



Mapping the Innovation Ecosystem in Kenya

ABRIDGED VERSION

Acknowledgment

This mapping exercise of the Kenya Innovation Ecosystem (2022) was initiated by the UNDP Accelerator Lab in Kenya in partnership with Konza Technopolis Development Authority (KoTDA), the African Center for Technology Studies (ACTS) and the Association of Countrywide Innovation Hubs. It builds on and appreciates diverse research conducted on the innovation ecosystem by other stakeholders and in particular a research conducted by the UNDP Accelerator Lab and graduate students from Thunderbird School of Global Management in 2021.

We are grateful for the team involved in developing this report; the UNDP Accelerator Lab team led by Caroline Kiarie- Kimondo, Lillian Njoro, Victor Awuor and Livingstone Mumelo; the team from Konza Technopolis Development Authority led by Josephine Ndambuki and Rahab Mureithi; the team from Association of Countrywide Innovation Hubs led by Magdalene Chepkemoi, Pauline Mutua, Savio Wambugu and David Ogiga and the team from ACTS whose expertise and skills were crucial to the research and development of this report, led by the African Center for Technology Studies (ACTS) Prof. Tom Ogada, Dr. Winston Ojenge, Patrick Obunga, Samuel Wanjau, Samuel Mibey, Mercy Ayub, Alfred Oduor, Fiona Makayoto, Linda Fatuma, Willis Otieno and Esther Mugeru.

We appreciate the partnership between UNDP Kenya and Konza Technopolis Development Authority under the leadership of Eng. John Tanui which made this report possible. We are also grateful to the UNDP Country Office team in Kenya, Kenya National Innovation Agency, and the Ministry of Information, Communication Technology (ICT), Innovation and Youth Affairs for the support and input in the development of this report.

This report is a developing body of knowledge that has benefited from valuable contribution from multiple actors in the innovation ecosystem particularly the innovators, start-ups, and innovation hubs. We are grateful to everyone who shared their experiences, knowledge, and insights with us.

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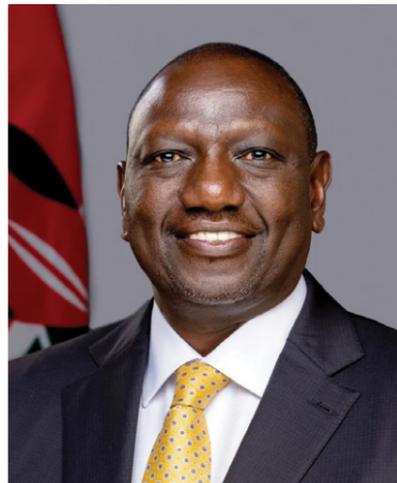
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Foreword by His Excellency Dr. William Samoei Ruto, President of the Republic of Kenya



H.E. Hon. Dr. William Samoei Ruto
President of the Republic of Kenya

The Government of Kenya recognizes the crucial role technology plays in accelerating the country's economic transformation agenda and specifically, the Digital Economy. My administration has clearly outlined the important role the digital economy will play in driving economic growth and job creation especially for the youth. Consequently, we are establishing a robust ICT driven economy, powered by ICT infrastructure towards meeting the 21st century needs.

Kenya is home to M-PESA and a vibrant startup ecosystem that is contributing to economic transformation. The government is keen on taking advantage of these achievements to digitize its operations in an ambitious plan towards E - government solutions, to streamline processes, improve productivity and efficiency and enhance service delivery to citizens. This ambition requires investment in the best IT solutions ranging from applications, infrastructure, and security systems to guarantee safe, reliable, and sound software systems.

It is against this backdrop that my government has set out an ambitious plan to ensure universal access to internet and broadband solutions, driven by a robust optic network backbone that is the 'Digital

Superhighway'. This is anchored by six undersea cables landing in the port city of Mombasa as well as the rich terrestrial infrastructure across the country. The government is committed to enhance last mile connectivity, and to deliberately put in place strategies to facilitate access to low cost internet ready devices to enable more Kenyans onboard into the Digital economy.

The government has further invested heavily in the establishment of the Silicon Savanna – Africa's technology gateway powered by the Konza Technopolis, a smart city, science park and innovation hub that is projected to contribute 2% of the country's GDP. Konza Technopolis is envisioned to catalyze Kenya's development in Knowledge Economy and Innovation. The Technopolis is playing a catalytic role in the development of the Innovation Ecosystem in Kenya by providing relevant supporting infrastructure to unlock the potential in this sector.

Kenya's Innovation Ecosystem ranks among the top three in Africa. Pioneering technologies continue to be realized across all sectors of development driven by the country's innovative startup community. Kenya prides itself as regional innovation leader and a hub for tech startups.

It therefore gives me much joy to launch this Innovation Ecosystem report that provides insights for the government and development organizations to make data backed decisions towards the enhancement of the Innovation Ecosystem in Kenya. I applaud our development partners who are playing a crucial role in the advancement of our Innovation Ecosystem which can only thrive and achieve its potential when all players collaborate to deliver on a shared vision. The quadruple helix approach to innovation calls for government, industry, academia, and non-state actors to collaborate. This report is testimony to the impact of such collaborations.

Kenya is committed to engage development partners in enhancing capacity for innovation and the contribution of ICT sector to the overall economy of the country. We commit to consider the recommendations in this report to influence policy direction, even as we strengthen the partnership between the government, private sector and non-state actors.

Preamble by Cabinet Secretary, Ministry of Information, Communications and the Digital Economy, Mr. Eliud Owalo



Mr. Eliud Owalo
Ministry of Information, Communications
and the Digital Economy

Kenya's innovation ecosystem has registered significant growth over the years. The growth of innovation hubs, both at the national and local levels, has played a key role in advancing our innovation ecosystem, by supporting the growth of start-ups and incubation of businesses. It has unlocked value in a knowledge-based economy and created jobs. The institutions of higher learning have further contributed to the growth of our innovation ecosystem, by introducing programmes that are geared towards preparing students for participation in innovation and entrepreneurship while, at the same time, setting up their own university-led innovation hubs.

The government continues to play its part by providing the strategic infrastructure for an empowered digital Kenyan society. Our strategic initiatives include deployment of critical infrastructure such as the laying of fiber optic cable, and an elaborate undersea cable network that will enhance universal access to digital technology in the country. In this regard, the government is committed to delivering 100,000 kilometres of the national fibre optic network and ensuring that Kenyans can access smart technology devices at very competitive costs, as a strategy to bring

many Kenyans into the digital economy. Additionally, the government is committed to building digital capacity among Kenyans so that they are not left behind in the global digital migration. With this solid foundation, we are confident to report that the country's ecosystem is on a positive trajectory and should continue to witness gains and contribute to the economy of the country.

The government recognises the strong role that our development partners like UNDP play towards the realization of our goals. It is, therefore, my pleasure to join our innovation ecosystem players in the launch of this Innovation Ecosystem Report that has been championed by UNDP Kenya, Konza Technopolis Development Authority, and other collaborating partners. The report provides solid baseline information on the state of the innovation ecosystem in Kenya.

This report also serves as a launching pad, from which we will strengthen our innovation ecosystems as we empower them to deliver on two strategic priorities of the Government – job creation (leveraging digital solutions) and augmenting the impact of the creative and digital economy. As we implement the findings and recommendations of this report, we will continue to position Kenya as a leader in digital technology in Africa, through Konza's Silicon Savanna, as the home of technology in Africa.

I pledge my commitment to working with all stakeholders towards building a strong innovation ecosystem in the country. I look forward to the realisation of the benefits of a robust digital ecosystem, following the implementation of the findings in this report.

Message from CEO of Konza Technopolis Development Authority, Eng. John Tanui



Eng. John Tanui
Chief Executive Officer (KoTDA)

We are glad as Konza Technopolis Development Authority (KoTDA) to be part of this great document that has mapped out the Kenya Innovation Ecosystem. The evidence from this report will go a long way in accelerating the gains made in the ecosystem.

This report offers a holistic and comprehensive outlook into Kenya's Innovation Infrastructure, maintaining a keen focus on the existing challenges highlighted by startups, and innovation ecosystem stakeholders. The report also deep-dives into the regional and national innovation barriers and gives an outlook on opportunities for mitigating these challenges and promoting an innovation-driven economy. The report provides a timely data-driven approach that calls for increased interconnectedness and collaboration of relevant stakeholders and innovation ecosystem players in driving innovation interventions to transform Kenya's economy.

We have noted several challenges affecting the innovation ecosystem among them commercialisation of innovations, low investment in technology, low number of people in STEM, uncoordinated innovation

pipeline, human resource development and government support. This has been captured in this report, to solve the challenges It is critical for the key players to get involved in and fully support the development of the space.

We are committed as Konza Technopolis to play our part to ensure that the sector thrives. Konza is developing an innovation ecosystem through the physical space as well as bringing together the various stakeholders within the industry to support the commercialization of research findings and the development of new solutions and enterprises. We are glad to note that the Kenyan innovation ecosystem is driven by youthful and well-educated innovators and entrepreneurs, with formally registered start-ups.

We are committed to providing an enabling environment for this category of players in the ecosystem to thrive.

Message from Resident Representative, UNDP Kenya, Anthony Ngororano



Anthony Ngororano
UNDP Kenya Resident
Representative

The relevance of a robust innovation ecosystem to a country's economy cannot be gainsaid. The potential impact of innovation in supporting social and economic development depends on the maturity of national innovation ecosystems. A vibrant and enabling innovation ecosystem facilitates the emergence and growth of businesses and is evidenced by the presence and fluidity of ideas and solutions.

The innovation ecosystem in Kenya has grown through leaps and bounds in the last decade supported by the improvement of key development indicators such as an increased number of innovation hubs across the country, increased broadband connectivity, increased funding for start-ups and increased government and private sector efforts towards decentralization and local capacity building. Kenya ranked 4th in Sub-Saharan Africa in 2022 Global Innovation Index and is one of the countries that holds a record for outperforming as an innovation achiever for the 12th year in a row.

Without a doubt, the complexities of today's development challenges and realities require new solutions and approaches to match them.

UNDP is keen to foster partnerships that build on the transformative power of innovation to address present day challenges across the world. Our recently approved Strategic Plan (2022-2025) has innovation and digital technology as strategic enablers of development which underpin UNDP's determination to stay at the forefront of development thinking and innovation.

UNDP in Kenya through the UNDP Accelerator Lab has played a critical role in strengthening the innovation and digital ecosystems by fostering critical connections between Government, academia, development partners, the private sector, and innovators. In partnership with Konza Technopolis Development Authority, African Centre for Technology Studies (ACTS), and Association of Countrywide of Innovation Hubs, UNDP has conducted an assessment of the innovation ecosystem to provide insights on the key drivers necessary for its growth.

This report presents the findings of the assessment and offers opportunities for collaboration, learning and investment that are relevant to any stakeholder engaged in innovation development. It uniquely contextualizes the role that industrialization has played in innovation development and the policies that have shaped the trajectory of the innovation ecosystem. The report further provides clarity on the existing infrastructure with a particular focus on innovation assets such as innovation hubs, accelerator labs, and others and the role they play in developing capacities for innovation and entrepreneurship. More than 150 innovation assets across the country were identified and mapped and the report highlights areas such as capacity building for hub managers, certification for innovators and innovation hubs, intellectual property management, access to finance and information as key for stakeholders to support.

Going forward, UNDP will continue working closely with the actors in the innovation ecosystem to enhance linkages between local, regional, and national innovation mechanisms, in the quest to accelerate the implementation of the country's development objectives.

