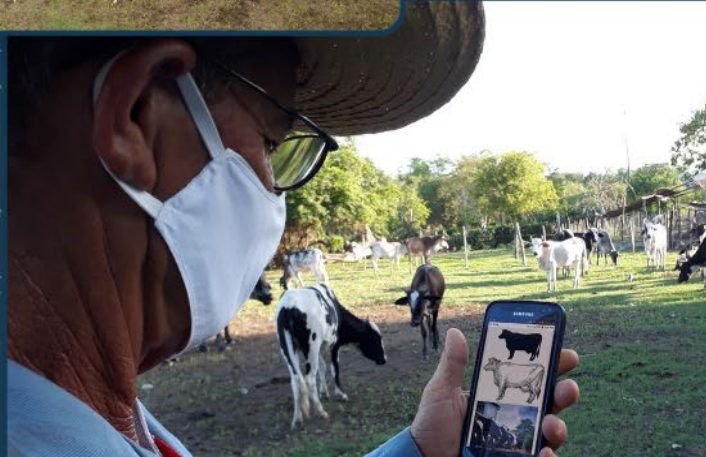


Small Island Digital States

HOW DIGITAL
CAN CATALYSE
SIDS DEVELOPMENT



Acknowledgements

Small Island Digital States: How digital can catalyse SIDS development is a product of the UNDP Global Small Island Developing States team.

This report was authored by Calum Handforth with support from Florence Liu.

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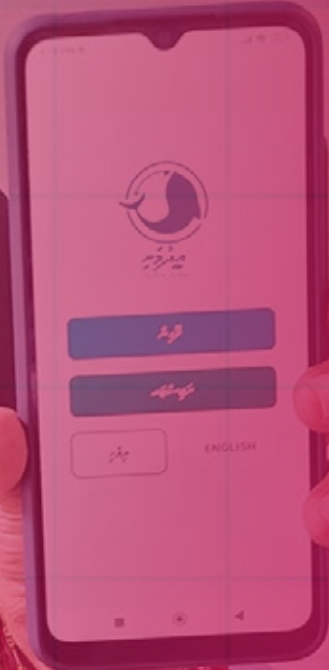
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Forewords

In an era defined by unprecedented technological advancements, the intersection of digital innovation and governance has become the cornerstone of a nation's progress. This direction is particularly important for Small Island Developing States, where digital and innovation can shape new opportunities and new collaborations. These tools will also play a crucial role in accelerating our unique development opportunities, and support our global island community as we tackle some of our greatest challenges.

As this report highlights, Small Island Developing States have an exciting and expansive digital heritage. From early explorations of digital public service delivery, to islands exploring emerging technologies such as artificial intelligence, 5G, and the Internet-of-Things. Several islands are developing National Digital Strategies, whilst many of our countries have built broad digital programmes to strengthen and build upon these digital components. We must recognize this progress, promise, and potential. And part of this includes celebrating our digital achievements, and our community of Small Island *Digital States*.

However, although we have built an important digital direction, these efforts must continue. The Small Island Digital States Report will assist SIDS by providing a framework for reference in mapping our digital progress, and in supporting each of our nations in shaping a 'whole-of-society' approach to digital transformation to ensure that no country, island, or community is left behind.

The insights presented in this report will serve policymakers, industry leaders, and citizens alike – recognizing that our national digital transformation, and our global digital leadership, is not the domain of a single actor or sector. It must be a truly collaborative effort and endeavor.

As we navigate an increasingly interconnected world, there is an urgent need for SIDS to rise to the challenges in the path towards digital transformation to achieve sustainable development. The limited capacity which SIDS face must be considered in this journey and investment in digital transformation must be approached holistically to address all opportunities and still be able to counter its threats. This includes the importance of agility in our approach – leveraging the opportunities that digital presents, whilst remaining alert to the potential risks and challenges that can also accompany new innovations and new technologies.



I extend my gratitude to the authors, researchers, and contributors who have diligently crafted this comprehensive report. May the knowledge shared within these pages contribute to a global dialogue which includes SIDS on the transformative potential of digitalization and inspire collaborative efforts to build a better, more digitally inclusive world.

H.E. Fatumanava III Dr. Pa'olelei Luteru

*Permanent Representative of Samoa to the United Nations and
Chair of the Alliance of Small Island States*

The world's 39 Small Island Developing States – or SIDS – account for a meagre one per cent of global carbon dioxide emissions that are driving climate change, yet they are amongst the countries most vulnerable to this existential threat. Low-lying atoll islands, such as the Marshall Islands and Kiribati, risk being submerged by the end of this century. Therefore, innovation is imperative for SIDS – everything from leveraging nature-based solutions to protect crucial environmental assets to efforts such as Cabo Verde's groundbreaking sustainable finance platform, Blu-x.

Many SIDS are also pushing new digital frontiers. They are the forefront of advancing internet gender parity, an important component in giving women and men equal opportunities to access the internet; building important components of cybersecurity; and leveraging e-commerce to serve global markets. More and more public services are being digitalised, the coverage and quality of connectivity in SIDS is growing, and an exciting and dynamic digital culture is emerging in many of these island nations. As part of the United Nations family, the United Nations Development Programme (UNDP) has been a longstanding partner to SIDS on their unique digital journeys. We have conducted comprehensive Digital Readiness Assessments in over 15 SIDS to identify key digital opportunities and priorities. Digital transformation is also a key pillar of the UNDP Rising Up for SIDS framework, and we are working across the SIDS community to support the development of National Digital Strategies and to shape important digital components and enablers. The UNDP Accelerator Labs Network is also collaborating with grassroots innovators across SIDS to ensure that digital is grounded in the needs, priorities, and aspirations of communities.

This new analysis – *Small Island Digital States* – builds on this continued engagement and responds to a gap in knowledge by serving as a practical handbook to support SIDS leaders and innovators in driving a *whole-of-society approach* to digital transformation. The analysis moves beyond considering digital as an abstract consideration or a one-size-fits-all solution. Instead, it highlights how SIDS can put specific tools, technologies, and ideas to work for the benefit of their communities as technological developments continue to advance. That includes strengthening SIDS' crucial digital foundations and driving digital progress across their societies, economies, and institutions, through to the shaping of behaviours, knowledge, and mindsets to ensure that digital can be used safely, usefully, and meaningfully for inclusive national development in line with the Sustainable Development Goals. In doing so, it demonstrates that digital is now an indispensable part of SIDS' sustainable development toolkit.

Collaboration across the SIDS community is driving digital best practices and accelerating the digital journeys of their fellow countries. SIDS can also demonstrate to the global community how current and emerging digital technologies can work for the benefit of everyone. Their smaller size provides an opportunity for agility, testing and trialling innovation. The close connections between government, the private sector, and civil society in SIDS demonstrate how this whole-of-society approach to digital transformation is vital to ensure that no one is left behind. In becoming *Small Island Digital States*, SIDS can help navigate our global community to a greener, more inclusive, and more sustainable future for all.

Achim Steiner

Administrator, United Nations Development Programme





The background of the page features a person wearing a pink shirt, with their back to the camera. Overlaid on the image are various digital graphics: a green header bar at the top with three colored circles (orange, yellow, green), a white rounded rectangle containing the text, and a bottom section with green and blue lines and plus signs. The overall theme is digital technology and its impact on development.

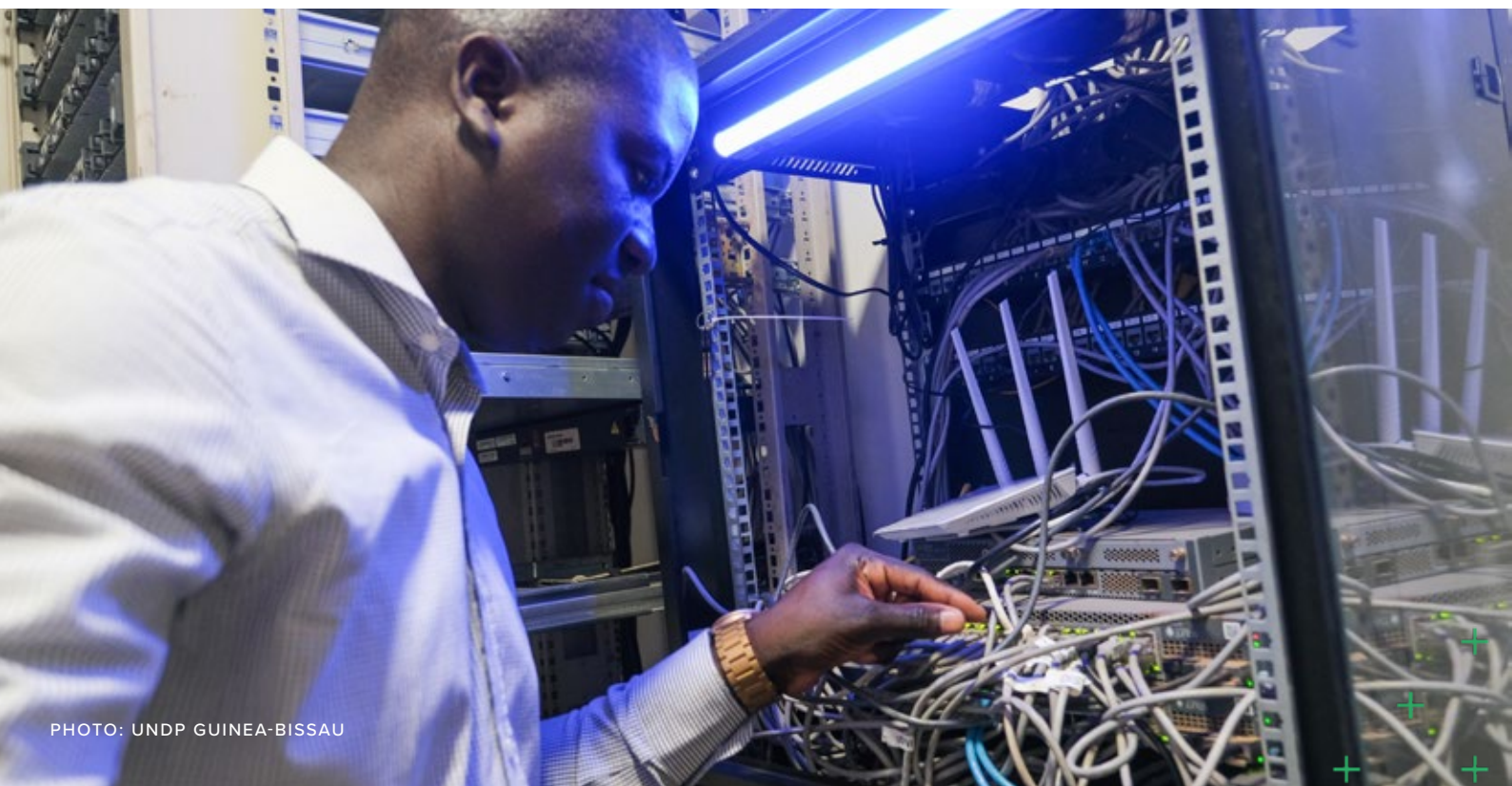
Executive Summary

Small Island Developing States are increasingly becoming Small Island Digital States. From Tuvalu's exploration of the metaverse, to Suriname recognising the national development potential of digital in its recent National Digital Strategy. Digital technologies are improving healthcare supply management in São Tomé and Príncipe, and increasing citizen engagement across the Pacific. Digital is positively impacting lives and livelihoods, improving the reach and effectiveness of government and public service delivery, providing exciting new opportunities for citizen engagement and empowerment; and shaping new products, sectors, and opportunities.

This report aims to support SIDS decision-makers, policymakers, and innovators to explore and implement the power and potential of digital. Founded on research and analysis drawing on extensive Digital Readiness Assessments - conducted in collaboration with governments in more than 15 SIDS around the world – it highlights how SIDS need to build and strengthen five key pillars in order to ensure an inclusive and whole-of-society digital transformation. These pillars are connectivity, government, regulation, business, and people. These pillars should also be founded on catalytic digital components - increasingly being recognized as 'digital public infrastructure' - to drive public and private service delivery: data exchange, digital payment mechanisms, and national digital identity.

Connectivity is the wired and wireless foundations of SIDS' digital economies and societies - and an essential conduit into the global digital community. From fixed-line fibre-optic broadband, to mobile connectivity, and satellite internet. These channels need to be affordable and accessible to SIDS populations, and deliver high-quality and reliable connectivity – including to the very last-mile. And many SIDS have made strong progress in this area. From the impact of liberalisation efforts leading to increased choice and competition (and improved service quality) in many countries, to considerable efforts underway to reach those still offline.

Government remains a key driver of digital transformation in SIDS, recognizing the size and centrality of the public sector in many countries. Governments define the legislation and policies that shape an enabling environment, and are also crucial partners in digital. From digitising public services, to building digital skills and capabilities, and catalysing the private sector and civil society. Here, SIDS have built exciting foundations. This includes the growing digitization and digitalization of public services, particularly core services of real interest and relevance to citizens and businesses – as well as senior engagement and ownership of digital, including Ministerial mandates and advancing National Digital Strategies. Digital cultures within the public sector are also taking shape.



Regulation is about setting the terms and parameters of a digital ecosystem. From foundational and fundamental protections for data, privacy, and consumer rights, to exploring how regulation can support and catalyse innovation within SIDS – as well as its role in supporting and growing the digital private sector. SIDS are also shaping regulation to engage with the opportunities, and challenges, posed by emerging technologies. A number of SIDS have shaped both foundational digital protections as well as forward-thinking regulations. This includes supporting equivalence between analogue and digital signatures, efforts to drive e-commerce and digital trade, and the recognition of digital assets and digital legal structures.

The private sector is a crucial catalyst for digital transformation in SIDS. From micro- and smaller-enterprises selling via digital platforms, to local entrepreneurs and innovators building digital products and services of relevance to their countries and communities – and ‘Big Tech’ providing global connection and opportunity. SIDS are seeing growing digital adoption amongst businesses, including deeper uptake of tools such as digital payments. Broader collaborations are also shaping exciting opportunities to support and grow the digital private sector in SIDS. This includes initiatives such as digital business incubators, accelerators, and other programmes – within countries, and also across SIDS.

Finally, the greatest asset of SIDS is their population - and digital can play a key role in tackling key challenges, such as the 'brain drain'. The talent, engagement, and ingenuity of this human capital is a crucial enabler for digital transformation – whilst digital needs to be driven by, and founded upon, the needs, realities, and aspirations of people. No one can be left behind or excluded. Many SIDS have built strong functional literacy in their populations, and have also embedded digital throughout national curriculums. There is also a growing digital culture across the SIDS community, including impressive efforts in developing and delivering local digital content and services - which in-turn are driving the adoption of digital. This global SIDS community could also be leveraged in pursuit of shared digital priorities - from regional harmonization of digital standards, to shaping digital norms.

This report also highlights the role of digital in supporting and shaping sectors crucial for SIDS broader national development. This includes how digital can drive e-commerce and financial inclusion, and how digital can improve education and health outcomes. Digital is also enabling SIDS to strengthen growth and opportunity in key industries – from the role of emerging technologies in diversifying SIDS’ tourism portfolios, to the scope of digital and data in improving the productivity and welfare of farmers and fisherfolk. Similarly, building the above foundational digital public infrastructure - from data exchange layers, to payment mechanisms - could be an important catalyst for SIDS' digital development.



