and Development, Logistics Performance Index dataset*

### 6.3. Transport productive capacity\*

#### Transport Productive Capacity Index

The Productive Capacities Index provide a quantitative measure of the productive resources, entrepreneurial capabilities and production linkages of a given economy. These three pillars of productive capacities are further broken down into the following eight categories: information and communication technologies, structural change, natural capital, human capital, energy, transport, the private sector and institutions. Transport measures the capability of a system to take people or goods from one place to another. It is defined as the capillarity of roads and railways network, and air connectivity. under five main indicators: (i) air transport, registered carrier departures worldwide per 100; (ii) air transport, freight (million ton-km); (iii) air passengers per capita; (iv) logarithm of km of roads/100km<sup>2</sup> land; and (v) logarithm of total km of rail lines per capita. Overall, the Index summarizes the state of productive capacities in economies worldwide by computing scores that range between 0 and 100 (boundaries not included).

*United Nations Conference on Trade and Development, UNCTADSTAT*



#### 6.4. Building quality control

##### Building Quality Control Index

The Building Quality Control Index is based on six indices—the quality of building regulations, quality control before, during, and after construction, liability and insurance regimes and professional certifications indices. Index scores range between 0 and 100.

*World Bank, Doing Business Database*

#### 6.5. Ease of starting a business\*

##### Ease of starting a business

Measures the paid-in minimum capital requirement, number of procedures, time and cost for a small- to medium-sized limited liability company to start up and formally operate in an economy's largest business city. These procedures include the processes entrepreneurs undergo when obtaining all necessary approvals, licenses, permits and completing any required notifications, verifications or inscriptions for the company and employees with relevant authorities. The ranking of economies in terms of the ease of starting a business is determined by sorting their distance to frontier scores for starting a business. These scores are the simple average of the distance to frontier scores for each of the component indicators.

*World Bank, Doing Business Database*

#### 6.6. Insolvency recovery rate

##### Insolvency recovery rate (cents on the dollar)

The recovery rate is recorded as cents on the dollar recovered by secured creditors through judicial reorganization, liquidation or debt enforcement (foreclosure or receivership) proceedings. The calculation takes into account the outcome: whether the business emerges from the proceedings as a going concern or the assets are sold piecemeal. Then the costs of the proceedings are deducted (1 cent for each percentage point of the value of the debtor's estate). Finally, the value lost as a result of the time the money remains tied up in insolvency proceedings is taken into account, including the loss of value due to depreciation of the hotel furniture. Consistent with international accounting practice, the annual depreciation rate for furniture is taken to be 20 percent. The furniture is assumed to account for a quarter of the total value of assets. The recovery rate is the present value of the remaining proceeds, based on end-2018 lending rates from the International Monetary Fund's International Financial Statistics, supplemented with data from central banks and the Economist Intelligence Unit.

*World Bank, Doing Business Database*

#### 6.7. Entrepreneurial employee activity rate

##### Entrepreneurial employee activity rate

Entrepreneurial employee activity refers to employees who, in the past three years, were actively involved in and had a leading role in at least one of these phases (i.e., 'idea development for a new activity' and/or 'preparation and implementation of a new activity'). The prevalence of entrepreneurial employee activity can be defined as the

number of entrepreneurial employees, as a percentage of the adult population (between 18-64 years of age).

*Global Entrepreneurship Monitor, Entrepreneurial Behaviour and Attitudes*

#### 6.8. Extent of corporate transparency

##### Extent of Corporate Transparency Index

The Extent of Corporate Transparency Index measures the level of information that companies must share regarding their board members, senior executives, annual meetings and audits. This Index has seven components: (i) whether buyer must disclose direct and indirect beneficial ownership stakes representing 5 percent; (ii) whether Buyer must disclose information about board members' primary employment and directorships in other companies; (iii) whether Buyer must disclose the compensation of individual managers; (iv) whether a detailed notice of general meeting must be sent 21 calendar days before the meeting; (v) whether shareholders representing 5 percent of Buyer's share capital can put items on the general meeting agenda; (vi) whether buyer's annual financial statements must be audited by an external auditor; and (vii) whether buyer must disclose its audit reports to the public.