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A locally manufactured drone by Swift Lab

Table of Abbreviations

ACTS	African Centre for Technology Studies
AfDB	African Development Bank
ASME	American Society of Mechanical Engineers
BMGF	Bill and Melinda Gates Foundation
B2B	Business to Business
BSc	Bachelor of Science
CA	Communication Authority of Kenya
CEC	County Executive Committee
CISCO	Commercial and Industrial Security Corporation
CUEA	Catholic University of Eastern Africa
DANIDA	Danish International Development Agency
DUE	Directorate of University Education
DRST	Directorate of Research Science and Technology
EA	East Africa
EAIRO	East African Industrial Research Organization
EDGE	Enhanced Data for Global Evolution
GCI	Global Connectivity Index
GSMA	Global System for Mobile Communications Association
GDP	Gross Domestic Product
ICT	Information Communication Technology
IBM	International Business Machines Corporation
ICT	Information Communication and Technology
ICDC	Industrial and Commercial Development Corporation
ISHOW	Innovation Showcase
IoT	Internet of Things
IP	Intellectual Property
ITES	Information Technology Enabled Services
IIEC	Innovation Incubation and Entrepreneurship Centre
12C	Innovation and Incubation Centre
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KALRO	Kenya Agricultural and Livestock Research Organization
KEBS	Kenya Bureau of Standards
KENIA	Kenya National Innovation Authority
KIE	Kenya Industrial Estate

KIMBO	Kenya Industrial Management Board
KIRDI	Kenya Industrial Research and Development Institute
KYEOP	Kenya Youth Employment Opportunity Program
KU	Kenyatta University
MSMEs	Micro, Small and Medium Enterprises
MoE	Ministry of Education
MNO	Mobile Network Operators
MSc	Master's degree
MTP 3	Medium Term Plan
MMUST	Masinde Muliro University of Science and Technology
NACOSTI	National Commission of Science Technology and Innovation
NCST	National Council of Science and Technology
NETFUND	National Environment Trust Fund
NGO	Non-Governmental Organization
NRF	National Research Fund
NOFBI	National Fibre Optic Backbone Infrastructure
NGAAF	National Government Affirmative Action Plan
PhD	Doctor of Philosophy
RA	Research Assistant
SACCO	Savings and Credit Corporative Organization
SAP	Structural Adjustment Program
SDGs	Sustainable Development Goals
SGCs	Science Granting Councils
SGCI	Science Granting Councils Initiatives
SIDA	Swedish International Development Cooperation Agency
STI	Science Technology and Innovation
TVET	Technical and Vocational Educational and Training
UKAID	United Kingdom Department of International Development
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USIU	United States International University
USF	Universal Service Fund
UoN	University of Nairobi
YEDF	Youth Enterprise Development Fund



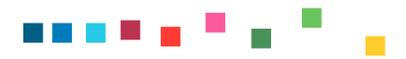
A virtual reality set used in teaching children on the autism spectrum



An innovator presenting a smart intelligent solar powered waste bin



An innovator presenting a solution for LED enabled indoor farming



CHAPTER ONE

Introduction, Objectives and Methodology

1.1. Background to the study

This study has been undertaken by the United Nations Development Programme (UNDP) in collaboration with Konza Technopolis Development Authority (KOTDA), the Association of Countywide Hubs and the African Centre for Technology Studies (ACTS). It builds on and appreciates diverse research conducted on the innovation ecosystem by other stakeholders.

1.2. Problem Statement

This study addresses the context and challenges related to the Kenyan innovation ecosystem as follows:

- a. The potential impact of technology innovation in the socio-economic development in developing countries depends on the level of maturity of the national innovation ecosystem. It has been observed that technological innovation does not grow equally in all cities in Kenya. It is therefore important to understand the factors that cause different growth rates and how the growth can be supported and sustained across a national landscape.
- b. In Kenya, innovation ecosystems are concentrated in urban areas, with many of the initiatives being run independently. There is therefore a risk of duplication and saturation of focus on the efforts being applied. There is also limited distribution of hubs and resources in locations outside Nairobi.
- c. Innovation spaces are insufficiently differentiated and have sustainability challenges with their business models, limited funding, and entrepreneurship support as well as insufficient collaboration and coordination between stakeholders.

The situation above prompted the mapping of the innovation ecosystem with a view to identify opportunities for collaboration, learning and investment and to support the growth and development of local innovators across the country.

1.3. Purpose, Objectives, and Scope

The purpose of this study is to conduct a mapping of the Kenya innovation ecosystem and generate evidence that can be used to accelerate its growth. To realize this purpose, the study pursued the following objectives:

- a. Establish the status of the Kenyan Innovation Ecosystem across the country: characteristics, organization (players and actors), challenges, and opportunities.
- b. Identify key levers and approaches on how to stimulate the sector for more economic growth towards achieving key development agenda items (SDGs, Vision 2030), including requisite skill sets, partnerships, and resources.
- c. Highlight emerging themes and opportunities for collaboration, partnership, and cross-learning across sectors.

The scope of the study included:

- a. A review of global trends in innovation and key innovation hubs in the innovation ecosystem as a background to the Kenyan context.
- b. Cover the innovation ecosystem across the country - Kenya
- c. Compile data on existing innovation hubs and accelerators disaggregated by location, focus and years of existence.



The review of the global innovation trends was necessary to show how Kenya is performing regionally and globally in the innovation front, identify areas where the country is performing well and where it is lagging ...

- d. Identify existing or prevailing challenges within the ecosystem for vulnerable and marginalized communities.
- e. Focus on sector players, Innovators (start-ups, MSME and select large innovators); innovation ecosystems: academia, hubs, labs, accelerators, corporate sponsors, development organizations and regulators).

well and where it is lagging, and what lessons can be learned from better performing countries. The desk review also documented the existing innovators and innovation hubs to obtain preliminary information on the characteristics of the Kenyan innovation ecosystem. An online desk study was carried out to help identify the innovation centres, hubs, accelerator labs, incubators, workspaces, and maker spaces.

The field data collection covered all the 47 counties and targeted key actors in the Kenyan innovation ecosystem. The study deployed research assistants (RAs) in all the 47 counties to collect data from the key actors in the ecosystem at the county level. The research assistants were taken through four training sessions on the data collection tools and research protocols required for the exercise. A data collection tool was developed and customized for each of the actors in the innovation ecosystem, so that only questions relevant to the specific actors were captured. For flexibility, the tools were deployed both online and offline with a view to reaching as many stakeholders as possible. In total some 225 actors were interviewed (Table 1.1):

1.4. Approach and Methodology

The study was undertaken through a desk review and field data collection. The desk review examined global innovation trends, case studies of selected leading innovation hubs, historical perspectives of the Kenyan innovation ecosystem and its indicators of growth as well as the existence of the driving vision for the ecosystem. The review of the global innovation trends was necessary to show how Kenya is performing regionally and globally in the innovation front, identify areas where the country is performing

Table 1.1:
Examples of innovations which were influenced by the background of the innovators

		Number of respondents reached
1	Hubs (Innovation hubs, Accelerators, Incubators, and co-working spaces)	68
2	Academic Innovation Labs	33
3	Government departments and agencies	32
4	Networks and marketing organizations	21
5	Skills trainers	47
6	Financing institutions	24
TOTAL		225

Box 1: Stakeholders interviewed

- a) Innovators (start-ups, SMEs, select large innovators).
- b) Hubs (Innovation hubs, accelerators, incubators, and co-working spaces)
- c) Academic innovation labs
- d) Government departments and agencies
- e) Networks and marketing organizations
- f) Skills trainers
- g) Financing institutions

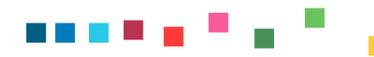


Innovators presenting a locally produced and organic nutritional product.



CHAPTER TWO

Main Findings of the Mapping



There are gaps in the Kenyan Innovation Ecosystem (KIE) with respect to these key drivers. These include the level of collaboration amongst the key actors in the KIE, insufficient government support to start-ups

2.1. Global trends of innovation ecosystem

Finding 1:

Players in the Kenyan Innovation Ecosystem: The key players in Kenyan innovation system consist of innovation producers (universities and research institutions); innovation consumers (Start-ups, Small and Medium Enterprises (SMEs) and large industries); innovation and business support systems (hubs, incubators); innovation governance structures (National Commission for Science, Technology and Innovation (NACOSTI), Kenya National Innovation Agency (KeNIA), National Research Fund (NRF), Kenya Industrial Property Institute (KIPI), Kenya Copyright Board (KECOBO) and Kenya Bureau of Standards (KEBS); innovation support policies and legislations (Science and Technology Act (STI) Act 2013, IP ACTS 2001, STI Policy 2020) and innovation financiers (Government of Kenya, NGO, development partners, banks and angel investors). Each of these building blocks have their own unique challenges that needs to be addressed and opportunities that needs to be tapped to improve the Kenyan innovation ecosystem. This provides a good starting point for formulation of interventions for the sector's growth.

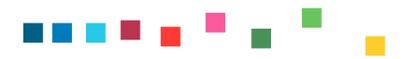
Finding 2:

Global innovation trends: Analysis of the global innovation trends was undertaken to provide context and metrics for benchmarking the Kenyan innovation ecosystem. The study considered the following: The Global Start-up Ecosystem Index, Global Innovation Index Report (GNI) 2021, the United Nations Conference on Trade and Development (UNCTAD's) 2021 Technology and Innovation Report and Cisco's Digital Readiness Index and the Global Innovation Hubs Index (Figure 1).

All these reports indicate that the Kenyan Innovation ecosystem is amongst the top 10 in the region but lagging globally, particularly in the following dimensions: skills, infrastructure, and financing.

Finding 3:

Drivers of growth of Innovation Ecosystem. The Global Innovation Index 2020 report highlights 30 global innovation cities that have done well in terms of research innovation, innovation economy, and innovation ecosystem. United States of America leads with 9 global innovation hubs, followed by China (4), France (2), Germany (2), and Japan (2), each while the remaining ten countries (United Kingdom, Sweden, Finland, India, Canada, Germany, Netherlands, Australia, South Korea, and Israel) have one each. The GIH index has identified the following as key drivers of growth of the innovation ecosystem – openness and collaboration, support to start-ups, infrastructure, and innovation culture. There are gaps in the Kenyan Innovation Ecosystem (KIE) with respect to these key drivers. These include the level of collaboration amongst the key actors in the KIE, insufficient government support to start-ups, availability of infrastructure, and the absence of an innovation culture.



Finding 4: Historical perspective of the Kenyan Innovation Ecosystem: The development of the Kenyan Innovation Ecosystem has been driven by efforts to realize industrialization in Kenya. The efforts that have driven industrialization in Kenya include the pre-independence industrialization initiatives (1941-1945), import substitution strategy (1945-1980), structural adjustment programmes (1980-1999), sessional paper No 2 of 1996 on industrial transformation, export-oriented industrialization, Vision 2030, the Science Technology, and Innovation Act (2013) and the current digital transformation agenda. The desire has been to create local enterprises, driven by local entrepreneurs and locally available raw materials, with strong backward linkages to agriculture. This justifies inter-ministry approach to the development of the Kenyan innovation ecosystem, bringing together ministries in charge of STI, Industrialization, ICT and Agriculture.

Finding 5: The vision of the Kenyan Innovation Ecosystem: The Kenyan innovation ecosystem currently does not have a stand-alone vision. The aspiration of the ecosystem is driven by Vision 2030, which aims to transform Kenya into a newly industrialized country by 2030, and which has identified Science, Technology, and Innovation, as one of the foundations for the realization of the vision's aspiration. There is need in the long term for Kenya to develop an Innovation Policy and Strategy to drive the ecosystem.

Finding 6: Coordination and governance: The STI Act (2013) has provided for the establishment of three agencies to spearhead science, technology, and innovation in Kenya. These are NACOSTI, NRF and KeNIA. These institutions are still at their early stages of establishment and have not yet built adequate human and financial resources to effectively deliver on their mandates. Furthermore, there is weak coordination with other agencies driving innovations such as those under Ministries of ICT, Youth, and Innovation as well as those of Trade, Industrialization, and Enterprise Development.

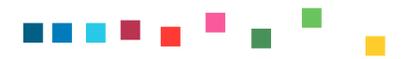
Finding 7: Talents and skills: There are talent gaps in terms of numbers and quality of human capital in the innovation space in addition to the insufficient skilling for innovation development, commercialization of innovations and management of innovation hubs. The review of the global innovations trend through analysis of the various innovation measurement frameworks has shown that skills and talents are key components where Kenya has scored lowest across the six frameworks reviewed. Investment in skills and talent will enhance Kenyan innovation performance in future ranking. The results of interviews of innovators and managers of innovation hubs and accelerators have also validated this.