The potential of digital is wide-ranging. Recognizing this, the below five key insights - drawn from the global analysis of digital successes, challenges, and trends in SIDS that form the basis of this report - highlight the need to:

- **Understand the value-add of digital.** Digital is a tool in the development toolkit, but needs to be applied in the most useful way. This includes founding it on people's needs, measuring impact and – crucially – adding value. Sometimes digital may seem abstract or less relevant to lives and livelihoods, and this can lead to reluctance to adopt digital solutions – or even foster mistrust in technology. Stakeholders need to demonstrate its use and usefulness. This also extends to understanding when digital may not be the most useful or appropriate tool in the first place.
- **Focus on people, and not technology.** People need to be at the centre of any use or exploration of digital. From co-design, to shaping regulation to tackle or mitigate digital harms (particularly in the context of cybersecurity), driving the affordability and accessibility of data and devices, and building digital skills across society to ensure meaningful and sustainable use and adoption of digital products and services. This also extends to shaping future-looking digital skills and career foundations and pathways – including within the public sector.
- **Identify roles and responsibilities.** A whole-of-society digital transformation cannot be the responsibility or domain of a single institution or sector. However, an important part of this journey is recognising the role, responsibilities, and comparative advantage of each sector. From the catalytic and empowering role of government (including in relation to enshrining key digital protections in legislation, and being a customer to the local digital ecosystem), to the expertise of the private sector in shaping relevant digital products and services, and the essential role of civil society in ensuring digital inclusion.
- **Recognise that digital transformation is not just about digital.** Although digital is already leading to important outcomes in SIDS, many of the foundations of these efforts are distinctively analogue and offline. This includes the importance of behaviour change in ensuring the sustainable adoption of digital – ranging from the importance of changing internal cultures and processes to embrace digital ways of working and thinking, to ensuring useful funding and financing opportunities for digital entrepreneurs in SIDS, and the opportunity to shift mindsets to understand how digital can play a valuable role in people's lives. Showcasing the potential of digital can also encourage exploration and adoption.
- **Plan for the longer-term.** Digital has the potential for considerable impact, but this return-on-investment can take a similarly considerable time to take effect. For example, Estonia's population saves a combined 800 years of working time each year due to the country's interoperable data exchange layer – X-Road – that improves public and private service¹.

1 See: <https://investinestonia.com/wp-content/uploads/eestonia-guide-veeb.pdf>

However, these benefits can be traced back to early and substantive investments in technology, skills, and the broader ecosystem. Another key component is leadership. And SIDS need to be supporting, empowering, and investing in digital leaders – within and beyond government, across generations, and also beyond their borders. With regard to the latter, this includes the diaspora community who can play a valuable role in driving SIDS’ digital ambitions.

Digital is already making a difference in SIDS, whilst the potential for a greater role in SIDS’ development is enormous. And interest in this increased role is also shared by many in SIDS. As highlighted by a number of the Digital Readiness Assessments conducted by UNDP across the SIDS community, citizens want to see even bolder digital efforts happening across their islands. This suggests exciting license for policymakers and innovators to accelerate their exploration and implementation of digital. However, these efforts need to be founded on the relevance of digital for lives and livelihoods in SIDS – with particular attention needed to ensure that no one is left behind, or excluded, from the potential that digital can offer.





The background features a person in a blue shirt working on a laptop. A semi-transparent green overlay covers the top and right sides of the image. In the bottom left corner, there are decorative elements consisting of several overlapping circles in orange, blue, and green, along with small green plus signs scattered around them.

Introduction

Digital is changing how people in small island developing States (SIDS) live, work and play. It is providing crucial connectivity and communication, shaping new industries and opportunities, and ensuring that public services reach the very last mile. Digital is steering and supporting SIDS economies, from data that enables better decision-making in agriculture and aquaculture to emerging technologies such as augmented and virtual realities for tourism.

Digital transformation is a priority for SIDS governments and countries around the world. Many examples include leveraging digital tools to improve financial inclusion in Trinidad and Tobago, applying open-source digital technologies in driving the COVID-19 response in Mauritius, and shaping an exciting emerging ecosystem of digital and technology innovators in the Cook Islands.

Digital has wide-ranging benefits and potential. It can support SIDS in reducing the asymmetries between island nations and the global community. It can mitigate, or overcome, geographical constraints and limited access to resources. By providing access to information, services and markets, digital technologies allow SIDS to connect globally and manage the challenges of their small size and remoteness. The Internet, email and social media facilitate communication and collaboration among SIDS communities, businesses and governments. They enable the easier and faster exchange of information and knowledge, the coordination of activities and networking opportunities.

Digital can play a key role in diversifying economies and opportunities available to SIDS, who typically rely on a narrow range of industries such as tourism and agriculture. It enables the growth of sectors such as e-commerce, software development, digital services and outsourcing. This could reduce vulnerability to external shocks, create new sources of income, and diminish the 'brain drain' that can significantly constrain development.

Digital can improve access to key services and resources, such as education and healthcare. Online learning platforms provide educational opportunities, especially in remote areas with limited infrastructure. Online 'microcredentials' can increase skills and employability. Telemedicine and digital health applications enable remote consultation, diagnosis and treatment, benefiting isolated island communities. Digital financial services, such as mobile banking and digital payment systems, can improve financial inclusion, providing convenient and secure access to banking and financial services, especially in remote areas without traditional banking infrastructure. This access can promote economic growth, entrepreneurship and poverty reduction.



Digital technologies contribute to sustainable development in SIDS by promoting resource efficiency and environmental conservation. Smart grid systems, energy management tools and renewable energy integration help reduce energy consumption and greenhouse gas emissions. Additionally, digital platforms enable sustainable tourism practices, waste management and natural resource monitoring.

Perhaps most importantly, digital is key for the survival of SIDS, as they are particularly vulnerable to the impacts of climate change, including rising sea levels, natural disasters and environmental degradation. Digital tools such as satellite imagery, remote sensing, and geographic information systems assist in monitoring and managing these challenges. They support early warning systems, disaster response planning and climate change adaptation strategies.

Despite the many benefits of digital, the process of digital transformation in SIDS is complex and not always linear. It includes challenges of:

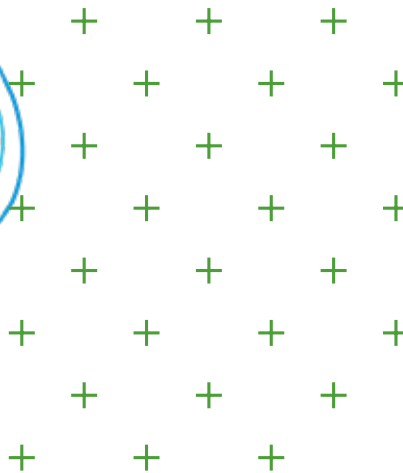
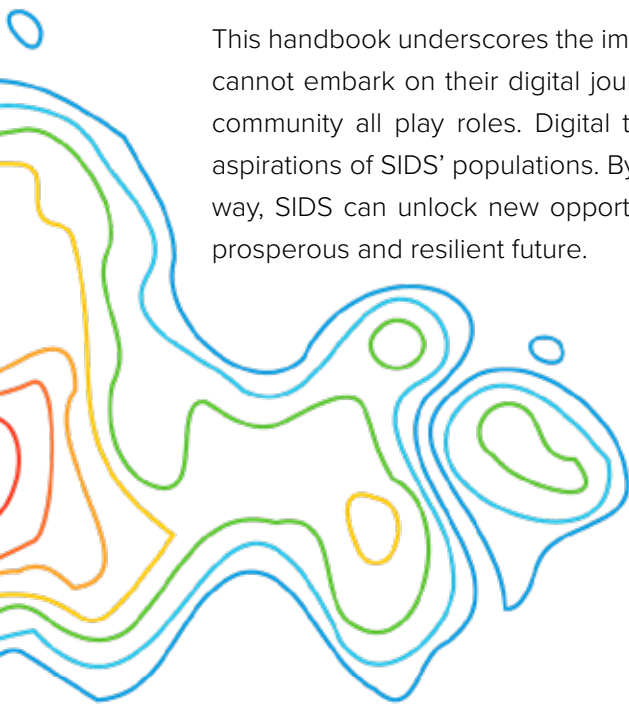
- **Limited infrastructure and connectivity**, with SIDS often facing inadequate physical and digital infrastructure, including insufficient access to reliable electricity, Internet connectivity and telecommunication networks. These limitations hinder the adoption and implementation of digital technologies. Building and upgrading infrastructure to support digital transformation can be costly and challenging, especially in remote and geographically dispersed island regions.
- **Legacy systems and infrastructure**, with many organizations in SIDS, both in governments and the private sector, having built their digital infrastructure over considerable time. This results in a complex web of interconnected systems that may be outdated, incompatible with modern technologies or without the flexibility required for digital transformation. Migrating or integrating new digital solutions where legacy systems are extensive can be a time-consuming and intricate task, often requiring significant resources and expertise.
- **Limited financial resources**, as SIDS typically face budget constraints. Allocating funds for digital transformation initiatives may compete with other pressing socioeconomic needs, such as healthcare, education and infrastructure development. A lack of dedicated digital funding can constrain more extensive digital investments. Limited financial resources can impede the investment required for acquiring and implementing digital technologies, training personnel and supporting organizational change. The benefits and positive outcomes of digital investment may take time to materialize.
- **Digital skills and capacity gaps**, with many SIDS experiencing a shortage of digital skills and expertise. Developing a skilled workforce capable of leveraging digital tools and technologies may be challenging due to limited access to digital skills-building and with digital not always present in traditional educational curricula. Retaining digital talent can be difficult since younger and digitally savvy populations often leave SIDS for digital economy opportunities in other countries.

- **Digital regulation gaps**, including data management and privacy risks. Many SIDS lack legislative or regulatory foundations for digital transformation. They have outdated or non-existent data protection and privacy policies. Establishing robust digital and data governance frameworks, cybersecurity protections and enforcement measures are essential but require significant attention and resources.

SIDS possess unique constraints and challenges. As economies heavily reliant on global supply chains for food and energy, they are highly vulnerable to shocks such as natural disasters, climate change and economic downturns. Such events can disrupt digital infrastructure, impede connectivity and hinder digital transformation. Rebuilding and recovering from shocks often takes precedence over long-term digital transformation goals, further delaying progress. Trust in and adoption of digital technologies varies. Tailoring digital solutions to the unique needs and cultural and linguistic aspects of SIDS can be challenging and can require strong co-design efforts, localization and engagement.

Recognizing these challenges, this handbook aims to support SIDS governments in navigating their digital transformation journeys, and positioning digital as a catalyst for economic growth, social inclusion, environmental sustainability and resilience. It emphasizes holistic approaches that integrate technology, policy and capacity-building to achieve sustainable and inclusive digital transformation as a journey, not an endpoint. Digital and technology are ever evolving; SIDS need to engage with the ‘twin-tech’² challenge of building key digital foundations and components while exploring emerging technologies.

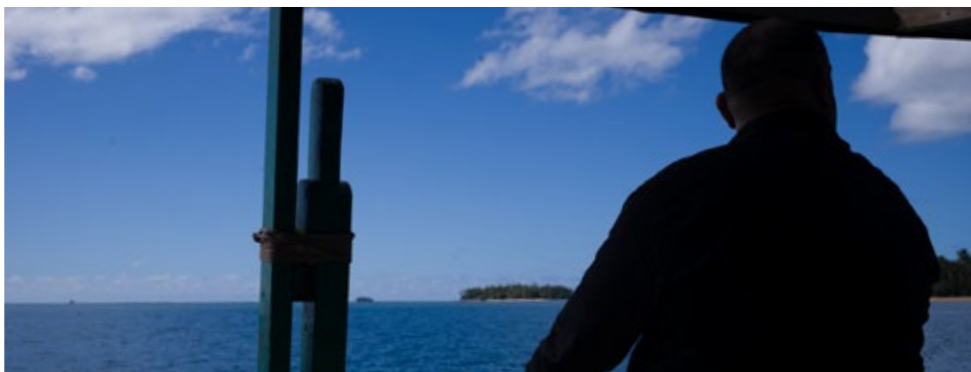
This handbook underscores the importance of collaboration and partnerships. SIDS governments cannot embark on their digital journeys alone. The private sector, civil society and international community all play roles. Digital transformation must be founded on the needs, realities and aspirations of SIDS’ populations. By embracing digital technologies in a sustainable and inclusive way, SIDS can unlock new opportunities, overcome unique challenges and pave the way to a prosperous and resilient future.



2 The ‘Twin Tech Challenge’: Spearheading While Catching Up - <https://www.csis.org/analysis/vietnams-twin-tech-challenge-spearheading-while-catching>



DIGITAL AND THE BLUE ECONOMY



SIDS are often defined by their small land masses. But many are stewards of significant marine resources and geographies, providing an exciting opportunity to reconsider them as ‘large ocean States’. The ocean areas within their control, known as exclusive economic zones, are, on average, almost 30 times the size of their land masses.³ With this in mind, SIDS are increasingly engaging with the ‘blue economy’. The exact definitions of this vary but in general focus on the role of oceans for economic development. For example, the World Bank defines the blue economy as:

“[The] sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem.”⁴

The blue economy interconnects with all areas discussed in the digital sectors at the end of this report, from transport to e-commerce, renewable energy to agriculture. Digital can readily drive a multisectoral approach to the blue economy in SIDS. Several priorities stand out, including in relation to climate adaptation (for example, flood modelling and digital early warning systems) and biodiversity conversation (for example, mapping ocean habitats).

-
- 3 The United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States - <https://www.un.org/ohrls/content/about-small-island-developing-states>
 - 4 Blue Economy definitions - https://www.un.org/regularprocess/sites/www.un.org.regularprocess/files/rok_part_2.pdf

ABOUT THIS REPORT

The UNDP Global SIDS Team has worked with more than 30 national country governments on the exploration, implementation and scaling up of digital solutions. These collaborations have informed this report, drawing on:

- Technical collaboration and implementation of digital projects and initiatives in SIDS
- UNDP Digital Readiness Assessments conducted in numerous SIDS; and
- Primary data from a global survey of SIDS youth

The report leverages extensive secondary research in exploring the digital context and aspirations of SIDS. It highlights differentiators and specific cases in which SIDS are leading initiatives to advance digital transformation. The report follows the structure of the UNDP Digital Transformation Framework (overleaf). The framework maps a country's digital progress and supports efforts to drive whole-of-society digital transformation. It comprises five core pillars, with related sub-pillars:

- **Connectivity:** the wired and wireless foundations for digital transformation, and the broader 'access enablers' ensuring access to the Internet and digital, including universal access for the entire population.
- **Government:** playing a central role in national digital development, including in designing and delivering public services, and shaping a future-proofed digital public sector.
- **Regulation:** building the framework and guidelines for the digital economy and society, from cybersecurity protections to opening up data to the private sector and civil society.
- **Economy:** the crucial role of businesses in building digital products and services that meet the needs of SIDS populations, driving further uptake and adoption of digital.
- **People:** SIDS' greatest asset; all people must be able to benefit from the potential of digital, with no one left behind.

The framework sets out three foundational digital catalysts: data exchange, digital identity and digital payment infrastructure. Data exchange focuses on interoperability and data-sharing among government departments and beyond with the private sector and civil society. Digital identity centres on building regulatory and technical architecture to provide a unique identifier to the population, and to improve access and use of digital products and services. Finally, digital payment infrastructure is crucial in a digital economy, improving financial inclusion and boosting efficiencies across the public and private sector. Throughout this report, shared challenges and opportunities are explored, and case studies highlighted. Each section contains policy and broader recommendations that SIDS may consider as they advance along their digital transformation journeys.