*World Bank, Doing Business Database*

#### 6.9. Trade (% GDP)\*

##### Trade (% of GDP)

Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

*World Bank, World Development Indicators*

#### 6.10. High-technology trade (% total trade)\*\*

##### High technology trade (% of total trade)

High-technology exports and imports minus re-exports and re-imports expressed as a percentage of total trade. The list of commodities contains technical products with a high intensity of R&D, based on the Eurostat classification, itself based on SITC Rev.4 and the Organisation for Economic Co-operation and Development (OECD) definition. Commodities belong to the following sectors: aerospace; computers and office machines; electronics, telecommunications; pharmacy; scientific instruments; electrical machinery; chemistry; non-electrical machinery; and armaments. Total trade is the sum of exports and imports of goods and services excluding trade in government goods and services divided by two.

*Index team calculations based on United Nations Comtrade, International Trade Statistics Database and International Monetary Fund, Balance of Payments and International Investment Position Statistics*

#### 6.11. Product concentration

##### Product Concentration Index

The Product Concentration Index shows to which degree exports (of goods) of individual economies are concentrated on a few products rather than being distributed in a more homogeneous manner among several products.



This Index ranges from zero to one, with a larger value denoting a higher concentration of product exports.

*United Nations Conference on Trade and Development, UNCTADSTAT*

## 6.12. Market concentration\*

Market Concentration Index

Measures the dispersion of trade value across an exporter's partners. A country with exports that are concentrated in a very few markets will have an Index value close to one. Similarly, a country with a perfectly diversified trade portfolio will have an Index close to zero.

*World Bank, World Integrated Trade Solution*

## 6.13. Chinn-Ito financial openness

Chinn-Ito Financial Openness Index

The Index measures the extent of openness in capital account transactions. Capital 'openness' (KAOPEN) is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). This Index takes on higher values the more open the country is to cross-border capital transactions.

*Chinn, Menzie D. and Hiro Ito, The Chinn-Ito Index*

## 6.14. Foreign direct investment, net inflows (% GDP)\*

Foreign direct investment, net inflows (% GDP)

Foreign direct investment is the net inflow of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors and is divided by GDP. The variable is reported as a three-year average.

*Index team calculations based on World Bank, World Development Indicators*

## 6.15. Debt dynamics

Debt dynamics

This variable measures the change in public debt-to-GDP ratio, weighted by a country's credit rating and debt level in relation to its GDP. This variable is a category-based min-max normalization of the debt change. To transform the debt change value into a 0 to 100 score, each country was assigned to a specific category that determined the value boundaries. Categories are based on three criteria: general credit rating, government debt-to-GDP level and country classification (one if country is considered advanced, zero otherwise, according to IMF's classification). The general credit rating for each country is computed as the average of Fitch, Standard and Poor's (S&P) and Moody's credit ratings.

*World Economic Forum based on data from International Monetary Fund and the rating agencies Fitch, Moody's, and Standard and Poor's*

## 6.16. Domestic credit to private sector (% GDP)

Domestic credit to private sector (% GDP)

Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. Financial corporations include monetary authorities and deposit banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds and foreign exchange companies. Credit to the private sector may sometimes include credit to state-owned or partially state-owned enterprises.

*World Bank, World Development Indicators based on IMF, International Financial Statistics and data files, World Bank and OECD*

## 6.17. MSME financing gap (% GDP)\*

MSME financing gap (% GDP)

MSME finance gap is estimated as the difference between current supply and potential demand which can potentially be addressed by financial institutions. The MSME finance gap assumes that the firms in a developing country have the same willingness and ability to borrow as their counterparts in well-developed credit markets and operate in comparable institutional environments — and that financial institutions lend at similar intensities as their benchmarked counterparts. Micro enterprises are defined as those with less than 10 employees, small and medium enterprises are defined as those with 11-250 employees.

*World Bank, International Finance Corporation SME Finance Forum*

## 6.18. Tax and contribution rate (% profit)

Total tax and contribution rate (% of profit)

The total tax rate measures the amount of taxes and mandatory contributions borne by a business in the second year of operation, expressed as a share of commercial profit. The total amount of taxes borne is the sum of all the different taxes and contributions payable after accounting for allowable deductions and exemptions. The taxes withheld (such as personal income tax) or collected by the company and remitted to the tax authorities (such as VAT, sales tax or goods and service tax) but not borne by the company are excluded. The taxes included can be divided into five categories: profit or corporate income tax; social contributions and labour taxes paid by the employer (for which all mandatory contributions are included, even if paid to a private entity such as a required pension fund); property taxes; turnover taxes; and other taxes (such as municipal fees and vehicle taxes). The total tax rate is designed to provide a comprehensive measure of the cost of all the taxes a business bears. It differs from the statutory tax rate, which merely provides the factor to be applied to the tax base. In computing the total tax rate, the actual tax payable is divided by commercial profit.