Finding 8. Infrastructure: Infrastructure to support the innovation ecosystem remains a challenge in Kenya. However, Kenya has made great strides in improving ICT infrastructure, which is a key driver of innovation and a key component for strengthening the innovation ecosystem. This includes the expansion of National Optic Fibre Backbone Infrastructure (NOFBI) across all the 47 counties and increasing access to electricity. The 6000-kilometre NOFBI has provided a robust infrastructure to citizens, eased communication across counties as well as improved government service delivery to the citizens. However, rural areas are lacking coverage with about 50% of the locations not having 3G network. Furthermore, 83% of the landmass lacks broadband services; and the quality of broadband services manifests in low-speed connections and poor reliability. Access to electricity, which is a critical component for innovation and development of start-ups, was at 70% in 2019, behind China, Ghana, Morocco, Singapore, and South Africa. Rural access to electricity stands at 62% with urban access at 91%. Morocco, Singapore, and China are amongst the benchmark countries with almost 100% rural access to electricity. Furthermore, existing innovation hubs are concentrated in the urban areas, leaving the rural areas underserved.

Table 2.1: Performance of the Kenyan Innovation Ecosystem

<p>Key Message</p> <p>Kenya doing very well regionally but lagging globally</p>	<p>1. Global Start-Up Ecosystem, Index 2021</p> <p>Ranked 3 regionally behind South Africa and 61 globally</p>	<p>2. Global Innovation, Index 2021</p> <p>Ranked 13 regionally behind South Africa and Mauritius. Ranked 85 globally</p>	<p>3. UNCTAD Technology & Innovation Report 2021</p> <p>Ranked 7 regionally behind South Africa, Mauritius Namibia, Gabon, Cape Verde & Ghana.</p>
<p>4. Cisco Digital Readiness Index 2019</p> <p>Ranked 7 regionally behind South Africa, Mauritius Namibia, Gabon, Botswana & Ghana.</p>	<p>5. Registered Active Hubs</p> <p>Ranked 4 (50 hubs). We are behind Egypt (56 hubs), South Africa (78 hubs) and Nigeria (90 hubs)</p>	<p>Areas of low performance</p> <ul style="list-style-type: none"> • Skills & Talents • Infrastructure • Technology adoption • Funding • Collaboration and partnership • Support Start-up Ecosystem 	
<p>Key Message</p> <p>Historically innovation in Kenya has been driven by industrialization efforts</p>	<p>1. Initial Industrialization Efforts (1941 - 1945)</p> <ul style="list-style-type: none"> • Central laboratory established in 1942 • KIMBO • East African Industrial Research Organization ST Act 1979 	<p>2. Import Substitution Strategy (1944 - 1980)</p> <ul style="list-style-type: none"> • KIE(1967) first government incubator • IDB (1973) promote joint ventures • ICDC (1975) support harness local entrepreneurship • Emergence of informal sector 	<p>3. Structural Adjustment Programs (1980 - 1999)</p> <ul style="list-style-type: none"> • Aimed to strengthen competitiveness of the industrial sector • Blamed for the collapse local industries and negatively impacted on the innovation development in Kenya
<p>4. Session paper no. 2 of 1996 on Industrial Transformation (1996 - 2007)</p> <ul style="list-style-type: none"> • Prioritised industrialization • Focused on local small-scale industries using locally available raw materials • Establishment of KIPi and KECOBO (2001) 	<p>5. Vision 2030</p> <ul style="list-style-type: none"> • Newly industrialized country by 2030 • Recognised STI as a foundation • Konza City as a flagship project • STI Act (2013) • NACOSTI, NRF, KeNIA, ICTA • Digital Transformation 		

Figure 1: Historical perspective of the Kenyan Innovation Ecosystem



Finding 9

Growth of the Kenyan Innovation Ecosystem: There is evidence that the Kenya innovation ecosystem is growing. Robust labour market, market environment, presence of hubs, activeness of the ecosystem, ICT, capital and resources, policy and regulation, university-industry linkages, economic performance, as well as technology diffusion and adoption systems are the main indicators of growth of an innovation ecosystem. Regionally, Kenya is performing well in these indicators and is currently ranked second after Nigeria in terms of labour market, start-up market environment, hub activities and attraction to start-up investment capital.

Finding 10:

Disparity in the Kenyan Innovation Ecosystem: Despite the rapid growth of the Kenyan innovation ecosystem, there is disparity in the distribution of benefits of the innovation in the country between rural and urban centres and across gender, in favour of men. Due to existing disparity between rural and urban areas in terms of access to internet, infrastructure, digital skills and high levels of poverty, innovation activities are concentrated in the urban centres leaving rural areas behind. Furthermore, the participation of women in the Kenyan innovation ecosystem is low compared with men as reflected by the low number of women-led start-ups and women-managed hubs.

The funding landscape in Kenya: Kenya is increasingly becoming an attractive destination for investment in start-ups. In the last five years, the amount of money raised by Kenyan start-ups has increased from USD 40 million in 2017 to USD 280 million in 2021 while the number of start-ups attracting investments has increased from 40 to 86, during the same period. Regionally, Kenya is amongst the top five countries in terms of funding attracted and the number of start-ups involved. For example, in 2021 Kenya had 86 start-ups, while Nigeria led the pack in terms of the number of start-ups supported at 156, followed by Egypt (105), South Africa (85). The top sectors that have attracted funding include, emerging technologies, Agriculture, Finance, Energy, and E-commerce. However, there are some potential sources of funding, which have not been adequately exploited by the Kenyan innovators. These include the Ajira Youth Innovation Fund; Youth Enterprise Development Fund, Acumen Fund Kenya, Africa Tech Ventures, DoB Equity.



Regionally, Kenya is performing well in these indicators and is currently ranked second after Nigeria in terms of labour market, start-up market environment, hub activities and attraction to start-up investment capital.

2.2. Characteristics of the innovators and start-ups in the Kenyan Innovation Ecosystem

Through desk review and field data collection, this study mapped out 232 innovators in the country, out of which 118 were interviewed to obtain information on the characteristics of the start-ups, their business status and capabilities, target market for their innovations and their successes in accessing funding for commercialization of their innovations.

Finding 12:

Age, education, and gender

About 50% of the innovators were less than 35 years of age, while those within 36-45-year age bracket accounted for 34%. Those above 45 years old were only 16%. An analysis of the level of education revealed that 81% of the innovators had at least a diploma certificate of education with 57% having a first degree and more. In terms of gender distribution, only 22% out of the 73 innovators/start-ups are female originated or led.

Finding 13:

Registration status and size of the start-ups

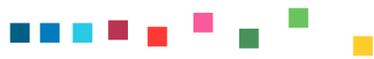
- 74% of the respondents indicated that they had formally registered their start-ups. This is different from MSMEs sector, which is dominated by informality, which is consistent with findings of a study by the UNDP Accelerator Lab team in Kenya on the impact of COVID-19 on Kenyan Micro, Small and Medium Enterprises.
- Out of those registered, about 40% of the start-ups are sole proprietorships, while the remaining are fairly distributed amongst partnerships (18%), corporations (16%), and limited liability companies (26%).
- Almost 63% of the start-ups are less than 3 years old, which is a significant statistic given that up to 80 % of new companies in Kenya do not celebrate their third birthday as confirmed by various studies . It is assumed that the bulk of the sole proprietorship start-ups, fall in this category. There is need for efforts and attention to this category.

Finding 14:

Influence on innovators' areas of education on the type of innovations:

Most of the innovators (over 90%) have technical and science-oriented disciplines. The academic disciplines of the innovators vary widely from engineering, ICT, agronomy, food science and technology, education, pharmacy, architecture, biotechnology, statistics, communication, social sciences, and business management. ICT accounted for 20% of the innovators. Analysis showed that the education background of the innovators influences the type of their innovations and support the commercialization of the innovations. Examples on Tabel 2.

Whereas the above is the normal trend, there are also a few extreme cases where people innovate outside their areas of education. For example, Dr Aghan Oscar, an Epidemiologist, is producing organic fertilizer from sludge obtained from cleaning plastics to address food security, adding bones, calcium, carbon, and iron to get organic fertilizer. He is also developing cement from organic waste to address the cost of building materials. He says, "My field of education has not helped much in commercializing the innovations as compared to on-the-job experience"



About 48% of the innovations are in e-commerce (27%) and Agri-tech (21%). The remaining are distributed amongst energy (11%), health (11%), education (10%), art & design (10%) and water (7%) and finance (3%).

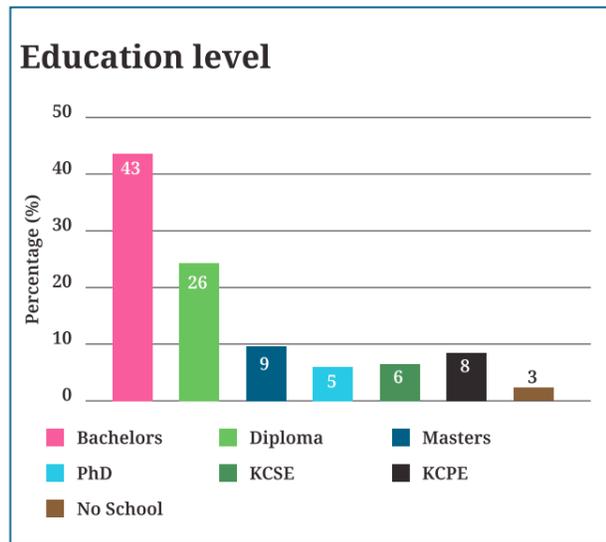


Table 2:
Examples of innovations influenced by the education background of the innovators

Alhajiri Limited: The founder holds a BSc in Agronomy and developed a Fintech innovation to support financial transactions by smallholder farmers. “We ventured into Fintech, to address mistrust, low transparency, and certain customer habits among our members. My agronomy background helped me to conceptualize the innovation”

Agricity Foods: The founder holds a BSc in Food Science and Technology. The innovation seeks to integrate technology in urban farming, address urban food security, regenerative farming (farming that has no waste), extreme hunger and nutrition. “My training has helped me commercialize the innovation.

CRESNET: The founder holds a degree in Education. The innovator developed a ‘virtual reality’ innovation for immersive learning targeting children with learning disability. “Knowledge around teaching helps determine the content required for teaching and understand pain points for teachers.”

Ikodawa Solutions Ltd: The founder holds a degree in Pharmacy. The innovation is a software solution which helps users/clients identify centers or places where they can access both pesticides and pharmaceutical drugs i.e., medicines. “My field of education has made it simpler to identify problem areas and find solutions.”



Finding 15:
Type of innovations

The bulk of innovations (32%) provide all-in-one (hardware, software, and process) solutions. Additionally, 29% of the innovations are process innovation, 21% software innovation and 19% hardware innovation.

- An example of software innovation is the Plant Signal which targets to address the problem faced by farmers of pest and diseases, which affects their crops thereby reducing the quality and quantity of the produce. Plant signal is an innovation that seeks to address this challenge. Just by taking a picture of a suspicious sick leaf the farmer can be able to get diagnosis of what is affecting their crops.

- On the other hand, Imarisha Innovation is an automated Ambu-bag ventilator which replaces manual Ambu-bag used in hospitals to support patients with breathing problems. Such innovation has all the three components – hardware, software, and process.

- First-mile solar-powered cold storage to minimize post-harvest food loss by SokoFresh Agri Innovations EA, would be considered as a hardware innovation.

Finding 16:
Areas of applications of innovations

About 48% of the innovations are in e-commerce (27%) and Agri-tech (21%). The remaining are distributed amongst energy (11%), health (11%), education (10%), art & design (10%) and water (7%) and finance (3%). From these results, the following observations were made:

- All the e-commerce innovations are ICT driven which corresponds to the increasing prominence given to the digital economy in the country.

- Agriculture is currently the backbone of Kenya’s economy, accounting for over 30% of the GDP. The current government’s development agenda – the Big Four Initiative (2018-2022) has agriculture as one of the four priority sectors; and there is interest in increasing productivity and income of the smallholder farmers. Some of the solutions are innovations focused on agriculture that are ICT driven, which is an interesting entry point for youth into the sector.

- The innovations in health and education are also ICT driven. COVID-19 pandemic has created more interest in developing solutions that can expand access to education through e-learning. As a result, the bulk of the solutions are related to e-learning.

- However, innovations in energy and water as well as some agro-processing innovations are hardware and process-oriented.

Finding 17:
Age of start-ups, number of employees and technical capacity:

The status of the start-ups was analysed based on their age since registration, size of the start-ups in terms of the number of employees and the technical skills of the innovators and the employees. 50% of the start-ups were registered between 2019-2022. These start-ups are, in theory, vulnerable, given the fact that majority of Kenyan MSMEs do not celebrate their 3rd birthday. The other 50% registered between 2011 and 2019 may be considered to have passed the valley of death. Despite 2020 being a difficult year, it was surprising that it recorded the highest number of registered start-ups, which was followed by a drop in 2021. Regarding number of employees, 49% of the start-ups may be considered as micro-enterprises (1-5 people), 35 % small (5-49), 2% medium (51-100) and 6% large (100 and above).