THE UNDP DIGITAL TRANSFORMATION FRAMEWORK





SECTION 1

Delivering whole-of-society digital transformation

Evidence-based policy-making, digital financial inclusion, healthcare, education, trade and tourism, business and e-commerce—digital is crucial for all aspect of SIDS national development. With the number of Internet users reaching 5.4 billion globally in 2023,⁵ the possibilities for transformational growth are considerable. One in three people worldwide uses social media,⁶ and the escalating adoption of digital technologies across SIDS is changing how many people live. Meaningful digital divides remain, however. Some countries risk being digitally left behind, underlining the imperative for a whole-of-society digital transformation in all SIDS.

5 ITU Measuring Digital Development: Facts and Figures 2023 - <https://www.itu.int/itu-d/reports/statistics/facts-figures-2023/>

6 Our World in Data - <https://ourworldindata.org/internet>



WiFi Wireless Internet

1. CONNECTIVITY

Connectivity is the physical and digital foundation for a digital economy, society and nation. This includes wired and wireless connectivity but also broader ‘access enablers’ that ensure all parts of the population can get online and benefit from connectivity. Key components, such as access and ownership of devices and access to electricity, must be prioritized as these are central to a sustainable digital ecosystem. A combination of human capital, core physical and digital assets, and meaningful collaboration is the engine of digital progress. The goal is to ensure universal access for the entire society regardless of structural barriers, such as infrastructure, income, culture, disabilities, geography and skills.

SIDS face a unique challenge when it comes to establishing digital infrastructure — significant geographic barriers due to their often small and remote locations. This has required reliance on historically expensive forms of connectivity, such as satellite communication.⁷ Submarine cables are increasing connectivity, however, and provide an opportunity to improve its speed, coverage and quality. Developments in the low-earth orbit satellite sector could also increase Internet availability and accessibility.

7 Internet Society, Ensuring Sustainable Connectivity in Small Island Developing States - <https://www.internetsociety.org/resources/doc/2017/sidsreport/>

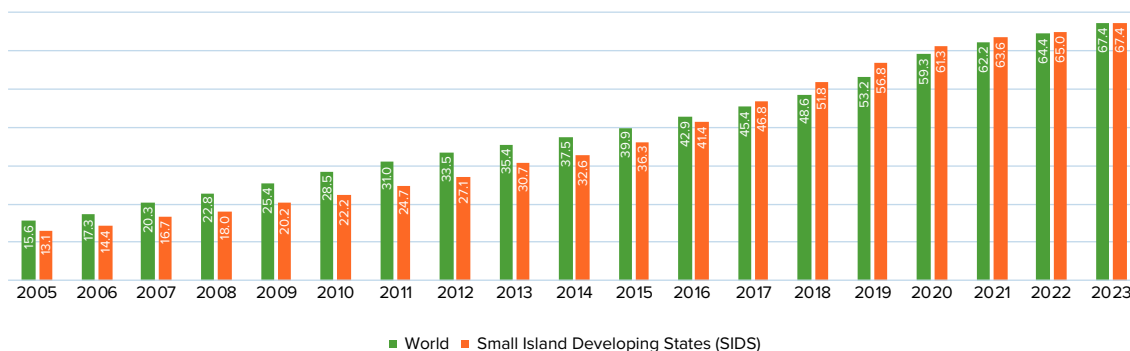
Affordability remains a major challenge, with data costs in SIDS a heavy burden for consumers and businesses.⁸ Some devices are still too costly for many households. Mobile phone-delivered Internet plays a key role, with fixed broadband coverage low but increasing at a steady pace.⁹ Technologies such as satellite broadband are increasingly affordable yet large gaps remain.

Access among disadvantaged sociodemographic groups to the Internet and other technologies varies. Digital divides are still a concern, with younger, male, urban and more educated populations engaging more with technology and connectivity. This inequity extends to the broader digital and innovation ecosystem, where women and girls and other marginalized populations are not always participating.

1.1 PHYSICAL INFRASTRUCTURE

Connectivity is the wired and wireless foundation of the digital economy, including mobile phone infrastructure (such as mobile spectrum and physical towers), fibre optic and other ‘fixed-line’ technologies, and technologies such as satellite connectivity. High-quality connectivity can lead to improvements in overall development, with one non-SIDS study noting a 0.15 per cent jump in GDP growth for every 1 per cent increase in broadband penetration. Extending and sustaining connectivity can be complex, however, involving challenges around land rights, the affordability of products and services, and the roles of the public and private sectors in ensuring last-mile coverage.

Internet usage continues to grow across the SIDS community
(percentage of individuals using the internet, ITU data)



8 Internet Society, Ensuring Sustainable Connectivity in Small Island Developing States - <https://www.internetsociety.org/resources/doc/2017/sidsreport/>

9 ITU Measuring Digital Development: Facts and Figures 2022 - <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022/>



SIDS Context

The connectivity infrastructure of SIDS has improved in recent years. Key developments include the liberalization of the telecommunications sector in many countries, initiatives to introduce or expand free public Wi-Fi access and increased landing of fibre optic cables. Across SIDS, 4G coverage is 71 percent, increasing to 85 percent for 3G.¹⁰ Wired-connectivity coverage is often much lower and usage of both technologies varies considerably, however, both between and within countries. These technologies are critical in supporting development but also in exploring new and emerging digital economy opportunities, such as remote working and increased digital outsourcing.

The realities of delivering connectivity in SIDS are complex, including in closing the coverage gap across islands. Accessing land to install digital infrastructure can be challenging due to unclear land rights or outdated legislation. Private sector investment can be difficult to attract. Generally, the capital expenditure for installing a mobile network site in a rural location can be two to three times higher than in an urban setting, while revenue can be up to 10 times lower.¹¹ Costs are likely even higher in some SIDS. In addition, lower levels of traffic make it difficult to rationalize a local Internet exchange point (IXP).¹² SIDS also require energy infrastructure to support the use of digital technologies.¹³ While governments around the world employ grid networks, such a strategy may not always be suitable for SIDS due to their geographical constraints. Overcoming competing land use priorities and connecting islands scattered across the ocean are considerable challenges.

SIDS are taking extensive efforts to address these issues, such as by working closely with operators to tackle key ‘not-spots’ and launching IXPs to improve the quality and performance of national connectivity. Many are updating legislation to improve connectivity or to drive infrastructure-sharing. Several SIDS are exploring how to best use Universal Service Funds to improve connectivity across countries, including in addressing difficult rural and last-mile challenges. SIDS are also supporting the development of locally developed content and services as key aspects of increasing consumer uptake of connectivity.

10 ITU, Measuring Digital Development: Facts and Figures 2022 - <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022/>

11 GSMA, Closing the Coverage Gap: How Innovation can Drive Rural Connectivity - <https://www.gsma.com/mobilefordevelopment/resources/closing-the-coverage-gap-how-innovation-can-drive-rural-connectivity/>

12 World Bank, World Development Report 2021: Data for Better Lives - <https://www.worldbank.org/en/publication/wdr2021>

13 UNOPS, Infrastructure for Small Island Developing States - https://content.unops.org/publications/Infrastructure_SIDS_EN.pdf

Case study

In 2018, the Government of Suriname collaborated with the International Telecommunication Union (ITU) to assess the feasibility and approach to developing an IXP. An IXP avoids having to route Internet traffic outside and back to the country by handling network traffic locally. This can increase bandwidth and Internet speeds. The Suriname Internet Exchange (SUR-IX) association manages the IXP, which was launched in 2022.



Recommendations

Key opportunities to improve infrastructure provision across SIDS include:

- Developing a **national broadband policy or broader digital infrastructure strategy** can optimize broadband and connectivity delivery and address last-mile connectivity challenges. This should be forward-looking in considering broader infrastructure needs and the priorities of the digital economy—for example, data architecture and cloud services. It may also include a focus on further liberalization (where needed), and broader priorities such as legislation on open infrastructure-sharing to achieve better last-mile connectivity. For example, the Bahamas has a regulation that sets obligations and procedures for price-setting for infrastructure-sharing among operators.
- Governments can undertake an **infrastructure needs mapping exercise**, as was conducted in Guyana, or a technical and organizational capacity assessment of the telecom sector that examines aspects such as service inefficiencies, as conducted in other SIDS. Such measures can provide insights into the realities of rolling out connectivity, inform the process and guide more directed intervention strategies. This exercise should take place in collaboration with the private sector, including in leveraging mobile and other network coverage data. Where possible, data should be disaggregated by gender and other sociodemographic characteristics.
- In recent years, the low-earth orbit satellite sector has seen significant activity, including a range of new entrants and increasingly affordable packages for consumers. Governments should **prioritize analysis and engagement with the sector**. Although satellite broadband will likely remain unaffordable for the broader SIDS population for some time, it could provide additional resilience to government and private sector operations (or free-up existing terrestrial bandwidth) and may eventually become a meaningful alternative connectivity solution for SIDS populations.
- Scarce land and competing priorities amongst connectivity providers and other utilities constrain connectivity roll-out in SIDS. With this in mind, governments and the private sector could **explore a ‘dig once’ policy to accelerate progress**. ‘Dig once’ policies increase

collaboration and coordination among connectivity and utility providers, landowners and governments. They can lead to improved and more efficient digital infrastructure and reduce disruption to citizens. Beyond connectivity, such a policy can also support burying electricity cables to improve energy stability.

- Recognizing the dispersed nature of many SIDS populations, governments often have considerable and island-wide ranges of public sector assets at their disposal. These include lamp posts, ducting, civic buildings, social housing and even public toilets. In collaboration with the private sector, SIDS governments could explore **a public sector asset reuse policy**. This allows connectivity providers to accelerate network extension by leveraging public assets to site key infrastructure. It can provide connectivity to underserved areas by using buildings and other components as ‘hubs’ to enable digital infrastructure to penetrate further into a community.

1.2 ACCESS ENABLERS

Expanded digital infrastructure is only one part of connectivity. The broader aim is to ensure universal access to the Internet and digital technologies, regardless of structural and broader barriers, such as infrastructure, income, culture, disabilities, geography and skills. Reaching everyone with digital products and services, including digital public services, is crucial for development. One study from the Alliance for Affordable Internet highlighted that women’s digital exclusion across 32 lower-income countries had resulted in a loss of US\$1 trillion in productivity. Ensuring the affordability and availability of connectivity is critical as is designing for inclusion—in other words, shaping digital products and services that SIDS populations want to use.

SIDS Context

The affordability of devices, data, tariffs and residential electricity is a major barrier in many SIDS. In several countries, mobile and fixed broadband baskets can cost up to 3 percent and 4.7 percent of gross national income (GNI) per capita, respectively.¹⁴ This is several times higher than developed countries and above the 2 percent target set by the Broadband Commission

14 ITU, Measuring Digital Development: Facts and Figures 2022 - <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022/>

for Sustainable Development¹⁵. Smartphone duties can also add to consumer costs. Progress is happening, however, with the price of 500MB of mobile data almost halving between 2014 and 2019 (from 15 to 8 percent of GNI per capita).

The availability of digital technologies varies across SIDS. Imports (and associated duties) can constrain the supply of devices. Local financing options may not be present, and customers may lack the necessary documentation to secure financing. Improving these processes can produce significant and positive multipliers. Given the poor availability of high-quality network infrastructure in many rural or last-mile communities, leveraging existing venues such as community centres to provide access to the Internet can be important in getting people online.

More granular information on the challenges in providing access to connectivity is needed. As noted by the ITU:

Timely and relevant statistics [on digital usage] are essential for policy-making and to monitor and fine-tune strategies. The availability of up-to-date ICT indicators in the SIDS varies. A few countries produce detailed sector-specific reports, some carry out annual surveys on household and individual ICT usage, while others include topics like Internet usage and household availability of digital devices in regular household surveys. Most SIDS... collect ICT indicators sporadically, sometimes only as part of a decennial census. And in a handful of SIDS there are no official data for something as critical as Internet usage. It is imperative for SIDS to include ICT indicators in their national statistical systems.¹⁶

Finally, more than a fifth of the population in SIDS in the Atlantic, Indian Ocean and South China Sea and the Caribbean regions are not active Internet users.¹⁷ A widening digital divide is seen in the limited availability of online content in local languages. Many SIDS are exploring how to build digital literacy across their populations to increase uptake. They are also designing service standards and other approaches to further engage their populations in digital. Co-design and other human-centred design processes are key tools.

15 In 2018, the Broadband Commission for Sustainable Development announced a key broadband affordability target. By 2025, entry-level broadband services should be made affordable in low- and middle-income countries at less than 2% of monthly Gross National Income (GNI) per capita. See: <https://www.broadbandcommission.org/advocacy-targets/2-affordability/>

16 Small island developing states (SIDS) and ICTs Mid-term review of the Samoa Pathway - <https://www.itu.int/en/ITU-D/LDCs/Documents/2019/SIDS%26ICTS-Midterm-Review-Samoa-Pathway.pdf>

17 UNESCO supports the digital transformation of education in Small Island Developing States - <https://www.unesco.org/en/articles/unesco-supports-digital-transformation-education-small-island-developing-states>

Case study

The Eastern Caribbean Telecommunications Authority is a regulatory body for telecommunications established in 2000 by the governments of five States—the Commonwealth of Dominica, Grenada, St. Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines. It collects data on a number of supply-side indicators from member States, including on connectivity penetration, local and international traffic, and provider revenues.



Recommendations

Key opportunities to improve access to the Internet across SIDS include:

- **Exploring offline access options.** In Fiji, community ‘telecentres’ in government schools throughout the country are open to the community after school. ‘Lab assistants’ provide users with technical support. Similar approaches have been explored in Samoa and the Solomon Islands, where community telecentres provide digital connectivity to underserved communities and act as government information channels to disseminate digital well-being messages (including on cybersecurity, online misinformation and cyberbullying).
- **Reducing barriers to SIM registration.** In many countries, registering for a SIM card and mobile package can require extensive identity documentation that may not be available to marginalized populations. SIDS governments should ensure that these populations can readily secure documentation, including through enrolment in national ID schemes, so they are included in the digital economy.
- **Considering the removal of sector-specific taxation.** In some SIDS, taxation levied solely against the mobile and digital industries can be a powerful factor in reducing digital uptake. It may also constrain the broader development of a digital ecosystem that relies on foundational digital infrastructure. This concern also arises in excessive customs fees for crucial mobile infrastructure, and similar duties on devices and other digital components. Ensuring a fair tax policy across sectors can be important in accelerating digital transformation.
- **Rolling out public Wi-Fi.** Although not a replacement for the nationwide roll-out of wired and wireless infrastructure, public Wi-Fi can be an important tool in tackling digital exclusion, including in combination with other efforts. For example, the Barbados Entrepreneurship Foundation, a local non-governmental organization, launched a public Wi-Fi campaign in 2011 to encourage businesses to reconfigure their internal networks to include a free ‘guest’ or publicly accessible network. The foundation covered the cost of restructuring these networks. As a result, by 2013, more than 100 free Wi-Fi access points operated in Barbados, covering 75 percent of the population.

- **Collecting population statistics on digital usage.** Global digital indices do not always include SIDS due to the challenges of data collection. Digital metrics are often collected by the private sector and not made routinely available to SIDS governments. Indicators on digital usage, behaviours and uptake can be a valuable tool for policymakers and others shaping SIDS digital ecosystems, however. Governments should support national statistical offices to collect regular, granular and relevant metrics on household and individual digital and ICT usage, in addition to incorporating these measurement points in censuses and other household surveys.





2. GOVERNMENT

Governments are central to digital transformation and crucial collaborators with the private sector and civil society. This role requires them to deliver high-quality, inclusive and sustainable digital public services, founded on a digitally skilled civil service. Governments need to ensure sustainable funding for digital priorities and fair and open procurement to deliver the products and services citizens deserve. They should equip civil servants with digital skills and tools for successful public service delivery. Digital transformation requires political will and sponsorship, including among senior political and civil service leaders; a strong mandate for whole-of-government change; and clearly defined responsibilities. All digital efforts must be grounded in robust monitoring and evaluation principles and processes, including strategies and frameworks to track implementation and to measure what is and is not working.