Commercial profit is essentially net profit before all taxes borne. It differs from the conventional profit before tax reported in financial statements. In computing profit before tax, many of the taxes borne by a firm are deductible. In computing commercial profit, these taxes are not deductible. Commercial profit therefore presents a clear picture of the actual profit of a business before any of the taxes it bears in the course of the fiscal year. Commercial profit is computed as sales minus cost of goods sold, minus gross salaries, minus administrative expenses, minus other expenses, minus provisions, plus capital gains (from the sale of property) minus interest expense, plus interest income and minus commercial depreciation.

*World Bank, Doing Business Database*

### 6.19. Bank non-performing loans (%)\*

Bank non-performing loans to total gross loans

Nonperforming loans to total gross loans ratio is calculated by using the value of nonperforming loans (NPLs) as the numerator and the total value of the loan portfolio (including NPLs, and before the deduction of specific loan-loss provisions) as the denominator. It is often used as a proxy for asset quality and is intended to identify problems with asset quality in the loan portfolio.

*International Monetary Fund, Financial Soundness Indicators Database*

### 6.20. Medium- and high-tech activities value added

Share of medium and high-tech activities in total manufacturing value added

This variable is defined as the proportion of medium and high technology (MHT) manufacturing value added from the total value added of all manufacturing industries. The value added of an industry (industry value added) is a survey concept that refers to the given industry's net output derived from the difference of gross output and intermediate consumption. Manufacturing refers to industries belonging to the sector C defined by the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev.4), or to the sector D defined by the International Standard Industrial Classification of All Economic Activities, Revision 3.1 (ISIC Rev.3.1).

*United Nations Industrial Development Organization, Competitive Industrial Performance Index*

### 6.21. Industry and services value added (% GDP)

Industry and services value added (% GDP)

Industry (including construction) corresponds to ISIC divisions 05-43 and includes manufacturing (ISIC divisions 10-33). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water and gas. Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water and gas. Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government (financial, professional, and personal services such as education, health care, and real estate services). Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling. Value added is the net output

of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC). This variable measures the equal-weighted average of the variables 'industry value added (% GDP)' and 'services value added (% GDP)'.

*Index team calculations based on World Bank, World Development Indicators*

### 6.22. Labour underutilization rate

Composite rate of labour underutilization (%)

The composite measure of labour underutilization represents the share of the extended labour force that are in unemployment, time-related underemployment or the potential labour force. In other words, it is calculated as follows: [(unemployment + time-related underemployment + potential labour force) / extended labour force]; whereby: (i) time-related underemployment is defined as all persons in employment who, during a short reference period, wanted to work additional hours, whose working time in all jobs was less than a specified hours threshold, and who were available to work additional hours given an opportunity for more work; (ii) unemployment is defined as all those of working age who were not in employment, carried out activities to seek employment during a specified recent period and were currently available to take up employment given a job opportunity; (iii) potential labour force refers to persons not in employment who express an interest in this form of work but for whom existing conditions limit their active job search and/or their availability; and (iv) extended labour force is defined as the sum of the labour force plus the potential labour force.

*International Labour Organization, ILOSTAT*

### 6.23. Output per worker

Output per worker (GDP constant 2017 international PPP\$)

Labour productivity represents the total volume of output (measured in terms of GDP) produced per unit of labour (measured in terms of the number of employed persons) during a given time reference period. The indicator allows data users to assess GDP-to-labour input levels and growth rates over time, thus providing general information about the efficiency and quality of human capital in the production process for a given economic and social context.

*International Labour Organization, ILOSTAT*

## Enabling environment

### 7.1. Peace and stability

Political stability and absence of violence

Political stability and absence of violence measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

*World Bank, Worldwide Governance Indicators*

## 7.2. Voice and accountability

### Voice and accountability

Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association and a free media.