Finding 18:
Technical capacity of the employees of the start-ups:

In terms of skills of the employees, 85% of the start-ups consider the level of the skills of their staff as ‘inadequate’ (16%) and ‘satisfactory’ (69%). Only 15% of the start-ups rate the level of the skills of their staff as adequate. The topmost mentioned skills required by the employees of the start-ups are: (a) marketing (38%), (b) legal and intellectual property expertise (35%), (c) business development (29%), and (d) data base management (29%).



Finding 19:
Market for the innovations

The market analysis covered the target market and demand for the innovations. The top target market for the start-ups/innovators are individuals (55%), companies (38%), and government (33%). Others are NGOs and development partners. Regional market and internal market are less targeted. Most of the innovators rated the demand for their innovations as 'very good' (23%) and 'good' (56%). Only 21% rated the demand as 'low'. This is a clear indication that these innovations are providing solutions that are missing and therefore demand driven. Further analysis showed that most of the innovations were driven by a gap in the market. For example:

- **Alphajiri Limited.** The start-up developed a Fintech solution to solve the problem of lack of trust, and low transparency in the informal table- banking sector. This is a growing sector.
- **Agricity Foods.** The start-up has developed a technology for household urban farming, to address urban food security.
- **CRESNET.** The start-up has developed a 'virtual reality' learning solution targeting children with learning disabilities.
- **Emoji Technologies.** The start-up has developed micro-USB cables. There are very few locally made USB in the current market.
- **Giomerc.** The start-up has developed a low-cost feed production solution to meet the increasing demand for fish feed due to expansion of aquaculture.
- **The Circular List.** The start-up has developed a software solution that documents the real effect of industrial manufacturing to the environment and promote circular economy.
- **Savanna Circuit Technologies Ltd.** The start-up has developed a solar powered cold storage system to reduce electricity bills and expand access to cold storage services.

- **Nyangorora Banana processors.** The start-up had developed value added banana products to enhance income for the farmers.
- **Ikodawa Solutions Ltd.** The start-up has developed a web-based solution that helps users/ clients identify centres or places where they can access both pesticides and pharmaceutical drugs i.e., medicines.
- **Sweet potatoes Processors.** The start-up developed a process solution for making bread from sweet potatoes. There was need in the market for the sweet potato bread.
- **Afyaboost Care Limited.** The start-up developed nutritional products for children below 12 years. There is a ready market that has influenced the steady growth of Afyaboost Care Limited

Finding 20:
Intellectual Property and Standards

- **Novelty:** Most of the innovators (66%) consider their innovation as novel and therefore should be patented/protected. However, only 40% of these innovators have tried to protect their innovation.
- **Protection of innovations:** Out of the innovators who have tried to protect their innovations, 44% indicated that they experienced the following challenges: (a) lack of proper information on intellectual property; (b) patent application processes are lengthy and time consuming, (c) high cost of patents in terms of applications and maintenance, and (d) infringement due to weak enforcement.
- **KEBS Certification:** Only 28% of the innovators have obtained KEBS certification- for their products. They indicated that the certification process is lengthy, time consuming and expensive.

Finding 21:
Impact of innovations to the economy

Whereas it is not easy to assess the possible impact of these innovations within the scope of this assignment, an analysis of the description of the innovations shows the potential for significant impact to the economy. For example:

- The **automated Ambu bag ventilator** innovation that replaces the manual ventilator has the potential for mass deployment in hospitals with significant contribution to efficient management of patients with breathing difficulties.
- The **Circular List** is a software innovation which helps to address the environmental impact from industries and major economy key players as a means of promoting circular economy, which is currently being embraced by many African countries.
- **Kuza Cooler Limited** through their solar driven coolers are targeting to reduce postharvest losses for about 150,000 small-scale fishermen in Kenya who depend on fishing to earn a living. Small-scale fishermen from low-income fishing communities are making huge post-harvest fish losses daily due to lack of access to reliable and affordable cooling services. Approximately 45% of their harvest goes to waste daily, hence making huge losses.

Finding 22:
Sufficiency of skills to run the business

The survey showed 59% considered the skills of their staff as 'satisfactory', 19% as 'inadequate', and only 22% considered the skills of their staff as 'adequate'. The top five skills that the innovators require for their staff are marketing, legal and intellectual property expertise, database management, programming, and business development.

Finding 23
Funding for commercialization of innovations from the mapped start-ups.

The key findings are given here below:

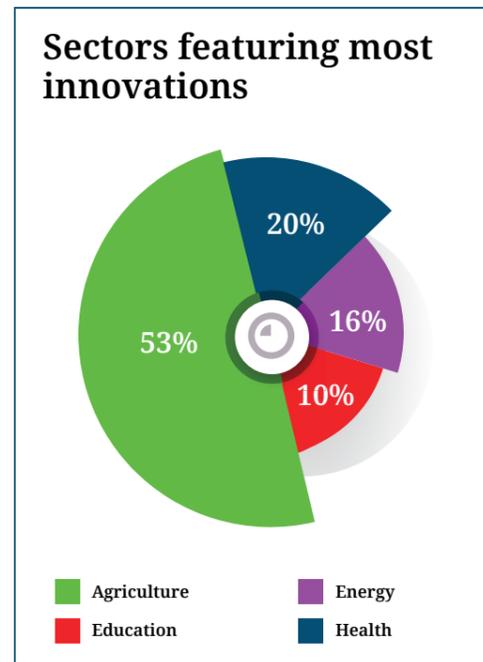
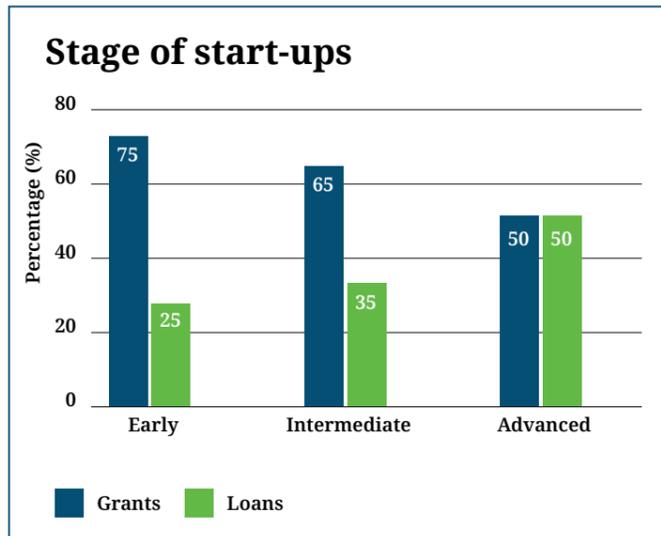
Key Findings

- Only 31% of the start-ups had received funding
- Funding sources: government, NGOs, Private entities and UN Agencies.
- Funding types: 59% grants, 41% loans no equity.
- Main funding for early start-ups grants (75%)
- Capacity to attract funding increasing with years of operation.
- The success rate for accessing funding increases with the level of education.
- Main areas that attracted funding were agriculture, health, energy and education

Finding 24:
Summary of key challenges facing the start-ups

- Funding
- Skills of innovators and staff
- Access to innovation hubs
- Limited services offered by innovation hubs
- Intellectual property and certification
- Weak collaboration with universities and research institutions to access services
- Sustainability
- Scaling up





2.3. Characteristics of Innovation hubs in the Kenyan Innovation Ecosystem

Finding 25:

County coverage: The existing hubs are not uniformly distributed across the country. Out of 186 hubs mapped, around 38% of them were in Nairobi while the major urban cities (Nairobi, Mombasa, Uasin-Gishu, Kisumu and Nyeri) accounted for 54% of the hubs.

Finding 26:

Distinctions within the innovation ecosystem

There is difficulty distinguishing the various innovation support structures. Figure 3 gives the definition adopted in the study while table 2 provides examples:

Finding 27:

Status and organization type

The study revealed 81% of the innovation centers to be formally registered. Out of the registered hubs, 35 % are public, 35% are run by non-governmental organisations (NGOs) and only 30% were private entities. It can therefore be concluded that the Kenyan innovation enablers segment is currently dominated by public entities and the NGO sector (70% of the hubs). Examples of public, NGO, and privately managed hubs in Kenya are shown below:

- Public managed hubs: KIRDI Incubation Centre, Chandaria Incubation Centre and C4D, University of Nairobi.
- NGO managed Hubs: Fablab Winam Kisumu, Swahilipot Hub, Mombasa and Sote Hub in Taita-Taveta and Learning Lions in Turkana.
- Private Managed Hubs: Technobridge in Mombasa, and Gearbox in Nairobi

Finding 28:

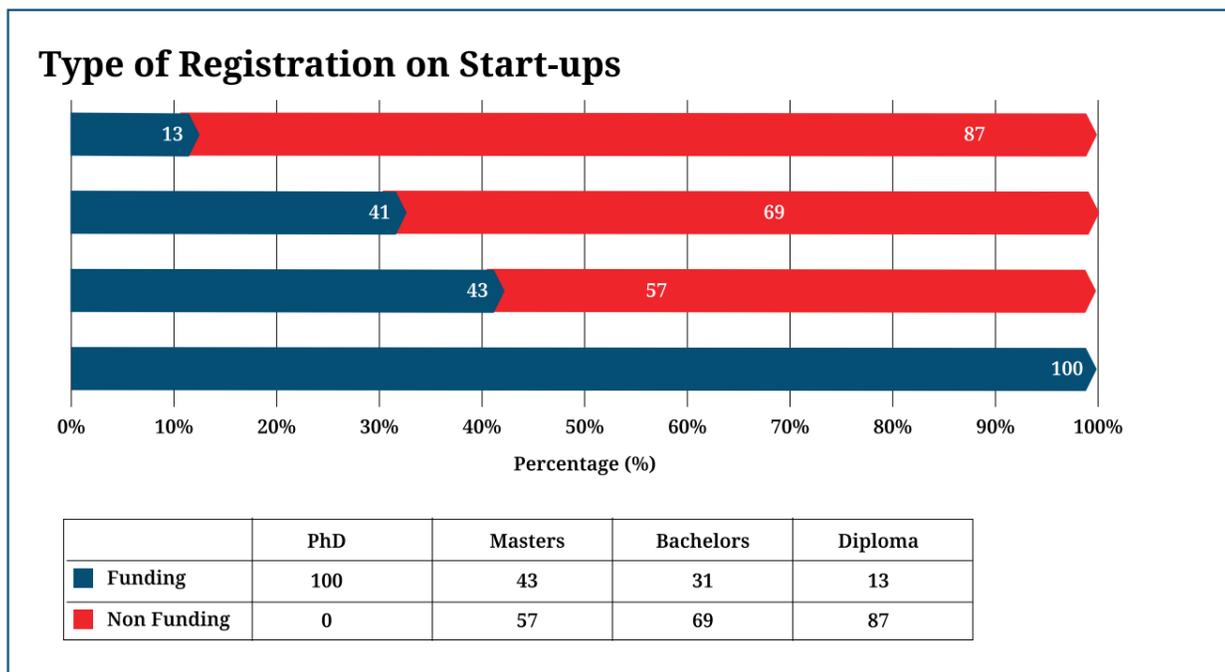
Education, gender, and age of the hubs managers

Figure 4 provides a summary of the level of education, gender, and age of the hub managers. The sector is driven by well-educated male youth. The analysis of the areas of specialization of the hub managers indicates that business management, entrepreneurship, ICT, project management and engineering are the top five specializations held by hub managers. Business management, entrepreneurship, and ICT are the top three specializations held by over 60% of the hub managers. It can be concluded, therefore, that these three areas of specializations are important for driving the growth of innovation hubs in the country.