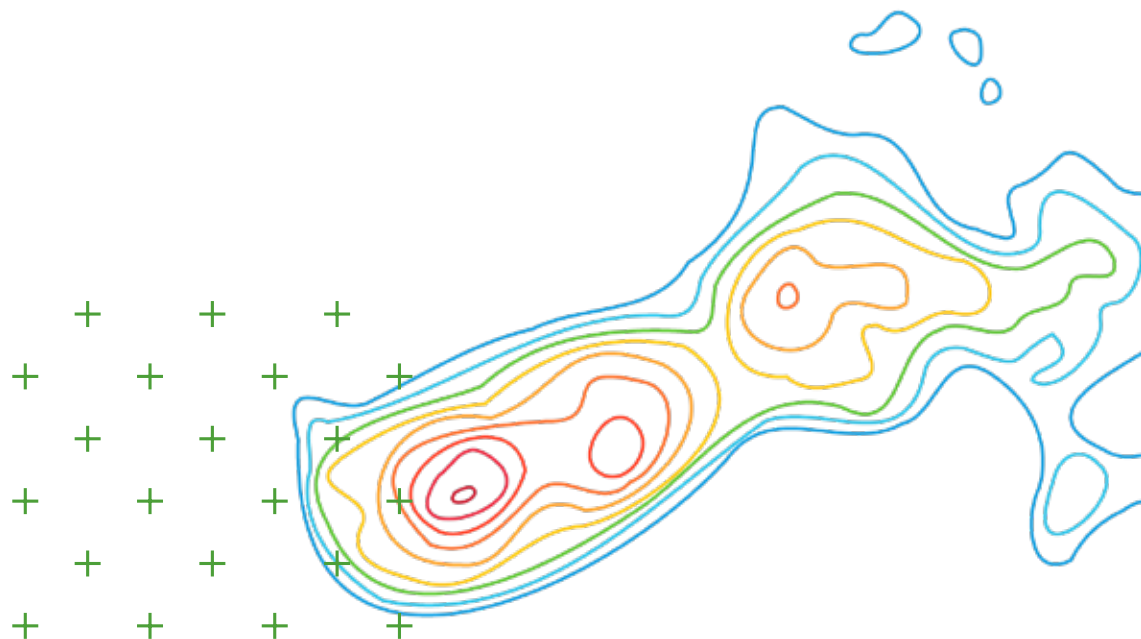
Digital transformation is a priority of many SIDS governments but needs to be accompanied by a whole-of-government approach to address coordination challenges among government agencies. The COVID-19 pandemic accelerated the digital delivery of public services but many efforts are standalone and may not be sustainable without expanding a digital culture within the public sector. Successful examples such as Curaçao's Smart Nation Vision illustrate how States can leverage pandemic-era digitalization to integrate digital into all government services, including the use of data for decision-making, procurement and transparency, and in building crucial monitoring capabilities.

Several SIDS have successfully implemented digital government approaches and are demonstrating real global leadership. Bahrain, Mauritius and Singapore are performing well with regard to the quality of their online services, the state of their telecommunications infrastructure and their human capacity to lead national digital transformation. There is scope for other SIDS to learn from and benefit from this digital progress, including the potential for shared digital components among countries and in terms of digital public goods.

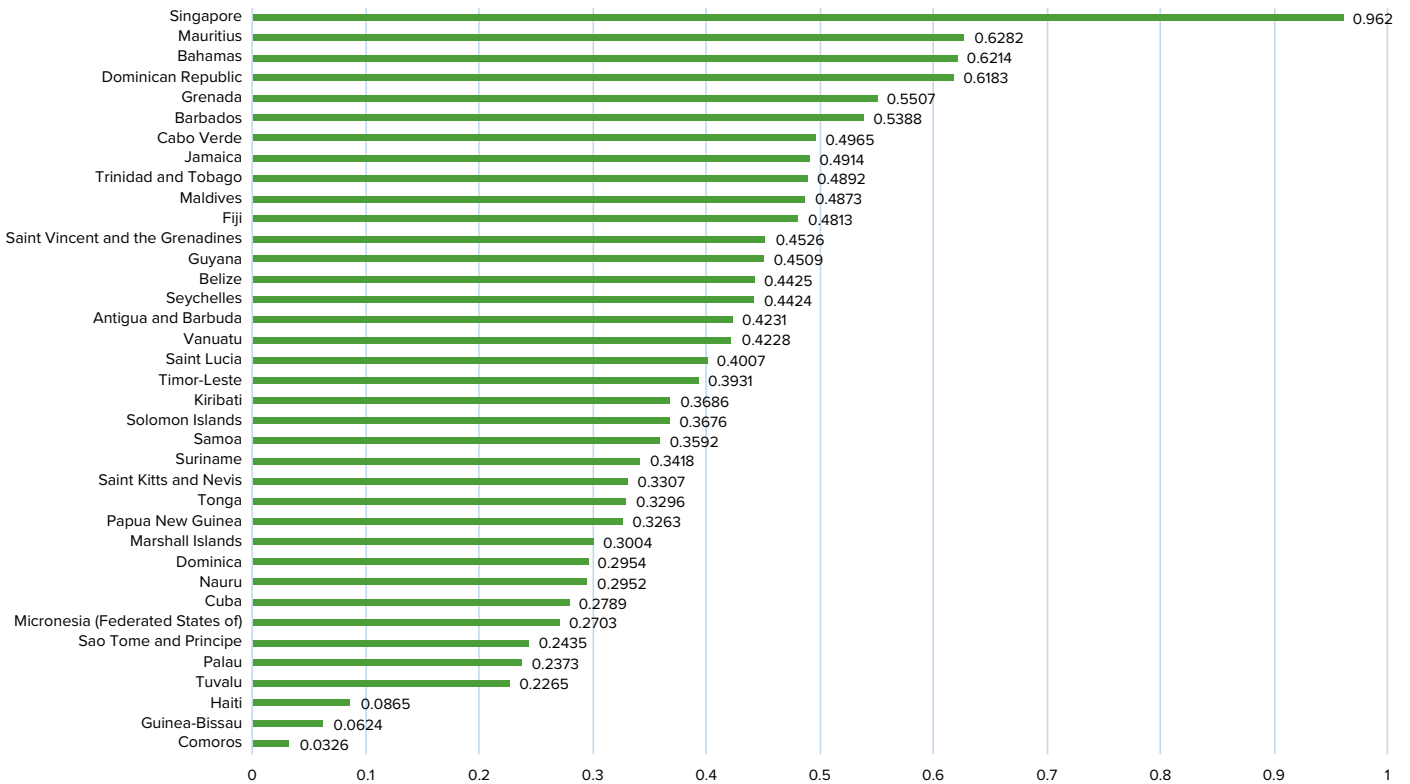
More broadly, progress is uneven across SIDS, however. The E-Government Development Index in the 2022 United Nations e-government survey measures the development of digital government within regions around the world. The index highlights generally low levels of digital transformation among governments in SIDS, with considerable disparity in scores. It is not feasible for many SIDS to maintain the digital momentum seen during the COVID-19 pandemic. There is also a risk that important progress and foundations will be lost even as broader gaps and challenges persist.

2.1 DIGITAL PUBLIC SERVICES AND PLATFORMS

Digital public services include the digitization of services such as bills and government payments; citizen-centric online services, for example, for land registry and business registration; and interoperable systems and platforms, such as to integrate national health and identity databases. Some SIDS are digitizing the most used or central public services but it is also crucial to advance on broader priorities, including to set standards for service design and delivery and establish interoperable data governance frameworks.



Online Service Index scores, measuring online e-government service provision across SIDS (UN-DESA)



SIDS Context

Several SIDS, such as the Dominican Republic, rank high on an e-participation index that looks at citizens’ access to information and public services and their ability to participate in governmental processes. Many SIDS score lower, however, indicating challenges with the delivery and design of digital services.¹⁸ This is a growing priority as digital public service delivery can propel broader digital transformation.

Several States have e-portals that serve as central entry points for accessing government websites. These tend to focus on the dissemination of information without more extensive technical features. Many lack transaction or interactive elements such as data exchanges or features allowing digital and online payments of taxes or bills. This ‘broadcast’ approach limits opportunities for building a feedback loop with citizens and constrains meaningful citizen engagement. Digital Readiness Assessments conducted by UNDP in a number of SIDS highlighted the interest from citizens in seeing the digitalization of important documents such as birth and death certificates, tax documents and driver’s licenses, and associated services, such as tax payments and license renewals.

18 UN E-Government Survey, UN DESA

Digital public service delivery is a complex undertaking, requiring wide-ranging efforts. A particular challenge is securing dedicated funding for digital service development and shaping a broader digital delivery culture within the public sector. Open data mechanisms are limited due to gaps in skills and processes. Documents and data sets are uploaded to websites, often as PDFs or other closed formats, further constraining the development of a wider digital ecosystem. Digital public service delivery depends on a number of other digital foundations, including digital literacy and investment in ensuring nation-wide connectivity.

Case study

The Dominican Republic was an early explorer of digital public services. Its 2016-2020 Digital Agenda included 'e-government and digital services' as one of five priorities. This steered a strategic and focused approach to digital public service delivery. The country now has more than 1,000 online services for citizens.¹⁹



Recommendations

Key opportunities to accelerate the digitalization of public services across SIDS include:

- Digitalization of public services can be a challenge, requiring governments to devise new ways of working and foster significant culture change in the public sector. **An 'exemplar service' demonstration approach** can be a useful tool. Essentially, this entails digitalizing one or a small number of priority public services and using this process as a journey to develop and embed digital cultures and delivery skills within the civil service. Often, key citizen-facing services, such as tax payments, property and land registration, or vehicle and other licensing, can be useful first steps.
- Governments need **to develop and embed digital service standards within the public sector** to ensure that public services work for the entire population and that no one is excluded, including persons with disabilities. The United Kingdom's Service Standards framework could serve as a guide. It features 14 best practices on user experience, universal access policies, open-source and other standards (and open data), as well as technical infrastructure and procurement considerations. A number of other service standards are publicly available from governments around the world.

19 See: <https://www.oecd-ilibrary.org/sites/840cffa4-en/index.html?itemId=/content/component/840cffa4-en>

- **Monitoring and evaluating digital public service transformation** remains a challenge. This should be a priority for governments, including in building digital service dashboards, embedding analytics into workflows and enhancing the analytical skills of civil servants. Outcome-based or other approaches to performance management may also be worth exploring. This work would comprise designing robust monitoring and evaluation resources and mechanisms, from improving the incorporation of user feedback to looking at standardized and cross-government oversight and reporting, including in leveraging digital service dashboards. Monitoring and evaluation should draw on international standards wherever possible, such as the World Health Organization’s primary health-care indicators for digital health services.
- Governments should explore every avenue to ensure that citizens can access and are aware of digital public services. This includes building inclusive and accessible public services and wider collaborations. For example, governments can work with mobile network operators to identify opportunities to drive further uptake of digital public services. This could encompass **zero-rating data** when citizens access government websites or other public services.

2.2 LEADERSHIP AND STRATEGY

Digital transformation requires strong leadership and coordination in government, including a high-level political and official mandate, a strategic framework and a clear division of responsibilities. An important quality, particularly in a digital context, is agility. Governments and leaders need to be responsive to new challenges and technologies that may arise, be able to quickly deploy solutions in a safe and iterative manner, and, most importantly, be willing to adapt and adjust according to outcomes. This is particularly the case with digital solutions that lend themselves to a “test, learn, adapt” iterative cycle, which requires embedding a culture of experimentation within the public sector.

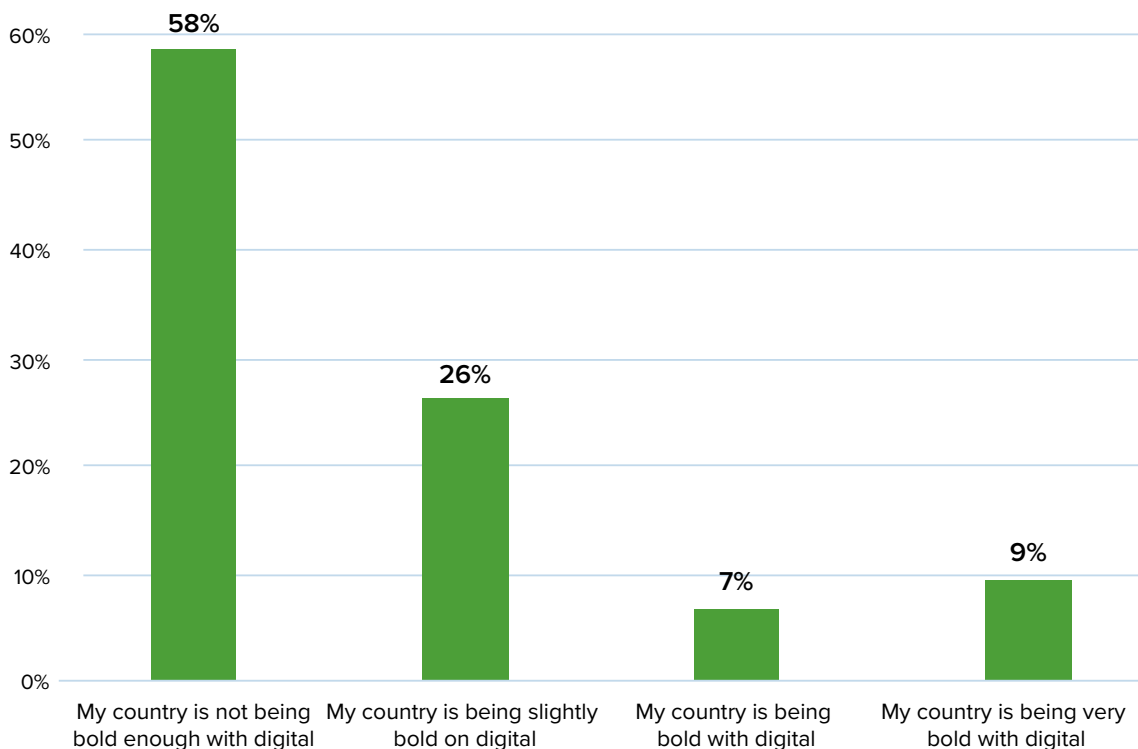


The following figure shows that the majority of citizens in SIDS want governments to be more bold in pursuing digitalization. This in part requires leadership at a senior minister level. Political buy-in is fundamental in a context of competing national priorities, and when digital transformation may not necessarily be a simple, inexpensive or linear path. A particular challenge is a lack of cross-agency (within and among ministries) and cross-sector (among ministries, government institutions and non-governmental actors) collaboration.

Part of shaping this collaboration is ensuring a valid cross-governmental mandate for digital transformation. Leaders, both political and official, must be empowered to drive digital change and supported through dedicated budgets, competent teams and a recognition that digital is a key aspect of national economic development. This includes a longer-term vision for digital transformation that is not wedded to political priorities or shorter-term electoral cycles.

Related to this is understanding the role of the ‘centre’ of government in the context of digital transformation. Governments may create a central ‘digital government’ unit, with the skills and capacities to improve and embed digital transformation across ministries and departments. One example is Singapore’s GovTech agency. Another option is a smaller central unit that manages and develops shared components while building more sizable digital teams in ministries. Regardless of the approach, ensuring clear mandate and vision is crucial.

People in SIDS are keen to see even bolder digital transformation efforts (n=5,788)



Case study

Dominica launched its national digital strategy, Dynamic Dominica, in 2022. It draws on extensive research and analysis, including a foundational digital readiness assessment facilitated by UNDP. Public ownership of the process was crucial, emerging through stakeholder interviews, a public roadshow, a public engagement survey with nearly 500 responses, and workshops and consultations.