World Bank, Worldwide Governance Indicators

## 7.3. Rule of law

### Rule of law

Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.

World Bank, Worldwide Governance Indicators

## 7.4. Control of corruption

### Control of corruption

Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

World Bank, Worldwide Governance Indicators

## 7.5. Government effectiveness

### Government effectiveness

Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies.

World Bank, Worldwide Governance Indicators

## 7.6. Female-to-male ratio in parliament

### Women-to-men ratio in parliament

The percentage of women in parliament is based on the number of seats held by women members in single or lower chambers of national parliaments, expressed as a percentage of all occupied seats. It is derived by dividing the total number of seats occupied by women by the total number of seats in parliament. The gender parity index represents the ratio of the variable value for females to that of males. A value of exactly one indicates parity between the two groups.

*Index team calculations based on Inter-Parliamentary Union, PARLINE Database*

## 7.7. Female-to-male labour force participation

### Labour force participation rate, female-to-male ratio, 15+ years

This is the ratio of female labour force participation rate to that of males. The labour force participation rate is a mea-

sure of the proportion of a country's working-age population that engages actively in the labour market, either by working or looking for work; it provides an indication of the size of the supply of labour available to engage in the production of goods and services, relative to the working age population. The labour force comprises all persons of working age who furnish the supply of labour for the production of goods and services during a specified time-reference period. It refers to the sum of all persons of working age who are employed and those who are unemployed. The gender parity index represents the ratio of the variable value for females to that of males. A value of exactly one indicates parity between the two groups.

*Index team calculations based on International Labour Organization, ILOSTAT*

## 7.8. Female-to-male ratio in Internet usage\*

### Female-to-male ratio, Internet users

Internet users refers to the percent of total population who use the Internet. This includes those using the Internet from any device (including mobile phones) in the last 12 months. This indicator can include both; estimates and survey data corresponding to the proportion of individuals using the Internet, based on results from national household surveys. The number should reflect the total population of the country; or at least individuals of five years and older. If this number is not available (i.e. target population reflects a more limited age group) an estimate for the entire population should be produced. If no survey data are available at all; an estimate specifying in detail the methodology that has been applied to calculate the estimate is provided. The gender parity index represents the ratio of the variable value for females to that of males. A value of exactly one indicates parity between the two groups.

*Index team calculations based on International Telecommunication Union, ITU World Telecommunication/ICT Indicators Database*

## 7.9. Social protection coverage (% population)

Proportion of population covered by at least one social protection benefit (%)

This indicator conveys the share of the population effectively covered by a social protection system, including social protection floors. It also provides the coverage rates of the main components of social protection: child and maternity benefits, support for persons without a job, persons with disabilities, victims of work injuries and older persons. This variable covers the share of population covered by at least one social protection benefit contingency.

*International Labour Organization, ILOSTAT*

## 7.10. Adult literacy rate

Adult literacy rate, population 15+ years, both sexes (%)

Percentage of the number of literate persons aged 15 years out of the total number of persons in the same age group, excluding persons with unknown literacy status. The adult literacy rate is defined by the percentage of the population aged 15 years and over that can read and write. It is typically measured according to the ability to comprehend a short simple statement on everyday life. Generally, literacy also encompasses numeracy and



measurement may incorporate a simple assessment of arithmetic ability. The literacy rate and number of literates should be distinguished from functional literacy, a more comprehensive measure of literacy assessed on a continuum in which multiple proficiency levels can be determined.

*UNESCO Institute for Statistics, UIS Database*

#### 7.11. Youth not in employment, education or training (%)

Share of youth not in employment, education or training (NEET) (%)

The share of youth not in education, employment or training (also known as 'the NEET rate') conveys the number of young persons not in education, employment or training as a percentage of the total youth population. It provides a measure of youth who are outside the educational system, not in training and not in employment and thus serves as a broader measure of potential youth labour market entrants than youth unemployment, since it also includes young persons outside the labour force not in education or training.

*International Labour Organization, ILOSTAT*

#### 7.12. Poverty headcount ratio (% population)

Poverty headcount ratio at national poverty lines (% of population)

National poverty headcount ratio is the percentage of the population living below the national poverty line(s). National estimates are based on population-weighted subgroup estimates from household surveys.