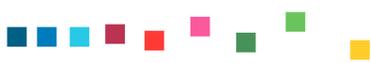
Finding 29:

Number of employees of the hubs and social presence

The bulk of the hubs (58%) interviewed had between 1 to 5 employees while 24% had between 5 and 10 employees and 18% had more than 10 employees. Among the large hubs (with more than 10 employees) are: Swahilipot Hub Foundation, which has 20 employees and Learning Lions, in Turkana, which has 30 employees. That 58% of the hubs are small entities with less than five employees, coupled with the fact that 70% of them are government and donor led, shows elevated levels of vulnerability regarding sustainability. The hubs rely heavily on social media for communication and marketing of their services. This is attributed to the dominance of the sector by youthful and well-educated hub managers.



Kenyan innovation enablers segment is currently dominated by public entities and the NGO sector (70% of the hubs)



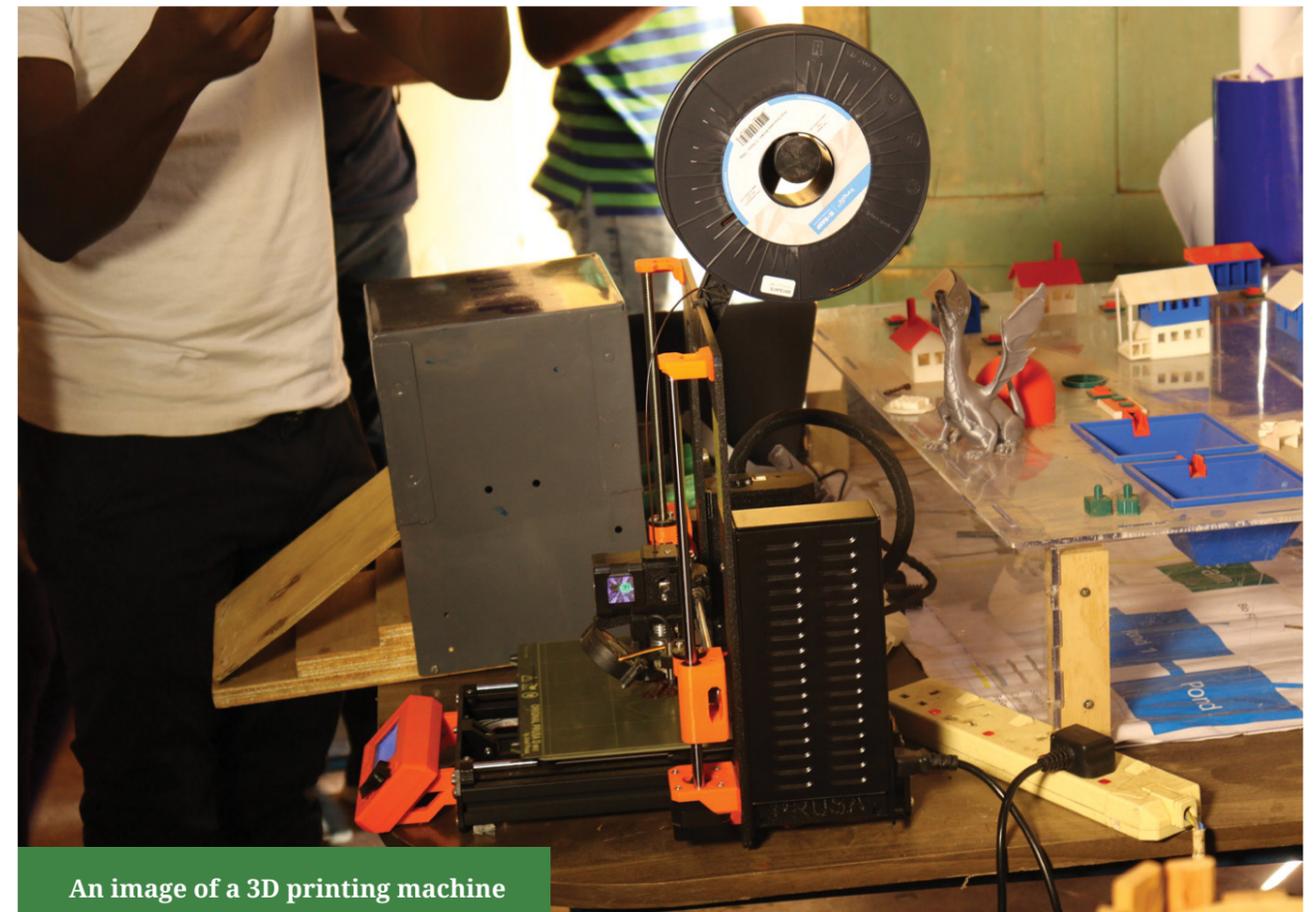
Hubs	Incubators	Accelerator	Co-working spaces
<ol style="list-style-type: none"> 1. Makueni Innovation Hub: Makueni 2. Mashinani Hub: Nyamira 3. Mt. Kenya Hub (MHub): Nyeri 4. iHub: Nairobi 5. Pawa254: Nairobi 6. Rift Valley Innovation Center: Baringo 7. Ubunifu Hub: Nakuru 8. Eldohub: Usain Gishu 9. Lake Hub: Kisumu 10. Wise Hub: Kisumu 11. Border Hub: Busia 12. Dlab Hub: Uasin Gishu 13. Circular Innovation (CIH): Nairobi 14. BitHub: Nairobi 	<ol style="list-style-type: none"> 1. Startup Lions- Turkana 2. Coelib Center- Nakuru 3. Sote Hub (Voi): Taita Taveta 4. Mt. Kenya Hub (MHub) 5. Innovation Incubation & Entrepreneurship Center (IIEC): Nairobi 6. The Entrepreneurship Hub: Nairobi 7. GrowthHub: Nairobi 8. IBizAfrica (Strathmore University): Nairobi 9. Nailab: Nairobi 10. Cisco EDGE Incubation Centre (UoN): Nairobi 11. Chandaria BII (KU)- Nairobi 12. Kenya Country Business Incubators (KeKoBi) 	<ol style="list-style-type: none"> 1. Ubunifu Hub: Machakos 2. Bay Hub: Homa Bay 3. Pangea Accelerator: Nairobi 4. The Entrepreneurs Hub: Nairobi 5. Growth Hub: Nairobi 6. mLab East Africa: Nairobi 7. Sinapis Group: Nairobi 8. Mara Launchpad Incubation Center 	<ol style="list-style-type: none"> 1. Nakuru Box: Nakuru 2. Kikao64: Uasin Gishu 3. Mt. Kenya Hub (MHub): Nyeri 4. Nomad Lounges Limited: Nairobi 5. Nairobi Garage: Nairobi 6. Mombasa Works: Mombasa 7. Nomadic Hub: Nairobi 8. Totosci Holdings Ltd: Kirinyaga 9. Coast Team Innovators (CTI): Mombasa 10. Workable Nairobi: Nairobi 11. IKIGAI: Nairobi 12. The Twig: Nairobi
		Marker-Spaces <ol style="list-style-type: none"> 1. Gearbox: Nairobi 2. KIRDI 3. Close the Gap 4. Constituency Industrial Development Centers 	



Figure 2: Summary of the findings on education, gender, and age of hubs managers

Table 3:
Services offered by the hubs

- The hubs offer innovators several services. These include training and skills development, marketing, networking, mentorships, makers spaces, and small-scale manufacturing, ideation, and prototyping, as well as market and research surveys.
- The majority (70%) of the hubs are public and NGO managed and offer subsidized or free services to innovators. This is positive since it enhances access to these services by innovators.
- The private hubs charge fees for services, paid for directly by the start-ups but in some cases through various support services.



An image of a 3D printing machine



Finding 30:

Services offered by the hubs: Table 4 shows the services provided by the hubs to the innovators.

Finding 31:

Capacity of the hubs to offer services to the innovators

The analysis showed that around 50% of the hubs had supported less than 10 innovators/ start-ups since their registration. This illustrates a micro-scale level of operation, compared to the possible number of start-ups that may require such services. Furthermore, 84% of the hubs are less than 10 years old. This demonstrates the projection of rapid growth of hubs in Kenya. In terms of meeting the needs of the innovators, the analysis showed the following:

- Only 36% of the hub managers have capacity to meet the needs of the innovators/start-ups. In addition, only 34% of the hubs rate themselves as successful in supporting the innovators.

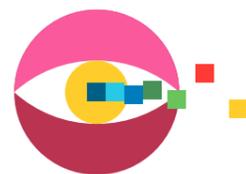
- Majority (67%) do not believe that innovators get the necessary legal and policy support they require to advance their innovations.
- Hub managers identified the following five top skills gaps that limit their capacity to offer complete services and meet innovators' needs: programming, accounting, marketing, legal and intellectual property, and cybernetics.

Finding 32:

Success factors for innovators in the hubs

Hub managers identified key factors necessary for innovators to convert their innovations into viable business entities:

- Access to funding is a key factor in the successful commercialization of innovations. Innovators with access to sources of funding are more likely to be successful in their ventures than those without.
- The criteria used by a hub to select innovators is a key indicator of success for the latter. Identifying and supporting innovators with viable innovations and self-drive is more likely to lead to a successful start-up.
- Being flexible and maintaining a positive attitude are important personal attributes that determine whether an innovator can successfully convert support offered by a hub into a viable enterprise or start-up.
- Innovators whose ideas are technology based are better placed to actualise them compared to those whose ideas are hardware based as most of the hubs specialise in technology-based support and capacity building.
- Innovators who peg their expectations on financial gain while joining hubs are bound to be disappointed. Furthermore, over reliance on aid, makes it difficult for many innovators to become self-sustainable.
- Persistence and consistency are key. Many give up on the way before trying enough.



Out of the registered hubs, 35 % are public, 35% are run by non-governmental organisations (NGOs) and only 30% were private entities.

Finding 33:

Collaboration of the hubs with the government: Areas, benefits, and suggestions for improvements

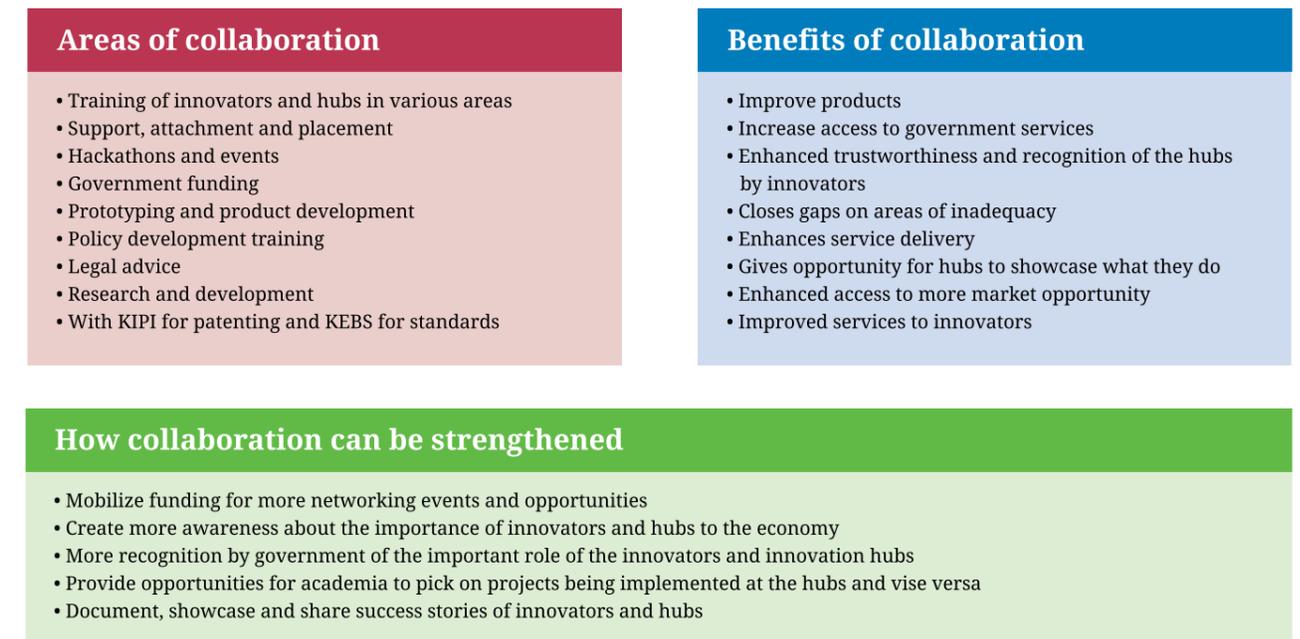


Figure 3 : Areas and benefits of collaboration with the government entities

Finding 34:

Enhancing support for innovators: Figure below shows a summary of the insights from hub managers – what has worked well, what has not, challenges and recommendations.