Recommendations

Key opportunities to accelerate digital transformation in SIDS include:

- Developing a **national digital strategy** to provide a strong direction and coherence to wide-ranging digital efforts. Such documents often detail government digital priorities and programmes and their relation to the country's broader development priorities and key sectors. They also set out the technical architecture to achieve these objectives, and explore the digital priorities and potential of the private sector, civil society and other actors. A strategy should also identify existing successes, skills and gaps across the local digital ecosystem; stakeholders from all sectors should be actively engaged in its development. It should avoid being technology-focused (it is not an 'ICT strategy') and emphasize the broader potential and catalytic role of digital.
- **Senior leadership of digital is an essential asset for SIDS.** This includes at the ministerial level, whether through a dedicated minister for digital and accompanying line ministry or as part of a broader portfolio, and within the public sector. It calls for a clear governance structure, and the potential creation of roles such as a chief technology or digital officer, an advisory council and digital delivery teams. Creating a dedicated digital agency may be useful to signal a clear mandate to lead national digital transformation and develop a country-wide digital transformation strategy.
- **Introducing dedicated funding for digital transformation.** A number of SIDS accelerated their digital transformation journeys in the early days of the COVID-19 pandemic due to dedicated funding for digital efforts. Moving forward, SIDS should ringfence central (and, where possible, departmental) budgets to build digital components, standards and skills needed for more sustainable digital development. This process should be accompanied by strong reporting mechanisms to identify the longer-term return-on-investment of digital spending, particularly recognizing that improved efficiencies in public service delivery, driven by digital technologies, can take several years to come into effect.
- **Exploring regional approaches to digital transformation.** These involve the regional harmonization of digital and ICT standards and regulations. Given the financial investments involved in digital transformation, regional partnerships benefit from the economies of scale generated by regional physical infrastructure over national infrastructure.²⁰ Opportunities include the CARICOM Single ICT Space, and explorations of regional and open procurement. Other regional actors, including universities, are important digital partners. Governments should explore and facilitate collaborations among universities, the private sector and governments to drive digital research and development and other efforts.

20 UNCTAD, World Investment Report (2017) - https://unctad.org/system/files/official-document/wir2017_en.pdf

2.3 CAPABILITIES

Technical capabilities and culture within government are essential foundations for kickstarting and sustaining digital transformation. These include knowledge of available technologies, the integration of digital into daily use across government, and sufficient technical and digital expertise, from basic to expert digital and data skills in particular departments or parts of the civil service. The ITU breaks down technical skills into basic (tasks such as emailing an attachment or moving a file or folder), standard (such as performing calculations with spreadsheets and creating electronic presentations) and advanced (including the ability to code). Having these abilities in a government is crucial.

SIDS Context

While the degree of adoption of technology varies across governments, many SIDS have a shortage of experienced and qualified technical civil servants, particularly those with advanced technical skills, including in emerging priority areas such as data science. This may be a consequence of lower digital literacy in the broader population. Other barriers may include poor remuneration for digital experts in the civil service, unclear or undefined career progression pathways, and the absence of digital training initiatives for non-digital staff.

Limited financial resources present barriers to technology adoption within governments, with vendor lock-in and expensive licensing fees exacerbating this problem. In particular, outsourcing misses opportunities to upskill internal staff and build internal government capacities, although some SIDS are requiring any such outsourcing to be accompanied by processes to institutionalize external expert knowledge within the government. As SIDS pursue growing digital literacy and awareness in the public sector, there is an opportunity for public sector reforms that strengthen a digital culture in the civil service and increase digital expertise within and beyond the government.

Rigorous digital training of civil servants needs to be incorporated into the capacity-building framework of the public sector, alongside the establishment of training standards for incoming professionals to maintain and strengthen this digital culture. This process should address any internal digital divides based on gender, skill, language and disability, among other dimensions.²¹ Training should build foundational digital competencies and provide opportunities for deeper and more technical learning. It should reaffirm that digital is not an optional skill or one solely for civil servants working in digital or ICT.

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21 OECD, The promises, pitfalls and potential of global technology governance - <https://www.oecd-forum.org/posts/the-promises-pitfalls-and-potential-of-global-technology-governance>

Case study

Shaping career progression for digital professionals in the civil service is an important part of developing and retaining talent. Singapore's Government Technology Agency, GovTech, has developed a Digital Academy providing on-demand technical and foundational digital literacy programmes tailored to the needs of civil servants. Modules range from cybersecurity risk awareness to exploring the Internet of Things and data science.



Recommendations

Key opportunities to embed digital transformation within the public sector include:

- **Undertaking skills mapping** to identify key skills priorities and gaps. This recognizes the need to build digital talent at all levels of government, including by better utilizing existing digital skills within the public sector. This mapping should be intentionally wide-ranging, including technical digital skills (such as data analysis and coding) and broader digital abilities (such as digital product management, Agile methodology skills and knowledge) and other priorities.
- Developing a **digital 'cadre'** in the civil service. Recognizing the valuable role of 'exemplar' services in shaping broader culture change, governments can also introduce a dedicated stream of digital talent to embed digital best practices, including in shaping delivery skills, across the public sector. These individuals can serve as digital champions within a central agency or be dispersed across departments and agencies. They should offer specific digital skills and abilities to begin institutionalizing digital service delivery across the government. Skills could include Agile training, user-centred design, data analysis, and digital project and product management.
- Shaping **digital career progression and pathways** within the public sector. Considerable digital talent leaves government or does not attempt to join it due to the lack of clarity around career progression for digital professionals. Governments should determine clear and meaningful pathways for such talent, particularly recognizing the inevitable disparities between public and private sector salaries. Pathways could be structured around deep digital skills (for example, a progression from a junior user-researcher to a head of user research) or focused on particular skills.
- Further efforts to retain digital talent in the public sector could involve upskilling current civil servants. Developing a **digital skills framework and strategy** will be vital in ensuring the public sector keeps pace with digital changes. To deliver capacity-building and skills, partnerships with educational institutions, international development organizations, regional partners, the private sector and other institutions should be explored. National or international secondments or other resource-sharing opportunities may be useful to consider, recognizing the smaller size of many SIDS and their nascent talent pipeline.

2.4 IMPLEMENTATION CAPACITY AND SYSTEMS

Even if governments shape extensive digital skills within the public sector, these efforts will be ineffective if not accompanied by strong abilities and processes for implementation and delivery. This can be a wide-ranging area. For example, coordinated and dedicated funding and procurement processes can drive and sustain digital efforts across a government. In comparison, a lack of funding or ineffective procurement can result in sub-par products or services, broader inefficiency or wastage, and vendor lock-in with proprietary or low-quality suppliers. Each aspect constrains success and innovation in national digital initiatives. Specific and allocated central digital funding is particularly important in supporting foundational investments and longer-term costs, including for maintenance, development and the digital upskilling of civil servants.





SIDS Context

Procurement, particularly for digital projects, presents a challenge for many SIDS governments. Global analysis highlights that around 70 to 80 percent of government digital transformation projects *‘either fail outright or achieve disappointingly limited success’*²² There is a substantial opportunity to first set open procurement standards to increase the transparency of government procurement and then use these mechanisms to incentivize new vendors to offer more suitable products and services. Digital strategies such as Singapore's outcomes-based procurement approach demonstrate how SIDS can work with local digital and ICT sectors to build the most suitable digital products and services for their populations.

A further opportunity is the creation of a ‘digital marketplace’ where governments can post procurement notices for ICT projects and services. Digital marketplaces improve transparency in public expenditure. Procurement opportunities become more visible to smaller local digital start-ups, strengthening the government’s capacity to act as a valuable customer of the local ICT sector. These efforts need to be accompanied by simplifying procurement processes to ensure that smaller entities are able to participate, and are not crowded-out by larger, better resourced and often international bidders.

Funding constraints are another barrier to advancing e-government projects. Digital transformation is often limited by a lack of dedicated digital funding. This was especially apparent during COVID-19, when several SIDS drew on emergency reserves to fund digital responses but without funding to guarantee longer-term maintenance. Digital projects tend to lack later-stage financial support, sometimes leading to programme failure or other challenges.

Rather than coopt segmented portions of government funds to finance isolated digital initiatives, governments should establish dedicated digital budgets at the central and departmental levels to account for the high capital and ongoing operational costs associated with expansive and longer-term digitalization. Where traditional public expenditure fails to meet the demands of digital transformation, SIDS governments could consider innovative financing tools and approaches such as public-private partnerships.

Case study

Governments can play valuable roles as customers in local digital and ICT markets, increasing the potential of micro-, small and medium enterprises (MSMEs). Trinidad and Tobago’s previous national ICT plan focused on increasing the proportion of government procurement (by contract value) from local digital enterprises. This recognised the important role that the public sector can play in strengthening, championing, and catalysing local digital enterprises.

22 See: <https://www.bcg.com/publications/2018/how-supercharge-your-national-digital-transformation>

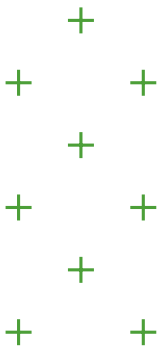


Recommendations

Key opportunities to sustain longer-term digital transformation within and beyond government include:

- **Exploring the ‘government-as-a-customer’ approach.** In particular, establishing a digital marketplace can be beneficial. In addition to the efforts in Trinidad and Tobago, the United Kingdom has a central, online procurement platform for digital projects in the public sector. This has enhanced access to specialized digital services, reduced barriers to entry for MSMEs, and improved transparency and accountability in government procurement. The Government has partnered with counterparts in Colombia, Indonesia, Malaysia, Mexico and South Africa to launch a global digital marketplace, echoing broader regional harmonization efforts by CARICOM and others relating to open procurement.
- **Conducting a data audit.** This can identify the catalytic potential of government data, including in relation to open-data approaches. Any such audit should identify the data architecture, classification and security protocols required for digital government, and how they each engage with the digital economy and other priorities. For example, the World Bank identifies six types of public intent data: administrative, census, sample surveys, citizen-generated, machine-generated and geospatial data. Maximizing the value of this data requires having useful coverage of the relevant population, ensuring data are high in quality and easy to use by stakeholders and partners, and adhering to privacy and security standards. Understanding which data can become open and public is also important.
- **Recognizing the crucial role that procurement plays** in driving a local digital ecosystem and trusting in the digital transformation journey. Purchasing ICT hardware and software should be combined with a broader strategy on digital procurement to increase opportunities for local MSMEs and ensure that procurement is not a barrier to digital transformation. This process could include exploring open contracting, and structuring databases, processes and other procurement initiatives around open-contracting data standards. The Dominican Republic’s e-procurement platform has an open-data portal that regularly releases public procurement data according to the Open Contracting Data Standard²³.

23 The Open Contracting Data Standard (OCDS) enables disclosure of data and documents at all stages of the contracting process by defining a common data model. It was created to support organizations to increase contracting transparency, and allow deeper analysis of contracting data by a wide range of users. See here: <https://standard.open-contracting.org/latest/en/>



- **Avoiding vendor lock-in.** SIDS governments should always be alert to the risks of proprietary solutions and technologies, including their impact on scale, sustainability and the success of digital transformation. Although not a panacea, open-source tools and technologies can be useful to explore, especially considering their potential to shape common components and standards and expand digital public infrastructure.
- Exploring the role of **cloud technologies** in improving the efficiency of digital transformation within and beyond government could encompass shaping workflows and processes to embed cloud technology within ways of working. For example, the Government of Tonga launched a Cloud Policy to guide civil servants in exploring where and how the cloud can support their work. This focus could extend to regulatory efforts, including to ensure that cloud policies and protections do not translate into data nationalism or protectionism.²⁴

2.5 OPEN GOVERNMENT

Open government refers to the degree to which governments are accessible, responsive and accountable to individuals in the use of data, participatory tools, transparency mechanisms and international standards. This includes broader monitoring approaches. Monitoring and evaluation frameworks, key performance indicators and citizen satisfaction metrics are necessary for governments to understand how well they are doing on digital. They help to track progress, provide accountability and oversight, and encourage healthy competition inside government. Publishing statistics or using tools such as digital dashboards is also important. Public transparency is essential in establishing trust with citizens and ensuring the government continues to serve people to the best of its ability.

SIDS Context

Many SIDS appear to lack a monitoring framework for tracking digital transformation. Generally, monitoring is ad hoc and inconsistent across government agencies, and takes place without standards or shared targets. This makes it challenging to consistently track progress, course correct, build on what does (or doesn't) work and share information with the public. Open-data efforts are also in their infancy, with few regulatory or other imperatives for sharing data. Data exchanges and other technical architectures are limited in their functionality.

These challenges stem from broader complexities. Monitoring digital transformation is a challenge in many SIDS for reasons including issues with the population-level representativeness of data and often low quality of available statistical data. National statistical offices and similar functions often

24 UNDP, Enabling Cross-Border Data Flow in ASEAN and Beyond - <https://www.undp.org/publications/enabling-cross-border-data-flow-asean-and-beyond>

struggle for resources and lack digital tools and processes. There is a lower level of statistical literacy in the wider public sector. Several SIDS have recognized the importance of making data-driven services more accessible to catalyse improvements.

Monitoring and impact assessments of digital projects vary across SIDS. Generally, initial feasibility assessments of digital strategies are not conducted during project planning, which makes it difficult to define outcome-based performance indicators beyond high-level objectives. It can be challenging to measure the progress of national strategic plans due to the absence of coordinated and systematic evaluation processes. Countries lack formal oversight boards or similar mechanisms for digital programmes. The capacity to create and update digital dashboards or other reporting frameworks is limited.

Case study

Understanding the success, and impact, of digital government efforts is crucial – in order to course-correct if things are going wrong, or to strengthen what is working. The Government of Suriname has developed a ‘Monitoring and Evaluation’ sub-department within the Planning Office of Suriname. The sub-department also has an explicit focus on monitoring and identifying the impact of ‘developmental’ initiatives – projects that are particularly focused on driving change or progress for the country. Building on this work, the team is also looking to strengthen monitoring and evaluation capacities across the public sector through training (including in areas such as Results-Based Management) and to explore more detailed evaluation of development projects.