*World Bank, World Development Indicators*

#### 7.13. GDP per capita

GDP per capita, PPP (constant 2017 international US\$)

GDP at purchaser's prices is the sum of gross value added by all resident producers in the country plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2017 international dollars.

*World Bank, World Development Indicators*

#### 7.14. Universal health coverage

Universal Health Coverage (UHC) Service Coverage Index

Coverage of essential health services is defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population. This Index is reported on a unitless scale of 0 to 100, which is computed as the geometric mean of 14 tracer indicators of health service coverage. The tracer indicators are as follows, organized by four components of service coverage: (i) reproductive, maternal, newborn and child health; (ii) infectious diseases; (iii) noncommunicable diseases; and (iv) service capacity and access.

*World Health Organization, Global Health Observatory*

#### 7.15. Healthy life expectancy (years)

Healthy life expectancy at birth, both sexes (years)

Average number of years that a person can expect to live in 'full health' by taking into account years lived in less than full health due to disease and/or injury.

*World Health Organization, Global Health Observatory*

#### 7.16. Under-five mortality rate

Under-five mortality rate (probability of dying by age of 5 per 1,000 live births)

The probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period. Under-five mortality rate as defined here is strictly speaking not a rate (i.e. the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as rate per 1,000 live births.

*World Health Organization, Global Health Observatory*

#### 7.17. Renewable energy consumption (%)

Renewable energy consumption (% of total final energy consumption)

Renewable energy consumption is the share of renewable energy in total final energy consumption. Renewable energy consumption includes consumption of energy derived from hydroelectric power, wind, wave, tidal, solar photovoltaic, geothermal aquifers, landfill gas, sewage gas, biogas from autogen, municipal solid waste, poultry litter, straw, wood, charcoal, liquid bio-fuels, bioethanol, biodiesel and biomass.

*World Bank, World Development Indicators from Sustainable Energy for All (SE4ALL) database from the SE4ALL Global Tracking Framework led jointly by the World Bank, International Energy Agency, and the Energy Sector Management Assistance Program*

#### 7.18. Ecological footprint per capita\*

Ecological footprint per capita (in global hectares)

It refers to the ecological footprint of consumption and is a measure of how much area of biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices. The ecological footprint of consumption is measured in global hectares.

*Global Footprint Network, National Footprint Accounts dataset*

#### 7.19. Natural hazard exposure

Natural hazard exposure

It represents the load that the community has to deal with when exposed to a hazard event. In INFORM, the metric for the natural hazard risk stops at the level of the physical exposure. It is introduced in terms of: (i) exposed population refers to the expected number of people located with-



in the hazard zone for each type of hazard for each return period per country; and (ii) average annual exposed population. The natural hazard is divided into five the hazard types: earthquake, tsunami, flood, tropical cyclone (cyclone wind and storm surge) and drought (historical impact and agricultural drought probability).

*European Commission, INFORM Risk Index*

*Note: Variables with extreme outliers were treated as follows: (\*) indicates Winsorization; (\*\*) indicates logarithmic transformation and (\*\*\*) indicates square root transformation.*





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A clear vision and strategy for knowledge development is essential to achieving the universal goal of sustainable human development. This necessarily requires the availability of tools with which to measure, evaluate and respond to key indicators reflecting global progress in the realm of knowledge development, with a view to supporting relevant and effective policymaking.

To this end, the Global Knowledge Index (GKI) represents an important addition to the global repository of knowledge on development, providing diverse and reliable data that can help countries and decision makers to understand and respond to related transformations and challenges more clearly.

It assesses seven sub-indices, chosen both for their correlative interactive relationships and their centrality to the process of cognitive and developmental progress.

The strong link between the quality of knowledge capital, on the one hand, and the ability to build effective knowledge economies that deliver equitable and sustainable development, on the other, necessitates the assessment of human resource qualification systems and their outputs, which are captured in pre-university education, technical and vocational education and training (TVET), and higher education.

The investments in, and the outputs of, scientific research, development and innovation are also central to sustainable development, and are assessed within research, development and innovation (RDI).

The progress achieved in developing technological infrastructure and applying its outputs is reflected in information and communications technology (ICT), while the economy provides an assessment of economic openness and competitiveness.

Finally, improvements in all these aspects of knowledge-based development require a suitable and supportive environment based on social and political freedoms, as well as sound environmental and health conditions, progress towards which is reflected in the enabling environment.