Figure 4: Experience of the hub managers with start-ups



Finding 35:
Access to funding and policy incentives

1. Access to funding: Majority of the hubs (85%) indicated that they did not have access to funding opportunities to expand their services to the innovators. Only one hub has received funding to expand its services.
2. Policy and legislative framework: In terms of government support, 60% of the hubs consider the regulatory framework (laws, tax incentives, policies) as not supportive to their operations. They are of the opinion that the regulatory framework is more tax-centred as opposed to incentivizing the sector. They propose the following: affordable licensing regime, enabling support systems at the county levels, relaxation of bureaucratic and legal bottlenecks to access essential services like funding and infrastructure, and awareness raising on policies related to innovation.

Finding 36:
Co-working spaces:

The key findings are summarised in Table 4.

Finding 37:
Academia innovations labs

Useful information on specific aspects of the innovation labs was obtained including level of education and discipline of the hub managers, areas of focus, adequacy of skills of the staff, services provided, target clients, and adequacy of services. These are summarised below:

- Most of the managers of the academic innovation labs have PhD and MSc level of education.
- Majority of the labs focus on Ed-Tech, e-commerce, and Agri-Tech.
- Most of them target internal innovators although a few provide support to external innovators too.
- About 72% are not able to provide all the needs of the innovators.
- Amongst the key challenges the academic innovation labs face includes low response rate from students, limited number of trained staff to run innovation labs, lack of skills to commercialise innovations, poor uptake of innovative solutions,

limited experience on intellectual property rights among legal personnel, inadequate institutional support towards intellectual property development, and lack of enough resources to support innovation development and commercialization.

- The academia innovation labs require support on funding for Research and Development, scaling innovation, and start-up development, forging linkages with industrial sector and within the innovation ecosystem, human capital development especially in emerging technologies, access to market, capacity building and IP management.

Finding 38:
Government agencies

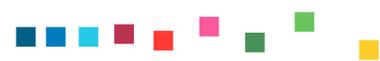
Various government departments at the county level were interviewed including the Ministries of ICT, trade and industry, gender, youth and social services, agriculture, education, and interior. In total 32 such county units were engaged for interviews. Key findings and observations are highlighted below:

1. **Areas of innovation:** Respondents perceive agriculture, ecommerce, health, education, and finance as the five top areas where most innovations are being developed. They believe that this is informed by the government's prioritization of these sectors in the recent past (including the big four agenda), as well as the rapidly growth witnessed in the digital sector. Majority (75%) feel that the innovation ecosystem in Kenya is still at infant stage.
2. **Support to innovators and hubs:** Respondents highlighted policy and legal, marketing, ICT, networking, and financial management as the five top skillsets required by innovators and agree that government's support to the ecosystem should target these skills. They also shared ways in which the government provides support to innovators which includes skill development training, promoting their products and services, linking them with relevant authorities for training and exhibitions and free or subsidized internet access at county hubs. Nevertheless, majority of the respondents (65%) agree that the available infrastructure is not adequate to support innovators.

3. **Contribution to the ecosystem:** The existing infrastructure has contributed to the development of the innovation ecosystem in Kenya by providing facilities and internet access to youth engaged in creative projects, enabling sharing of ideas and training at the centres, providing space and environment for innovation, giving innovators an opportunity to advance their knowledge and allowing government departments to embrace innovative approaches to service delivery.
4. **Support provided by the government to innovators:** Government officials also listed financial support systems provided by the Government to innovators and other key actors in the innovation system. These include infrastructure development, skills development through trainings, funding through the Youth Enterprise Development Fund (YEDF), the National Empowerment Fund (NEF), National Government Affirmative Action Fund (NGAAF) and Uwezo Fund, access to loans, reduced tax rate, and the establishment of Kenya Innovation Agency.
5. **Policy environment:** Majority (61%) believe that existing policies and regulations are adequate to positively impact on the innovation ecosystem. They mention, for example, the STI Act No. 28 of 2013, Vision 2030, National ICT Policy, draft Digital Economy Strategy, draft STI Policy (2020) and the draft Start-up Bill. However, there are still major policy gaps in relation to innovations ecosystem in Kenya which include: implementation of existing policies, inadequate technical support to help innovators realize their potential, and inadequate public participation. The officials proposed several ways through which the gaps can be addressed: enforcement of the policies; engagement of all policy makers, experts, influencers, and stakeholders; budget allocation; and establishment of rural industrial park and innovation centres.
6. **Challenges and interventions:** The government officials also identified challenges facing innovators such as lack of awareness, lack of access to the available infrastructure, insufficient education, unreliable power, and inadequate mentorship programs.

The officials proposed the following interventions to address these challenges:

- Revive and revamp constituency innovation hubs and youth empowerment centres; promote and support partnership with other institutions in public engagements and trainings; subsidize the cost of raw materials and other inputs for start-ups; and ensure consistent flow of information relevant to innovation, innovators, and star-ups.
- Map and document innovations and start-ups at county and national level, raise awareness on the existence of services offered by innovation hubs to the public, provide incentives to investors supporting innovation hubs; and offer dedicated financial support to spur innovative efforts.
- The government can fuel the development of entrepreneurial culture in Kenya by providing subsidies, building the capacity of innovators through trainings, providing linkages with donors, supporting commercialization of innovations, organizing innovations events/competitions, facilitating access to funds for the youth and other vulnerable groups in the community, and creating linkages with business partners for learning and growth.
- They also mentioned other interventions by the government to promote the development of innovation culture in Kenya: lower taxes and offer tax reliefs to innovators, invest in trainings and skills transfer, invest in infrastructural facilities that support innovation, enhance linkages, networking, collaboration, and funding.



**Table 4:
Main findings from co-working spaces**

	Dimension	Characteristics
1	General Characteristics of co-working spaces	<p>a) Organization type: Majority (70%) are private entities.</p> <p>b) Gender: 83% of the organizations are male led.</p> <p>c) Education: Most managers (87%) of co-working spaces have degree level of education.</p> <p>d) Skills: Only 33% of the respondents rate the skills of their staff as adequate and many indicated legal skills, marketing, and networking skills as skills gaps for their staff.</p>
2	Market Analysis	The bulk of the co-working spaces target individual innovators/start-ups; 74% rate the demand for their services as 'good' and 'very good'. However, 83% of the respondents indicated inability to meet all the needs of the innovators. The services required most by the innovators are financial support, marketing and brandings, ICT infrastructure & Internet, legal and IP rights support, and mentorship.
3	Collaboration	About 74% of the respondents collaborate with other partners in the innovation ecosystem with the majority (72%) indicating that collaboration is beneficial. They receive support in form of financial and credit linkages, networking and training, capacity building, and access to information. However, they face several challenges which include lack of confidence in innovators and hubs by foreign investors, difficulties in aligning the interests of partners, and inadequate financial resources to support collaborative interventions such as workshops and mentorship programs.
4	Success factors for start-ups	Managers of co-working spaces identified specific features of innovators that make them successful: Innovators who have completed studies but lack employment respond better than those still in school or employed. Additionally networking skills and a positive mindset by innovators contributed to the success of a start-up.
5	Challenges	The key challenges facing co-working spaces include lack of skilled staff, limited space, limited funding for innovations, limited ICT infrastructure and limited business development skills.

Finding 39:

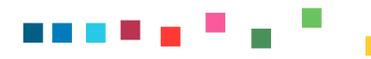
Networks and marketing organizations

During the study, 24 networks and marketing organizations were interviewed. The followings are the highlights of the findings:

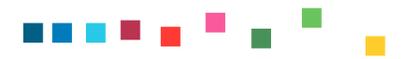
Finding	Characteristics	Key findings
1	Services offered to innovators	Services offered were training, ideation, incubation, advertisement and marketing, capital linkages and networking, prototyping, marketing, digital skills training, and product development.
2	Services innovators need most	The top services required by innovators are financial, marketing, technology, training, human resource management, legal and IP rights services and business management services.
3	Staff skillset	Majority of the organizations (73%) rated staff skills as being 'inadequate' and/or 'satisfactory'. The main skill gaps are legal and IP training, business development, communication, and marketing.
4	Age of the organizations	The bulk of the organizations (75%) were registered during the last 10 years (2011-2021).
5	Gender distribution	Only 39% out of the 24 networks and marketing organizations are women originated or led.
6	Use of social media	The most embraced social media tool for business was Facebook (43%). Followed by Twitter (20%), Instagram (16%) and LinkedIn (14%).
7	Level of education	Most of the managers of the networks and marketing organizations are first degree holders (12), followed by Masters (8) and Diploma (3).
8	Type of entity	Majority (62%) were private entities and (38%) were public.
9	Meeting Innovator needs	About 62% indicated that they did not fulfil all innovator needs.
10	Skills gaps	Networking, marketing, finance, training, legal and IP rights training, human resource management.



Innovators assembling a 3D printing machine



An innovator showcasing a fabrication machine in use



CHAPTER FIVE

Conclusions & Recommendations

5.1. Introduction

This study sought to generate evidence that can be used to develop interventions to strengthen the Kenyan Innovation Ecosystem. This overall objective was realised by pursuing the following specific objectives through desk study and field data collection.

- a) Establish the status of the Kenyan innovation ecosystem across the country: characteristics, organization (players and actors), challenges, and opportunities. Findings would be disaggregated per region, sector, and demographics.
- b) Identify key levers and approaches on how to stimulate the sector for more economic growth towards achieving key development agenda items (SDGs, Vision 2030), including requisite skill sets, partnerships, and resources.
- c) Highlight emerging themes and opportunities for collaboration, partnership, and cross-learning.

This section presents the conclusions and recommendations derived from the findings that could be pursued to strengthen the Kenyan Innovation Ecosystem

5.2. The Status of Kenyan Innovation Ecosystem

5.2.1. Key players in the Kenyan innovation ecosystem

Conclusion 1: Kenya has a reasonably well-defined innovation ecosystem, with the key building blocks already in place. The clear identification of these building blocks provides a good foundation for interventions geared towards improving the ecosystem.

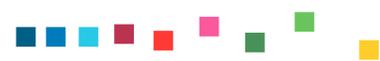
The building blocks of the Kenyan Innovation Ecosystem include: innovation producers (universities and research institutions, areas of innovation); innovation consumers (Start-ups, SMEs and large industries), innovation and business support systems (hubs, incubators), innovation governance structures (NACOSTI, KENIA, NRF, KIPI, KECOBO, Konza

Technopolis and KEBs), innovation support policies and legislations (STI Act 2013, IP ACTS 2001, STI Policy 2020, Start-up Bill,2020) and Innovation Financing (GoK, NGO, development partners, banks an angel investors). Each of these building blocks has their own unique challenges that needs to be addressed and opportunities that needs to be tapped to improve the Kenyan innovation ecosystem. This provides a good starting point for formulation of interventions for the sector's growth.

5.2.2. Performance of the Kenyan Innovation Ecosystem

Conclusion 2: Regionally Kenya ranks amongst the best performing countries with regard to the status of her innovation ecosystem. However, globally, Kenya is lagging. This is evidence that more work needs to be done to harness the opportunities and benefits accruing from an innovation driven economy.

There is evidence that regionally the Kenyan innovation ecosystem is amongst the top in Africa. For example, the Global Start-up Index Ecosystem Index 2021 and the Global Innovation Index 2021 rank Kenya at position 3 after South Africa and Mauritius. However, globally, the two reports place Kenya at position 61 and 85 respectively. As per the Global Start-up Index Ecosystem Index 2021, Kenya compares poorly with countries it traditionally benchmarks with such as China (which is ranked number 7), India (20), Brazil (24), South Africa (48) and United Arabs Emirates (25). This clearly demonstrates the opportunities ahead and the need for Kenya to put more efforts to strengthen its innovation ecosystem especially in improving existing innovation infrastructure, talents and skills, and access to investment finance.



5.2.3. Key drivers of global Innovation Ecosystem

Conclusion 3: The four key drivers of global innovation ecosystem relevant to the Kenya are: openness and collaboration, support to start-ups, public services (infrastructure) and innovation culture.

There are gaps in the Kenyan Innovation Ecosystem (KIE) with respect to key drivers in this space. Currently, the level of collaboration amongst the key actors in the KIE, the government's support to start-ups, availability of infrastructure, and the existence of an innovation culture is inadequate.