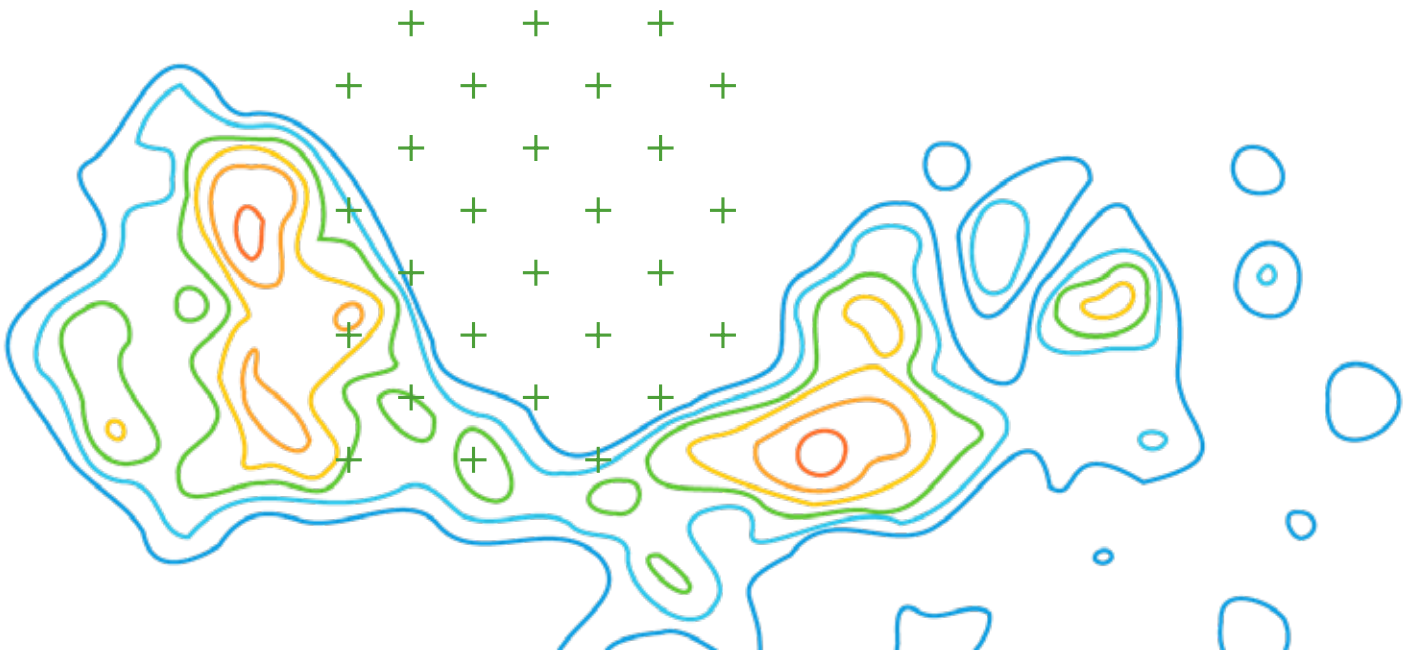




Recommendations

Key opportunities to shape more open government include:

- Exploring the role of **'once-only' legislation** in encouraging—or mandating—government departments to better share data, for the benefit of citizens and towards more open government. 'Once-only' requires government departments to make only a single request for data from citizens. This encourages departments to look internally to see if data are held by another department already, which can reduce burdens on citizens. This approach was a particular driver of the digital development of Estonia.
- Accelerating the **development of open-data infrastructure**. In many SIDS, citizens and others are unable to readily access government data, even as open data could catalyse a vibrant digital economy. Building on data audits, SIDS can shape data governance strategies that consider the value and usefulness of different data sets. This consideration should extend to the role of policies in driving cross-border data flows and data sharing.
- Engaging with the **potential of open-source solutions**. The common components of many digital government efforts, including social payment mechanisms, citizen communication channels and digital identity, are often available as open-source components that have been tested by other governments and can be adapted to other settings. This is the foundation for digital public goods or digital public infrastructure. Modular and reusable components can accelerate digital journeys.
- Developing service-level **dashboards** to publicly track key performance metrics and ensure that digital public services are having impacts. Digital service dashboards can empower governments and digital delivery teams to monitor, analyse and optimize their digital services. This can improve performance, enhance citizen and user experiences, and inform better decision-making, ensuring that limited digital budgets are deployed most effectively.





3. REGULATION

Regulation, including legislation, oversight, guidelines and policies, should underpin digital transformation. This includes ensuring fundamental protections, such as data security and privacy, while supporting and catalysing competition and innovation. It calls for working with non-governmental partners to shape regulation. Striking this balance can be difficult. The fast pace of technological development can make regulation quickly outdated. One priority is to avoid focusing only on the market. Governments and legislative bodies must protect and support citizens, including in the context of e-commerce (such as digital payment protections), cybersecurity (from upstream work on security standards to tackling cybercrime), and ensuring that current and emerging technologies adhere to the highest ethical standards.

SIDS are at different stages in developing regulatory frameworks. While some countries have foundational regulations to support digital projects, others have more limited digital and data standards and protections or lack a coordinated and comprehensive regulatory framework. UNDP Digital Readiness Assessments conducted across a number of SIDS highlights shared regulatory gaps, including in open data, data security and privacy more broadly, digital identity, cybersecurity and digital consumer protections.

Outdated legal frameworks present a barrier to innovation. They may fail to keep up with new opportunities in the market and could put the public at risk. Although some governments have taken steps to increase responsiveness to private sector innovation, considerable regulatory

challenges exist. In particular, establishing key digital protections, including for data privacy, digital payments and cybersecurity. Innovations in shaping regulations, such as sandboxes and other components, can be valuable.

Many governments have made progress in developing regulations to enable fair market competition. In some SIDS, however, the digital economy is still in its infancy. Legal and administrative regulations will be crucial to supporting emerging digital economy projects. Legislation needs to back the development and digitalization of MSMEs as well as actions to safeguard consumer protection. SIDS that have already established free trade, fair trade and antitrust entities need to position these organizations to address competition and broader regulatory challenges in the digital economy.

Given the absence of legacy systems and processes, SIDS can shape legislation to put their countries at the forefront of digital. They may do so by identifying regulations that could address competitive challenges in the digital economy and differentiate them in specific areas, including digital payments, intellectual property and market competition. Initiatives to regulate digital could complement standard setting on data-sharing and once-only legislation to revamp data management processes across government agencies and improve public service delivery.

3.1 DATA AND PRIVACY

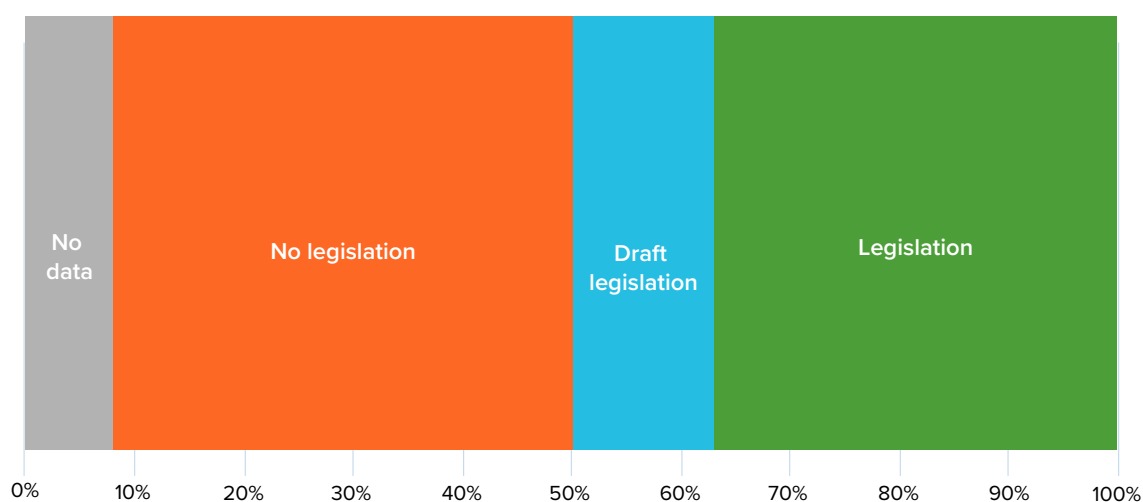
Data standards and protections should encompass the regulation of data access, privacy and safeguards, and open and interoperable government data architectures. Regulations are increasingly necessary as the world digitizes and data become a growing asset and commodity, including in the context of cross-border data flows among SIDS and other countries. Strong standards and protections ensure countries can interface with internal and international digital services while protecting residents' personal information and rights.

SIDS Context

In general, SIDS need to strengthen and better operationalize data standards and protective regulations. Some governments have developed regulatory tenets and legislative acts to support digital transformation but others still lack a comprehensive framework specific to the digital economy, including in terms of data privacy and consumer protection. Among SIDS, 37

percent have privacy legislation and 13 percent are drafting legislation.²⁵ In the former group, some legislation and protections were drafted several years ago. Monitoring and implementation challenges arise due to weak and sometimes absent enforcement. Awareness of data standards and protection laws, where they do exist, can vary, meaning that any advances in privacy legislation are not effectively applied.

Half of SIDS have - or are drafting - data protection and privacy legislation (UNCTAD, 2021)



SIDS are taking steps to implement regulatory foundations for digital transformation and the development of a broader digital economy. Several are drafting data protection and privacy protections to improve regulation and increase consumer trust in digital services. SIDS also have potential to catalyse digital innovation by building on international best practices in developing regulatory frameworks that facilitate public-private sector collaboration and support for MSMEs.

Numerous SIDS have explored more future-proofed legislation, such as to ensure equivalence between digital and analogue signatures, and to shape digital identity priorities. The relative size of SIDS could prove advantageous in devising more advanced yet agile regulation. This could include a focus on outcomes- or risk-based regulation to reduce the chance of legislation becoming quickly outdated in the context of rapidly advancing and global digital technologies. Working in collaboration with other SIDS to define regional or other frameworks and protections could be advantageous, particularly for areas such as cross-border data flows.

25 UNCTAD, Data Protection and Privacy Legislation Worldwide - <https://unctad.org/page/data-protection-and-privacy-legislation-worldwide>

Case study

Jamaica passed a Data Protection Act in 2020, with components coming into force in the following years. The Act established the Office of the Information Commissioner, which is responsible for monitoring compliance with the Act and associated regulations; advising the Minister of Science, Energy and Technology on data protection; disseminating public information; and preparing and disseminating guidelines to promote good practices by data controllers.



Recommendations

Key opportunities to improve data protections and privacy include:

- Establishing **robust privacy protections** as the foundation of any digital economy. They are also an important catalyst for e-commerce, digital public service delivery and other aspects, including broader priorities such as cross-border data sharing. Many SIDS do not yet have a personal data protection law in place. The importance of improving citizen trust and experiences in digital activities cannot be overemphasized. Related priorities such as shaping and enforcing digital consumer protection laws are also important.
- Undertaking a **systematic legal and regulatory gap analysis** to identify opportunities and challenges in the context of digital transformation. This could be explored in parallel with building protections but also in beginning to establish a comprehensive framework (including for e-transactions, consumer protections, cybersecurity and privacy) in line with the latest global developments to govern, promote and sustain national digital transformation.
- Working with the private sector to identify other opportunities to **improve and streamline regulation**. For example, the New Zealand ‘Better for Business’ pan-government initiative, was founded on extensive user mapping of the business journey to identify pain points and other challenges in interacting with the Government. The country is consistently ranked highly in relation to ease of doing business²⁶. Similar exercises could offer significant benefits for SIDS in terms of private sector development, given interest in driving further engagement between governments and local private sectors, and in shaping new industries (including fintech and ICT-driven offshoring opportunities).
- Exploring **innovative regulatory approaches, including regulatory sandboxes**. A regulatory sandbox provides an opportunity for innovators to test digital products and services in a real-world or ‘live’ market environment, including in serving customers. This approach allows

26 See: <https://www.mfat.govt.nz/en/countries-and-regions/asia/timor-leste/new-zealand-embassy/doing-business-in-new-zealand/>

governments to work closely with innovators to build data protections and other safeguards within organizations and innovations. This ensures that they can better protect customer data when launching at scale and can also strengthen businesses to effectively compete in the market.

- Engaging with the **‘twin-tech’ challenge**²⁷. SIDS need to build fundamental protections but also **engage with the challenges and opportunities of new and emerging technologies**. Emerging technologies can be explored even as strong digital foundations are being developed. Governments should consider a pan-government working group to examine regulatory needs, priorities and risks for both current and emerging technologies. All approaches to regulation should be founded on a multisectoral, consultative approach to examining how these developments can advance digital priorities, guided by effective monitoring and evaluation mechanisms.

3.2 FAIR MARKET COMPETITION

Regulation supporting fair market competition involves laws on intellectual property, taxation, network neutrality and equal access to communications channels as well as broader work to avoid monopolies or other sub-par market behaviours. Market competition among companies, such as among telecom providers, helps consumers by driving down prices and increasing the supply and quality of digital products and services. Protecting intellectual property and other business interests encourages entrepreneurial endeavours. Many challenges can arise in uniformly developing and enforcing such laws, however.

SIDS Context

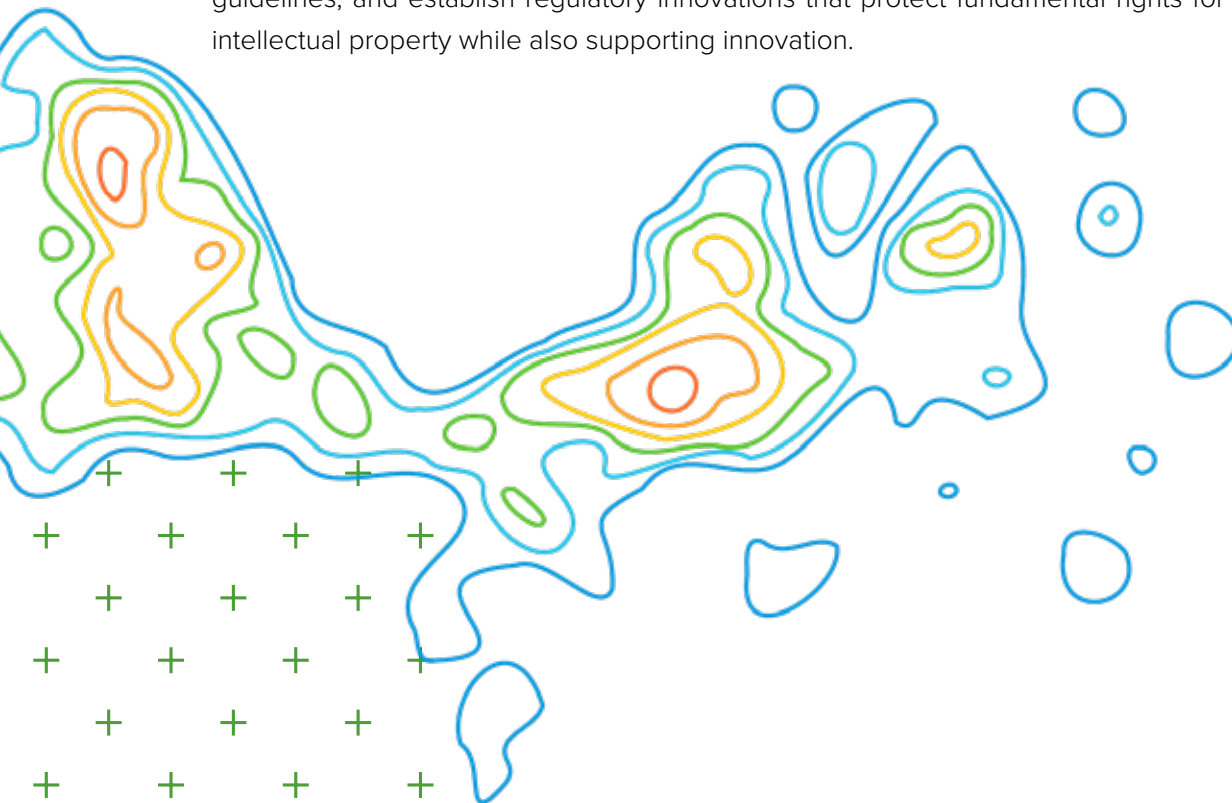
Many SIDS have made good progress in shaping institutional mechanisms for fair market competition. Yet a number of regulations lack specificity to the digital economy. Legislation often focuses on particular sectors. Furthermore, some SIDS still struggle with tackling rent-seeking behaviour, corruption and unfair business practices, which in turn inhibit a healthy digital economy. Having weak laws on competition or neglecting crucial aspects such as intellectual property and consumer protection obstructs the goal of supporting MSMEs and bigger companies in their

27 See: The ‘Twin Tech Challenge’: Spearheading While Catching Up - <https://www.csis.org/analysis/vietnams-twin-tech-challenge-spearheading-while-catching>

digitalization and participation in export markets, including in terms of the commercialization of digital and innovation. SIDS could improve coordination between fair market regulatory bodies to explore legislation that meets the demands of the digital economy.

Countries could leverage knowledge, political will and existing legal infrastructure on sector-specific fair market competition to extend regulation so that it is specific to the digital economy. This could entail upskilling and empowering market regulators, which typically lack the resources, funding and abilities to engage with the new products, services and market entrants in digital transformation. This challenge is only likely to increase as the pace of technology generates new business models and ways of working as well as new risks and inequities. A broader review should determine the policy and regulatory framework needed to protect property rights, enable competition, and spur entrepreneurship and investment.

Given the impact of fair market access on consumers and the private sector, governments and regulators need to work with multiple sectors to ensure that local digital markets and ecosystems benefit citizens, including in the interface between digital and other priorities such as developing the blue economy.²⁸ Cooperation with the private sector is already underway in many SIDS through public-private partnerships. This needs to be broadened to support the next generation of innovators so their products can compete in global markets. SIDS can also take ideas from other countries and explore forward-thinking legislation for the digital economy. They can work with stakeholders inside and outside governments to develop consumer and data protection guidelines, and establish regulatory innovations that protect fundamental rights for people and intellectual property while also supporting innovation.



28 See, for example, the Blue Economy initiative from the World Intellectual Property Organisation: <https://blueeconomyinitiative.com/>

Case study

The World Intellectual Property Organization developed a participatory initiative to develop understanding and engagement on intellectual property in the context of the blue economy in SIDS. Inviting SIDS leaders to bring projects and initiatives, it provided training on becoming investment ready, understanding intellectual property rights, and cultivating a community of blue economy innovators and leaders.²⁹



Recommendations

Key opportunities to improve fair market competition include:

- Supporting **national regulators to shape the digital economy**. Many SIDS have de facto ‘digital’ regulators, often those with a historic focus on areas such as telecommunications or traditional utilities. Many lack resources to regulate the broader digital economy for the benefit of citizens, however. Undertaking a detailed assessment of regulator capacities is important, including to understand alignment with other national regulators (such as financial regulators, recognizing the interplay between digital and financial services, and interest in fintech in many SIDS). This assessment should lead to broader capacity-building, potentially through regional forums.
- Developing **intellectual property protections** to support the digital aspirations of SIDS. Barriers to building new products, services and content continue to fall due to the increasing availability of new tools and technologies. This provides an opportunity for innovators to compete in the global economy. SIDS need to ensure that suitable intellectual property protections are in place, however, and are relevant and inclusive of digital materials and mediums, in order to safeguard the ideas of innovators from international competitors entering local markets.
- Identifying **broader opportunities to encourage cross-sector collaboration**. For example, ‘dig once’ policies encourage collaboration between digital infrastructure providers and ‘traditional’ utilities without formal intervention by regulators. These more directed policy mechanisms can be a useful tool, particularly in a context of devolved or decentralized regulatory powers, and the complexity that these structures can create.
- Undertaking **detailed analysis of comparative advantages**. In the face of global markets, SIDS need to understand their competitive and comparative advantages, including in areas such as agricultural products and commodities that are still core sectors for a number of countries.

29 WIPO, Blue Economy Initiative - <https://blueeconomyinitiative.com/>

This assessment extends to identifying opportunities for new markets and industries, and wider strategies for economic diversification. Areas such as the blue or orange economy and opportunities such as outsourcing and fintech could be relevant.

- Exploring **further liberalization opportunities**. The liberalization of telecommunications has been an important catalyst in many SIDS for improved connectivity, including greater and higher-quality coverage and services that have benefitted citizens. SIDS should explore where further liberalization, including continued efforts in digital infrastructure but also more widely, can have positive impacts on citizens and the growth of the digital economy.

3.3 CYBERSECURITY

With increased digitalization comes a growing need for cybersecurity policies to set protections and standards, manage risks, and protect public and private assets as well as citizens from cybercrime. Having a cybersecurity strategy to guard information flows can catalyse innovation and improve trust among public and private stakeholders, particularly in SIDS economies that rely heavily on cross-border data flows or other forms of international digital collaboration. Governments should also work on raising awareness of cyberthreats and cybersecurity regulations to minimize public concerns when engaging with digital.

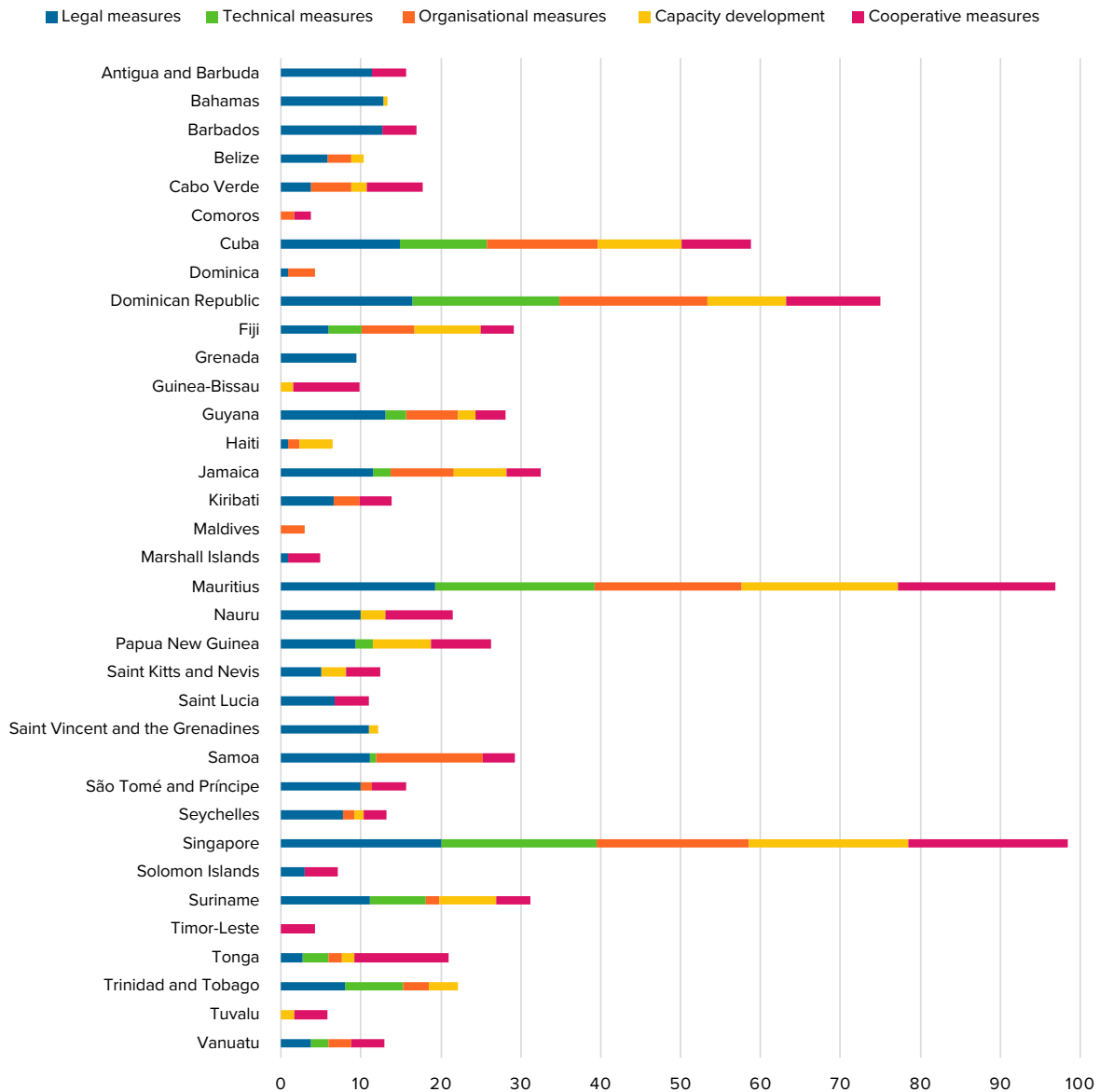
SIDS Context

Cybersecurity remains a significant concern for SIDS. UNDP research highlights how unauthorized access to data and devices, account hijacking, data privacy and confidentiality breaches are among the top concerns of SIDS stakeholders. As highlighted by the ITU Global Cybersecurity Index, SIDS are shaping cybersecurity protections in the legal, cooperative, organizational, capacity development, and technical domains. Across the SIDS community, cybersecurity legal measures are an area of relative strength for countries - whilst building technical measures are an important area of potential growth. SIDS increasingly face cyber-threats, with one nationwide malware attack against Niue prevented in 2020.³⁰

Several SIDS have not developed a cybersecurity strategy or have weak technical and organizational capacity to deliver cybersecurity efforts and associated components. Many governments are drafting cybercrime legislation but the timeline, operationalization and enforcement remain unclear. In the absence of a national cybersecurity framework, SIDS are engaging with previous legislation

30 Security Brief, Fortinet partners with Telecom Niue to increase network security - <https://securitybrief.co.nz/story/fortinet-partners-with-telecom-niue-to-increase-network-security>

Global Cybersecurity Index (2020)



relating to digital and ICT—including computer misuse, information protection, telecommunications misuse and traditional criminal laws relating to fraud—to start consolidating a national strategy. Many of these components require updating, however. SIDS can use knowledge from regional cooperation networks and international best practices as a point of reference when developing cybersecurity regulations.

The public sector often lacks cybersecurity and other digital skills, although a number of governments are focusing on this area (including Suriname in reactivating its Cyber Incident Response Team). Since cybersecurity skills and knowledge in broader populations can vary, many SIDS are launching public awareness campaigns.³¹

31 See, for example, Get Safe Online Cook Islands: <https://www.getsafeonline.org.ck/>

Case study

Tonga's National Computer Emergency Response Team is the country's focal point for cybersecurity issues affecting businesses and other institutions. It "provides advice and support on cyber threats and vulnerabilities to the owners and operators of Tongan critical infrastructure and other systems of national interest" (Pacific Cyber Security Operational Network). It also participates in regional and global groups, including the Asia Pacific Computer Emergency Response Team network.



Recommendations

Key opportunities to improve cybersecurity in SIDS include:

- **Shaping a comprehensive approach to cybersecurity.** Many SIDS have developed discrete and disparate components, but few have a comprehensive cybersecurity programme. This should encompass enshrining cyber protections in legislation (including, potentially, dedicated cybersecurity and cybercrime offences), building governance structures for cybersecurity, developing a cybersecurity strategy, ensuring enforcement capacity for breaches or criminal acts, and establishing grievance redressal and other consumer protections. This combination of measures would provide legal protections to individuals and businesses and increase their confidence in navigating the digital economy.
- Developing **cybersecurity knowledge across the population.** Increasingly, a country's first line of defence against cyber threats is its population. With this in mind, SIDS need to increase the cybersecurity knowledge of their citizens, from shaping positive online and digital behaviours to increasing awareness of digital protections to embedding positive 'cyber hygiene' across the country. These priorities may require public awareness campaigns, capacity-building, behaviour change 'nudges' and other incentives and tools.
- Conducting a **cybersecurity audit.** A systematic review of current cybersecurity systems and processes can identify opportunities, gaps and other challenges. This analysis should include identifying key gaps at the regulatory, organizational and technical levels that could then inform the basis for a national cybersecurity strategy and a comprehensive approach. Formal or informal benchmarking with more advanced countries within the wider region and globally could also inform improvements.
- Exploring **cybersecurity governance options.** Cybersecurity can cut across a number of priorities, from national security to economic resilience. With this in mind, SIDS governments may want to consider establishing a specialized team or unit responsible for national cybersecurity policy development; a committee, council or working group for national cybersecurity policy

coordination; and a national unit specialized in strategic cyberthreat situation analysis. Within these, or separately, a Computer Emergency Response Team could be mandated to respond to any cyberattacks or threats.

3.4 HUMAN RIGHTS

Emerging technologies, such as artificial intelligence (AI), blockchain and Big Data, can intentionally or unintentionally cause harm. Existing technologies can also have wide-ranging positive and negative multiplier effects. More broadly, limiting digital access can deny human rights. The role and extent of digital demands protections, ethical standards and regulations to safeguard citizens and their rights. Regulation is also an important enabler of emerging technologies through shaping how they can most effectively and positively interact with the society and economy.

SIDS Context

Human rights intersect with a number of aspects of digital. Digital tools help advocate for, defend and exercise human rights, and provide a voice to marginalized or disempowered populations. Digital technologies can also limit or violate human rights through surveillance, censorship or online harms. Measures that SIDS are taking to ensure that digital produces positive benefits for entire populations encompass inclusive digital products and services .

New and emerging technologies reaffirm the need for responsible use and suitable protections and safeguards. Given the relative infancy and pace of change of technologies such as AI, blockchain and Big Data, many SIDS have yet to develop formal or other ethical standards to accompany broader innovation and digital transformation efforts. Recognizing the leading efforts of many SIDS in previous digital regulation efforts, particularly around areas such as e-commerce, new areas are worth prioritizing.

Transparency standards in the public sector are an emerging government priority in many SIDS, towards ensuring that policies and programmes improve lives and livelihoods. This focus includes increasing the availability and accessibility of public-facing open data and enhancing public financial management through better coordination on budgets across the government. Evaluating how digital technologies impact governments and beyond will likely grow in importance. Grounding digital transformation in government accountability, transparency and openness should be a central emphasis of future digital strategies or approaches.

Case study

The Internet Governance Forum, established in 2006, is a space for policy and other discussions to shape the governance of the Internet and ensure it works for everyone. As part of the forum, the SIDS community created the Dynamic Coalition on Small Island Developing States in the Internet Economy to bring forward SIDS priorities and voices and to share learning within and beyond the SIDS community.



Recommendations

Key opportunities to protect human rights include:

- Identifying **opportunities where digital can improve inclusion**. Equality and non-discrimination are crucial components of human rights. Digital can play an important role in providing channels and platforms for marginalized voices. Governments should explore crowdsourcing and collective intelligence mechanisms and newer tools such as ‘chatbots’ to improve engagement with harder-to-reach groups.
- Focusing on **human-centred design**. Digital products and services need to incorporate the needs, realities and aspirations of diverse people. This includes engaging with their lived experiences and using digital to support and empower them. Governments and digital developers and innovators should embed human-centred design processes in digital service development. Human-centred design *“emphasizes the importance of diverse perspectives and encourages solution-seeking among multiple actors... [what] differentiates human-centered design from other problem-solving approaches is its focus on understanding the perspective of the person who experiences a problem most acutely”* (UNDP).
- Shaping **feedback loops to learn about digital and broader priorities**. Recognizing the potential for digital to reach and engage populations, governments should ensure that these tools are not just used to ‘broadcast’ information. They should also explore how to build meaningful feedback loops with citizens. This is a growing area of work that provides significant opportunities to shape policies, programmes and other interventions to improve lives and livelihoods.
- Building **data and digital protections**. The digital economy presents enormous opportunities as well as challenges and risks. With this in mind, SIDS need to shape robust protections, including in the context of emerging technologies and other developments, to safeguard the human rights of their populations.

3.5 EMERGING TECHNOLOGIES

From AI to DLTs to DAOs to DeFi to NFTs³²—and 4IR, or the Fourth Industrial Revolution, SIDS need to engage with the potential and challenges of emerging technologies even as they build digital foundations. A number are already exploring emerging technologies, such as Fiji's use of radio frequency identification tags and QR codes to monitor its tuna supply chain, and Vanuatu's use of drones and GIS technology for rapid assessments of post-disaster damage. This highlights that digital transformation is not a linear pathway.