5.2.4. Historical perspective of the Kenya Innovation Ecosystem

Conclusion 4: The development of the Kenyan innovation ecosystem has been driven by the efforts to realize industrialization in Kenya. Therefore, adopting a whole of government approach towards innovation ecosystem development is key to the growth of the innovation ecosystem.

5.2.5. The Vision of the Kenya Innovation Ecosystem

Conclusion 5: Despite having multiple policy documents in place, Kenya does not currently have a common coherent strategy and vision for the innovation ecosystem. Nevertheless, it would appear that the Kenyan innovation ecosystem is inspired by Vision 2030. This being the case, therefore, it is important to develop a coherent stand-alone innovation policy and strategy.

5.2.7. Coordination and governance

Conclusion 6: Although there are adequate coordination and governance structures for the Kenyan innovation ecosystem, their capacities to provide effective support to the ecosystem are limited by human and financial resources. Furthermore, coordination with the other agencies like ICT Authority, which is driving digital innovations, as well as ministry of trade, industrialization and enterprise development is weak.

The STI Act (2013) has provided for the establishment of three agencies to spearhead science, technology, and innovation in Kenya. These are NACOSTI, NRF and KeNIA. These institutions are still at their early stages of establishment and have not yet build adequate human and financial resources to deliver on their mandates. Furthermore, there is inadequate collaboration with other agencies driving innovations such as those under ministries of ICT and youth as well as those of trade, industrialization, and enterprise development.

5.2.8. Talents and Skills

Conclusion 7: There are talent gaps in terms of numbers and quality in addition to the right skills for innovation development and commercialization of innovations as well as managing of innovation hubs. Strengthening of skills and talents is one of the areas that Kenya will need to invest in more to strengthen the Kenya national innovation ecosystem. Investment in skills and talent will contribute to enhanced Kenyan innovation performance in future ranking.

5.2.9. Infrastructure

Conclusion 8: Kenya has made great strides in improving its ICT infrastructure, which is a key driver of innovation and a key component for strengthening the innovation ecosystem. This includes expansion of National Fibre Optic Backbone Infrastructure across all the 47 counties, establishment of the National Data Center and increasing access to electricity.

However, 83% of the country still lacks broadband services and the quality of broadband services manifests in low-speed connections and poor reliability. Access to electricity, which is an important component for innovation and development of start-ups, was at 70% in 2019, behind China, Ghana, Morocco, Singapore, and South Africa. Rural access to electricity stands at 62 % with urban access at 91 %. Morocco, Singapore, and China are amongst the benchmark countries with almost 100% rural access to electricity.

5.2.10. Growth of the Kenyan Innovation Ecosystem

Conclusion 9: There is evidence that the Kenya innovation ecosystem is growing.

The indicators that demonstrate the growth of the Kenyan innovation ecosystem are robust labour market, market environment, hubs, activeness of the ecosystem, ICT, capital and resources, policy and regulation, university-industry linkages, economic performance, as well as technology diffusion and adoption systems. Regionally, Kenya is performing well in these indicators and is currently ranked second best after Nigeria in terms of labour market, start-ups market environment, hubs activities and attraction to start-ups investment capital.

5.2.11. Disparity in the Kenyan Innovation Ecosystem

Conclusion 10: Despite the rapid growth of the Kenyan innovation ecosystem, there is disparity in the distribution of the benefits of the innovation in the country between rural and urban centers.

This is due to existing disparity between rural and urban areas in terms of access to internet, infrastructure, digital skills high level of poverty, innovation activities. Furthermore, the participation of women in the Kenyan innovation ecosystem is low compared with men as reflected by the low number of women led start-ups and women-managed hubs.

5.2.12. The Funding Landscape in Kenya

Conclusion 11 (Funds raised and by whom): Kenya is increasingly becoming an attractive destination for investors in start-ups. During the last five years, the amount of money raised by Kenyan start-ups has increased from USD 40 million in 2017 to USD 280 million in 2021 while the number of start-ups attracting investments has increased from 40 to 86, during the same period. Regionally Kenya is amongst the top five in terms of funding attracted and the number of start-ups involved. For example, in 2021 Kenya had 86 start-ups, while Nigeria leads the pack in terms of the number of start-ups supported at 156, followed by Egypt (105), South Africa (85).

Conclusion 12 (Main players in funding and the sectors funded): The top ten Kenyan start-ups in terms of volume of money raised are M-Kopa, Twiga Foods, Copia Global AZA Finance, Sendy, Lendable, Little Cab, African Talking, PayGo, and Gro Intelligence. Most of these firms are foreign owned or joint ventures with foreign nationals. This is not necessarily a bad thing since it provides opportunities for local innovators to create diverse teams for their start-up development. It is also a useful information for developing a strategy for the innovation ecosystem. Egypt, Nigeria and South Africa provides opportunities for Kenya to benchmark with within the region. Not all sectors prioritised by Kenya, have attracted funding for start-ups. Artificial Intelligence, Agriculture, Fintech, Energy, and E-commerce were the top four best funded sectors in Kenya, while sectors like health, housing, water, and sanitation attracted less.

Conclusion 13 (Untapped funding opportunities): There are some potential sources of funding, which have not been adequately exploited by the Kenyan innovators. These include the Ajira Youth Innovation Fund; Youth Enterprise Development Fund, Acumen Fund Kenya, Africa Tech Ventures, DoB Equity. There is need to develop an information portal that can support innovators to create awareness about these opportunities. Although bonds and local angel and venture capital avenues of funding are still low, they are viable options.

Meanwhile, the government should look at the possibilities of restructuring existing funds. For example, the Youth Fund still require collaterals like Title Deeds, Logbooks, and healthy bank statements which innovators may not have. The funding ceiling is also too low at Kes 100,000 Kes to Kes 1 million. These bottlenecks should be revised.





5.3. Mapping of the innovators

5.3.1. General Characteristics of start-ups

Conclusion 14 (age and level of education): The Kenyan innovation ecosystem is driven by youthful and well-educated innovators and entrepreneurs, with formally registered start-ups. This bodes well for the sector. However, in terms of gender distribution, women are lagging with only 22% of the start-ups being women-originated or led.

Conclusion 15 (Registration status): Unlike traditional MSEs which are largely informal enterprises in Kenya, majority (74 %) of the start-ups are formally registered.

This makes it easier to identify and monitor their growth and develop targeted interventions. However, the bulk of these start-ups are early-stage business enterprises (less than 3 years old) and micro-enterprises (with less than 5 employees). Their survival and sustainability should be a cause for worry.

Conclusion 16 (role of education on innovation): There is evidence that the educational disciplines of the innovators influence the type of innovations developed and the success of commercialization. This makes it possible to develop a strategy that can support generation of innovations in prioritised sectors of the economy.

5.3.2. Market for Innovations

Conclusion 17 (sectors targeted): Most of the innovations are linked to prioritized sectors of the Kenya economy, namely e-commerce, agriculture, energy, health, education, water, and finance. However, there are few innovations addressing sectors such as manufacturing and housing.

Conclusion 18 (Market as a driver for innovation): There is evidence that most of the innovations are market driven. Most of the innovators (78%) rated the markets for their innovation as 'good and very good', a clear indication that these innovations are providing solutions that are missing and therefore demand driven. Therefore, the deployment and upscaling of some of these innovations has the potential to impact positively on the economy.

5.3.3. Challenges of Start-Ups

Conclusion 19 (Inadequate skills): Most of the start-ups do not have adequate skills to effectively manage their businesses. The top-most-rated skills required by the innovators and the employees of the start-ups are marketing, legal and intellectual property management, business development, and data base management. This points to the need for capacity building of the start-ups in the identified areas.

Conclusion 20 (Intellectual Property Rights): Protection of innovations through intellectual property rights remains a challenge for most of the start-ups. Only 40% of the innovators had tried to protect their innovations. The main reasons cited for this are: lack of proper information on intellectual property, lengthy and time-consuming patent application process, high cost of patents applications and maintenance, and infringement due to weak enforcement. There is need to provide support to innovators in this area.

Conclusion 21 (KEBS Certification): Similarly, certification of innovators product is a challenge. Only 28% of the start-ups have received KEBS Certification, mainly due to high costs associated with access to certification services. It is important to note that intellectual property rights and KEBS certifications are important tools for commercialization of innovations; interventions in this area should be encouraged and supported.

Conclusion 22 (Funding of innovation development and commercialization): Access to funding remains one of the top challenges of start-ups. Only 31% of the start-ups have received funding, mainly grants (59) and loans (41). It appears that access to equity funding is still limited and yet it is the most sustainable funding mechanism for innovation ecosystem. Furthermore, it appears that most early-stage start-ups rely on grant funding and gradually, as they grow, their capacity to attract loans increases. Meanwhile, there is indication that the higher the educational level of innovators the higher the chances of attracting funding. Agriculture, health, energy and education are the four top sectors attracting start-up financing. Interventions in start-up financing should be part of any innovation ecosystem development strategy.

Meanwhile, the government should look at the possibilities of restructuring existing funds. For example, the Youth Fund still require collaterals like Title Deeds, Logbooks, and healthy bank statements which innovators may not have. The funding ceiling is also too low at Kes 100,000 Kes to Kes 1 million. These bottlenecks should be revised.

5.4. Mapping of the innovation hubs

5.4.1. General Characteristics of Hubs

Conclusion 23 (Disparity): There is evidence of disparity in distribution of hubs in the country. Out of 148 hubs mapped, 68 (46%) are in Nairobi. Indeed, the top nine counties - Nairobi, Mombasa, Uasin Gishu, Kisumu, Nakuru, Nyeri, Machakos, Garissa and Kiambu account for 74% of the total hubs in Kenya. The remaining 30 counties have between 1 and 3 hubs. This is a disadvantage for innovators in these counties with fewer hubs.

Conclusion 24 (Differentiation of Services): The main services provided by the hubs are skills development, marketing and networking, mentorship, maker spaces and small-scale manufacturing, prototyping and ideation, research, and market analysis. Interestingly, evidence shows no clear distinction in terms of services offered by accelerators, incubators, co-working spaces, and maker spaces. For urban areas, endowed by large number of hubs, there is merit for specialization of services by accelerators, incubators, co-working spaces, and makers spaces to enhance the quality of services provided to the innovators. However, for rural areas, not well endowed with hubs, consolidation, and creation of a one-stop-shop for the innovators could make more sense.

Conclusion 25 (Public or Private led): Currently the Kenyan innovation hubs segment is dominated by the public entities and the NGO sector (70% of the hubs), while the private sector accounts for only 30%. This demonstrates government increasing support to the innovation ecosystem. However, the involvement of the private sector is important for long term sustainability.

Conclusion 26 (Age, gender, and level of education): The current management of hubs in Kenya is dominated by well-educated youth, with 78% having at least a degree level of education, while 64% are less than 35 years old. This is positive since it is in line with Kenya government's efforts of promoting job creation through youth innovativeness and creativity. Most of the managers of the hubs (84%) are male, which points to gender disparity in the innovation ecosystem.

Conclusion 27 (Specializations of hubs managers): Business management, entrepreneurship, ICT, project management and engineering are the top five specializations held by the hub managers. It can be concluded, therefore, that these five areas of specializations are important in driving the growth of innovation hubs in the country. This can form the basis for developing a growth strategy for innovation ecosystem.

5.4.2. Capacity of The Hubs to Offer the Services to Innovators

Conclusion 28 (Level of operation): Data analysis showed that around 50% of the hubs had supported less than 10 innovators/ start-ups since their registration. This illustrates a micro-scale level of operation, compared to the possible number of start-ups that may require such services. Scaling up the operations of these hubs will be necessary to enhance outreach.

Conclusion 29 (Capacity to provide services): There is evidence that most of the hubs do not have adequate capacity to meet all the needs of the innovators. The five top skills gaps for the managers of the hubs include are: programming, accounting, marketing, legal and intellectual property and cybernetics. It can therefore be concluded that capacity building of hub managers and their staff is an important intervention in strengthening the innovation ecosystem in Kenya.





5.4.3. Collaboration and impact of hubs

Conclusion 30 (Collaboration with other agencies): There is evidence of collaboration of the hubs with other government agencies and that such collaborations bring benefits to the hubs. However, the level of collaboration is inadequate. Networking events and opportunities are not regular while collaboration with research institutions and universities are almost non-existent. Furthermore, there is little evidence of collaboration not only between the hubs themselves but also with other business entities.

Conclusion 31 (Impact of innovation hubs): Traditionally, policy makers require evidence for policy and decision making. Therefore, documenting, showcasing, and sharing success stories on the role of the innovation hubs and their contributions to the economic growth of the country is desirable. This, together with awareness creation, are important strategies that can help unlock more resources to the sector.

5.4.4. Support to Innovators and Success Factors

Conclusion 32 (Support to innovators): As per the hub managers, innovators face several challenges, and they need to be supported to address these challenges. The key challenges are lack of trainers and facilities, funding, over-dependency on handouts from humanitarian efforts over many years, lack of market and opportunities to showcase their products, inadequate infrastructure, and weak collaboration amongst the innovators. To enhance support to innovators, it is important to provide and/or create more awareness of existing funding avenues and how to access the funds; invest more on infrastructure that support innovators; create more opportunities for networking and partnerships; build the capacity of innovators through training, government support, enact policies conducive for innovation, and enhance national and county-level legal and regulatory frameworks. As indicated in the Start-up Bill, 2021, other ways of supporting start-ups can include subsidising the formalisation of start-ups; facilitating the protection of the intellectual property of innovations by start-ups in Kenya and with international organisations; providing fiscal and non-fiscal support to start-ups admitted into incubation programmes under this Act; and providing support in the form of research and development activities.

Conclusion 33 (Success factors): Based on their practical experience and lessons learned, the hub managers shared their perspectives on how to successful support of start-ups: skills training and funding for innovators is critical while supporting more innovators is paramount; cooperation and collaboration within the industry is crucial; patience with innovators is necessary as different innovators require different resources and skill trainings; and finally, communication skills is important for pitching.

Conclusion 34 (Policy and legislative framework): The current regulatory framework (laws, tax incentives, policies) are considered not be supportive to the operations of the hubs as they are more tax-centered as opposed to incentivizing the sector. In addition, innovators and hub managers feel the government does not provide adequate funding for innovations and the ecosystem.

1. **Development of an innovation strategy**
2. **Coordination and governance**
3. **Talents and skills**
4. **Infrastructure**
5. **Funding**
6. **Openness and collaboration**
7. **Support to start-ups**
8. **Innovation culture**
9. **Policy and legal framework**
10. **Intellectual property and standards**
11. **Disparity within the innovation ecosystem**



5.5. Recommendations

Based on the findings and conclusions presented above, recommendations for the strengthening of the Kenyan innovation ecosystem have been proposed based on the following emerging themes:

5.5.1. Development of an Innovation Strategy.

The Kenyan innovation ecosystem currently does not have a stand-alone vision since there is no innovation strategy in the country (Conclusion 5). There is need in the long term for Kenya to develop an innovation policy and strategy to drive the Kenyan innovation ecosystem towards becoming a global leader in the sector (Conclusions 2 and 3). Therefore, the following recommendation is proposed.

Recommendation 1: The Government of Kenya, through the relevant ministries (the Ministry of Education, the Ministry of ICT and the Ministry of Industrialisation) should develop a stand-alone innovation strategy to drive the country from a regional leader to a key player in the global innovation ecosystem. The strategy should provide a clear vision for the Kenyan innovation ecosystem, taking into consideration the existing strengths and opportunities as well as the identified challenges and gaps.

5.5.2. Coordination and Governance

The current capacities of government ministries and agencies responsible for spearheading science, technology, and innovation in Kenya are not adequate to enable them deliver on their mandates (Conclusion 4) and coordination with other agencies driving innovations is weak. To address this situation the following two recommendations are proposed.

Recommendation 2: The Kenya Government in collaboration with partners, should allocate adequate resources to strengthen Agencies and institutions responsible for innovation to enhance service delivery to the Kenya innovation ecosystem.

Recommendation 3: The relevant government ministries and agencies should develop a framework to enhance collaboration amongst all the entities involved in innovation activities to enhance service delivery to the Kenya innovation ecosystem.

5.5.3. Talent and Skills

There is evidence indicating that the available talent and skills is still inadequate drive the Kenyan innovation ecosystem to a globally competitive level. (Conclusions 7, 19 and 29). To meet this gap and ensure that capacity building is undertaken in a coordinated manner, there is need to develop a strategy for talent and skills cultivation for the Kenyan innovation ecosystem. Therefore, the following recommendation is proposed

Recommendation 4: The Government of Kenya through the relevant ministries and agencies in collaboration with other partners should develop a talent and capacity building strategy for the Kenyan innovation ecosystem. The strategy should outline ways and means of building the capacity of innovators and hub managers as well as developing the required pipelines of talents and skilled entrepreneurs.

5.5.4. Infrastructure

Infrastructure, which includes the speed of broadband connection, access to internet and electricity, number of data centers, ICT capabilities, test centers, labs, and other facilities, is a key driver for the innovation ecosystem (conclusions 2, 3, 8, and 9). Therefore, the following recommendation is proposed.



Recommendation 5: The Government of Kenya, through the Ministry of ICT, the Ministry of Industrialization, the ministry of education and the Ministry of Energy, in collaboration with other partners, should continue investing more resources in the development of infrastructure to drive knowledge economy and strengthen the Kenyan the Kenyan innovation ecosystem.

5.5.5. Funding of Innovation Development and Commercialization.

Funding has been identified as a major challenge for the Kenyan innovation ecosystem (conclusions 2, 3, 10-13, and 22). Therefore, the following recommendation is proposed.

Recommendation 6: The relevant Government Ministries and Agencies should develop a funding strategy for Kenyan innovation ecosystem. Such strategy should include the following:

- a. Establishment of an innovation fund.
- b. Developing mechanisms for increasing the number of local start-ups that access investment funding.
- c. Developing an information platform on funding opportunities.
- d. Developing a mechanism for mobilization of local investors to finance start-ups.
- e. Providing policy incentives for financing women led start-ups and hubs.
- f. Restructuring the existing government funding mechanisms for youth, women and SMEs to fund start-ups
- g. Promoting certification of start-ups through Technology Readiness Levels for the purpose of accessing loan and equity
- h. Establish a mechanism for equity stake by universities and research organizations as well as hubs in spinoffs and start-ups

- i. Explore PPP framework for equipping and managing existing government own innovation support infrastructure.

- j. Financing of IP protection

5.5.6. Partnerships and Collaboration

Collaboration and partnership are important drivers of the innovation ecosystem (Conclusions 3, 24, and 30). In this respect, therefore, the following recommendation is proposed.

Recommendation 7: The relevant Government Ministries and Agencies should develop a mechanism to strengthen partnerships and collaboration of actors within the Kenyan innovation ecosystem.

Such mechanism should include the following:

- a. Strengthening partnership between start-ups and well-established businesses through sub-contracting.
- b. Funding partnerships between start-ups, hubs and various government Agencies.
- c. Strengthening existing networks of hubs.
- d. Promoting start-ups to start-up business relationships.
- e. Promoting business and start-ups forums.
- f. Access to testing and product development laboratories
- g. Promoting county innovation weeks.

5.5.7. Innovation and Entrepreneurship Culture

An ebullient innovation and entrepreneurship culture is key in driving innovation ecosystem. And although there such culture exists in Kenya; it is not at the level that would drive the county's innovation ecosystem to be globally competitive. (Conclusions 3, 19, 29, and 32). Therefore, the following recommendation is proposed.

Recommendation 8: The Government, through the relevant Ministries should protect and support the existing vibrancy in the innovation ecosystem and promote its continued growth through the relevant government ministries and agencies.

5.5.8. Support for Start-ups

There is need for more support by government and development partners to enable start-ups to grow and compete with their international counterparts. (Conclusions 3 and 32, and 33). Therefore, the following recommendation is proposed.

Recommendation 8: The Government, through the relevant Ministries and agencies in collaboration with other partners should develop a support programme to start-ups.

Such mechanism should include the following:

- a. Capacity building in areas of skills gaps such as marketing, intellectual property, business development and database management.
- b. Innovation protection through intellectual property rights.
- c. Product certifications and standards through KEBS.
- d. Mentorships and handholding of early stage start-ups.
- e. Resource mobilization.

5.5.9. Policy and Legal Framework

As alluded to above, the policy and regulatory environment is not conducive for the growth and development of start-ups in Kenya. Policy incentives and conducive legal framework are required to support the Kenyan innovation ecosystem (Conclusions 3 and 34). Therefore, the following recommendation is proposed.

Recommendation 9: The Government, through the relevant Ministries, should review the existing policy and legal framework for business in general and start-ups and hubs in particularly to support the Kenyan innovation ecosystem.

These may include:

- a. More sponsorship programmes,
- b. Affordable licensing regime,
- c. Develop support systems at the county levels,
- d. Reduce bureaucracy and legal bottlenecks to access essential services like funding and infrastructure, and
- e. Initiate awareness campaigns on policies in innovation.

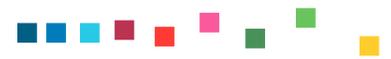
5.5.10. Protection of Intellectual Property

Both the start-ups and hub managers have shown that innovators face difficulties in protecting their innovations (conclusions 19, 20, and 29). Therefore, the following recommendation is proposed:

Recommendation 10: The Government, through the relevant Ministries and Agencies, should develop a programme or playbook to support innovators to protect their innovations.

Such Programme should include

- a. Creation of awareness on the benefits of intellectual property to innovators.
- b. Supporting with the preparation of patent applications.
- c. Hand-holding the innovators during the IP process.
- d. Reduction of fees for protection and maintenance.
- e. Capacity building on various methods of commercialization of innovation.
- f. Support the innovators with licensing process.
- g. Enabling KIPi to speed process by recruiting a larger and more diverse team of researchers





5.5.11. Certification of Innovation Products

Similarly, innovators and hub managers indicated that innovators face challenges in obtaining KEBS standards of quality certification (Conclusion 21). Therefore, the following recommendation is proposed.

Recommendation 11: Develop a programme/ playbook to support start-ups on Certification of innovation products

- a. Creation of awareness on the benefits of standards in accessing markets.
- b. Capacity building on certification processes and procedures.
- c. Hand-holding the innovators during the certification process.
- d. Reviewing the certification fees for start-ups.

5.5.12. Disparity between Urban and Rural Areas

The existing disparity between urban and rural as well as male and female with regard to facilities and opportunities relating to the innovation ecosystem is a concern that must be addressed (conclusions 9 and 23). Therefore, the following recommendation is proposed

Recommendation 12: The relevant Government Ministries should develop a programme to promote the growth of the county-based innovation ecosystem.

The programme should enhance the role of the county government on the following:

- a. Promote innovations in selected country priority sectors.
- b. Work with county-based universities and TVETs to form county-based innovation clusters;
- c. Promote establishment of county innovation weeks.

- d. Ring-fence certain quotas of tenders for local innovators and hubs from the counties. This will create local demand for services/goods of the innovators and make them competitive at national and global level.
- e. Strengthen coordination of existing national innovation Programmes such as Ajira centres; constituency innovation centres and constituency industrial development centers, and county technology development centers;
- f. Development of county innovation plans.

5.5.13. Impact of Innovation Ecosystem

There is need for evidence on the impact and contribution of innovation ecosystem to the Kenya economy to inform decisions by policy makers in favour of the sector (conclusion 31). In this respect, the following recommendation is proposed.

Recommendation 13: a study on the impact and contribution of hubs to national development and use the evidence to lobby for more support for the sector.

5.6. Opportunities for Further Studies

In the post-data collection analytics, and post-study validation processes, the following opportunities for further studies were apparent and may need to be explored.

- 1. Reasons for women's exclusion from management of hubs
- 2. The problem of perennial start-ups
- 3. Activities of start-ups in the post-hub periods
- 4. Database of all existing innovators
- 5. Reasons for prevalence of innovations in some economic sectors, away from others

- 6. Reasons behind non-registration of some start-ups
- 7. Valley of death and factors behind it
- 8. Demographic of individual users that most innovations target
- 9. The role that co-creation plays in development of innovations
- 10. What need to be done to attract more equity than grants toward innovations; the qualities of an innovation that funders prefer; the tools to rank an innovation according to the qualities.
- 11. What is the size of the markets for the various types of innovations
- 12. What is the quantity and quality of maker-space outputs?





Kenya
accelerator
lab

Co-building the Accelerator Labs as a joint venture with:



UNDP
Core
Partners

For queries and information related to this report,
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