SIDS Context

An important part of engaging with emerging technologies is being able to create the rules of the game and not just being subject to them, particularly as research, standards and other components are often defined in just a handful of countries. Involvement in global initiatives such as an emerging 'Internet of Rules' for global trade, for example, could simplify the international trade architecture for the benefit of smaller countries. Engagement extends to ensuring that new and innovative technologies work for the benefit of all SIDS. For example, the Marshall Islands aims to become a global hub for DAO incorporation. A DAO is a type of organization with its rules and governance encoded in a digital format. The country is the first sovereign nation to recognize DAOs as legal entities.

The global digital community can benefit from the vibrancy, creativity and dynamism of SIDS, including in shaping the norms and structures of new digital initiatives. Newer technologies may reach populations that governments struggle to reach, and may change assumptions and narratives about SIDS. Social media, for example, has provided an opportunity for creators in lower-income countries to craft new narratives about their countries and communities.³³ SIDS can be exciting 'testbeds' for innovation, particularly given their smaller scale and agility. Collaborations need to be true partnerships and not a case of larger countries or corporations treating SIDS as 'playgrounds' for testing technologies.

AI is now garnering significant interest and debate. It presents potentially significant opportunities for product and service development but also poses challenges. Emerging issues include defining and regulating AI so it does not exacerbate or entrench digital divides. NFTs, an approach to digital property rights, could provide valuable and protected income for SIDS creatives but male

32 Artificial Intelligence, Distributed-Ledger Technologies, Decentralised Autonomous Organisations, Decentralised Finance, and Non-Fungible Tokens.

33 Tony Blair Institute, Social Media Futures: How to Change The African Narrative - <https://www.institute.global/insights/tech-and-digitalisation/social-media-futures-how-change-african-narrative>

artists are still the main beneficiaries in many contexts. A global review noted that female artists accounted for just 5 percent of all NFT sales in one 21-month period, and NFTs may entrench other inequalities. SIDS can learn from the emerging technology explorations of other countries.

Case study

In 2020, the Government of the Cook Islands launched the SMART Economy initiative. This provided grant funding to local digital innovators to explore and scale up innovations, including through explorations of emerging technologies. Grant recipients praised the leadership of the Government in boosting the local digital sector with predictable funding. Initiatives funded through the programme included businesses exploring how blockchain can improve asset management. A number focused on e-commerce. Others included a local fintech enterprise and an Internet of Things island network to provide real-time data on energy usage.



Recommendations

Key opportunities to leverage emerging technologies include:

- **Engaging with new debates.** Several low- and middle-income countries are exploring evidence-based regulations to consider the opportunities and challenges of emerging technologies. In Columbia, for example, while piloting a data marketplace project in collaboration with the private sector, the Government explored regulatory imperatives in parallel. It formed a working group comprising stakeholders from various government entities and the private sector to co-design guidelines on data sharing, Big Data and AI. In Viet Nam, the Ministry of Finance established a research group to examine legislative reforms for cryptocurrency and test regulatory models for blockchain to support the central bank's pilot digital currency project.
- **Leading by example.** As highlighted by the SMART Economy initiative in the Cook Islands, governments can play an exciting role in inspiring local innovators to test new ideas and approaches. SIDS governments should not underestimate the possibilities. Feedback from similar programmes has praised the leadership and commitment of governments to innovation.
- **Identifying testbed opportunities.** Small States can actively lead the development of emerging technologies. Their smaller size and agility are useful characteristics for innovators seeking real-world environments to test new tools and approaches. Testbed opportunities may arise for particular technologies, such as 5G connectivity or AI, or specific 'use cases' such as transport, healthcare, tourism or other topics. 'Sandboxes' to shape regulatory standards for emerging technologies could also be valuable.

- **Shaping an approach to innovation.** Governments need to engage with emerging technologies and ensure that the benefits of these tools and digital more broadly significantly outweigh the risks and costs. Governments should play a leading role in incentivizing innovation and defining regulatory frameworks that protect citizens, property rights, intellectual property and data. This work will require new capacities and capabilities, within and beyond governments, but could also lead to new jobs, sectors and opportunities.
- **Engaging in global debate and development.** The standards, components and other foundations of emerging technologies are led by a handful of countries. This poses considerable risks in relation to the inclusion, applicability and fairness of these tools. For example, many AI and machine-learning models are ‘trained’ using English language data. The global SIDS community should identify where focused efforts could ensure that this new generation of technology does not lead to discrimination or disempowerment. They could explore funding training data sets in SIDS local languages, for example, or engaging in other collaborations. The Mozilla ‘Common Voice’ project aims to crowdsource underrecognized languages to support the development of more inclusive and equitable digital products.

3.6 CONSUMER PROTECTION

Digital is making new products and services available to citizens in SIDS, from local, national and international markets. A growing area is e-commerce, including digital marketplaces and digital payment platforms. These new opportunities, however, need to be accompanied by regulations, standards and safeguards to protect consumers from malicious actors, scams and other crimes, and provide effective grievance redressal and free choice. Laws and regulations must be enforceable, enable the growth and development of MSMEs, and foster an environment of trust across and between the public and private sectors.

SIDS Context

Consumer protection in SIDS is not uniform given that many have yet to develop regulatory frameworks for areas such as e-commerce. Existing protections are not well enforced or need updating. Only 37 percent of SIDS have consumer protection laws compared to 59 percent of non-SIDS.³⁴ Outdated or restrictive laws in areas such as online and offline transactions, content

34 UNCTAD, Train-for-Trade SIDS Needs Assessment Report - <https://unctad.org/system/files/non-official-document/DA2225F-needs-assessment-en.pdf>

regulation, data protection and intellectual property constrain consumer protection efforts. Building on existing legislation or starting afresh, SIDS will need to adopt regulations that cover all aspects of the digital economy, including specific legislation for intellectual property, payment services and consumer rights.

Some progress is being made. Various SIDS have already developed legal frameworks for the supervision of electronic contracts, signatures, transactions and service providers, although some components require updating. Several SIDS have established national payment systems and data-sharing platforms, but these have not always been accompanied by consumer protections enshrined in legislation. From platforms and portals to payment gateways and postal systems, a comprehensive approach to consumer protection has yet to materialize in many countries.

Consumer protection requires strong public and private collaboration. For example, e-commerce efforts have largely been led by the private sector or propelled by citizens looking for new markets and opportunities. E-commerce could be a valuable entry point for SIDS to increase government engagement. Existing consumer protections in many SIDS were developed for in-person or offline transactions and need to now engage with electronic, digital and international transactions. Governments also need to ensure that their populations are aware of their rights and responsibilities in the digital era.



Case study

In 2020, the Financial Services Commission in the British Virgin Islands launched a regulatory sandbox to provide fintech innovators with a 'live and contained' environment to test innovative products without applying for a formal license to conduct financial services. The sandbox was founded on the country's Financial Services (Regulatory Sandbox) Regulations. Innovators paid a fee of \$2,000 as part of the application process and then a further fee to participate in the sandbox, with the exact amount depending on the complexity of the business model.



Recommendations

Key opportunities to leverage shape consumer protections in SIDS include:

- **Ensuring enforcement capacity.** Consumer protection is founded on citizen's trust in the broader ecosystem of rules and responsibilities. This includes ensuring grievance redressal and accountability. With this in mind, SIDS governments need to support sufficient enforcement capacity to ensure that companies or other actors are held accountable for any breaches in their responsibilities and that consumers can rely on protections.
- Conducting a **gap analysis of consumer protections.** This is an emerging area for many SIDS, since existing protections and legislation are often outdated and given challenges with enforcement. SIDS governments should carry out a comprehensive gap analysis exploring the current regulatory, policy and enforcement environment related to consumer protections. This should extend to local norms or other behavioural aspects that could form part of a broader approach to consumer protection.
- **Raising awareness of consumer rights.** Digital marketplaces and other platforms are not familiar to everyone in SIDS, while even digitally savvy citizens may not always be aware of their rights in digital and online spaces. Governments, in collaboration with the private sector and civil society, should identify opportunities to raise awareness of consumer protections, where they exist and are enforced. They should highlight the responsibilities of MSMEs and other digital traders to uphold these protections.
- Exploring **regulatory sandboxes.** As highlighted earlier, a regulatory sandbox provides an opportunity for SIDS governments to work closely with private sector innovators to build data protections and other safeguards within these organizations and their innovations. They are then better able to protect customer data when launching at scale. Regulatory sandboxes can be a valuable approach to embedding consumer protections from the very outset of product and service development.



4. ECONOMY

The private sector, from start-ups to Big Tech, is an important partner in the digital economy, offering foundational products and services, including digital infrastructure and digital payments mechanisms. Firms catalyse citizen uptake of digital. They can drive digital inclusion and better products and services, improving lives and livelihoods. Private sector adoption of technology, whether payment infrastructure, cloud services or online marketplaces, can also accelerate government digital transformation. The private sector plays a leading role in ensuring that digital has a positive impact, including in shaping digital technology norms, adhering to transparency requirements and practising broader sustainability reporting.

The digital economy is emerging in many SIDS but it is hard to quantify its exact scale. Many countries lack formal statistical measures of it.³⁵ Smaller businesses are leveraging social media for promotion and sales, however. Digital marketplaces are present in some countries, and consumers are increasingly digitally savvy. E-commerce is of growing interest to businesses, consumers and governments while increased digital connectivity is providing opportunities to strengthen core SIDS sectors such as professional services.

Despite progress, challenges remain for smaller and digital enterprises that lack sustainable financing options. There are often real difficulties in incorporating technology into businesses and scaling up operations without enough digitally skilled workers. Governments are making

35 UNCTAD, Train-for-Trade SIDS Needs Assessment Report - <https://unctad.org/system/files/non-official-document/DA2225F-needs-assessment-en.pdf>

efforts to drive further digitalization and support digital product and service development and delivery, although sometimes these attempts may be constrained by low awareness in the MSME community and overly complex application processes. Creating successful national innovation policies is necessary. For instance, in 2016, Fiji adopted an innovative policy to encourage foreign entrepreneurs to choose the island as their location to start a new business.³⁶

Setting up a business and navigating the start-up journey remain complex in many SIDS. With UNDP Digital Readiness Assessments in a number of SIDS highlighting this challenge. This was broadly consistent across ages, genders and educational backgrounds. SIDS governments are responding by setting up networks, advisory services and other support services to navigate the bureaucracy, including digital information platforms as virtual 'one-stop-shops' for information on establishing and operating a business as well as paying taxes and other fees. Increasingly, digitizing business registration and associated business processes is becoming a priority for SIDS.

4.1 BUSINESS

The digital economy combines start-ups, traditional enterprises, and large and small businesses, and the work required to turn new digital innovations into sustainable and scalable businesses. Starting and running a business can involve many steps, from securing capital to registration and licensing to filing taxes. Each step can present a potential barrier, especially for those with fewer resources such as women and people in more rural areas. Providing a smooth process for businesses and a safe and predictable operating environment for both entrepreneurs and consumers fosters a healthy digital economy.

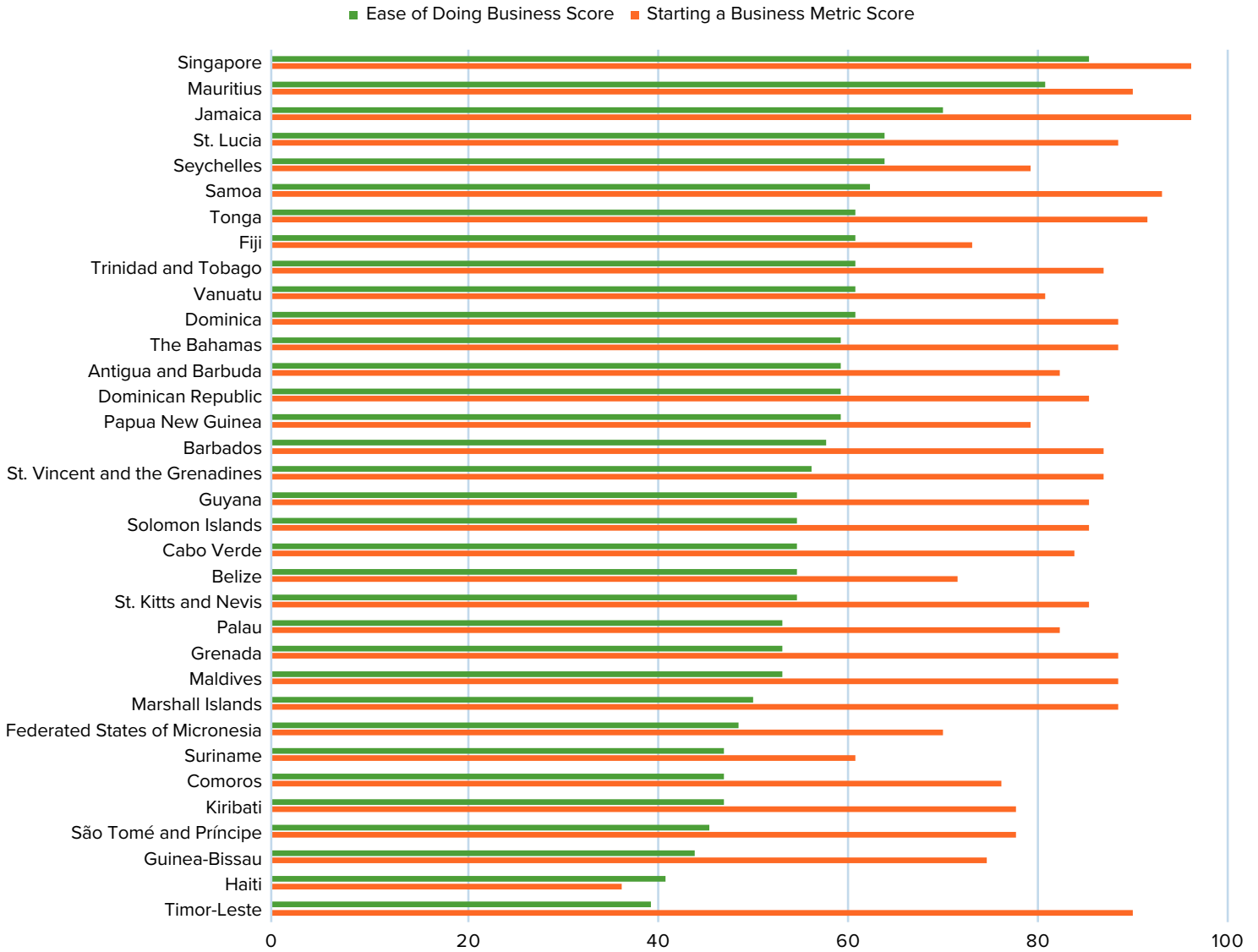
SIDS Context

As entrepreneurship increases, SIDS have made good progress in easing the steps to start a business. Several were named in the World Bank's 2020 *Doing Business* report³⁷ as among the most successful in revamping these processes, including the Bahamas, Bahrain, Cabo Verde and Mauritius. For example, Mauritius implemented reforms to facilitate construction permits, property registration, contract enforcement and measures for resolving insolvency. Bottlenecks and other challenges persist in some SIDS, however.

36 UK Department for International Development, Business Environment Reform in Small Island Developing States: Implications for St Helena - <https://assets.publishing.service.gov.uk/media/5c7e92e9ed915d4063af98fd/BERF-Evidence-Note-on-BER-in-SIDS-implications-for-St-Helena.pdf>

37 See: <https://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf>

Many SIDS perform well in making it easy to setup a business - but broader business foundations can be variable



While in some countries entrepreneurs are winning regional and global innovation competitions, SIDS also need to provide increased and continued support to growing domestic enterprises. Certain barriers make it difficult for start-ups to establish themselves and scale up. Infrastructure problems, such as the accessibility and affordability of electricity and Internet connectivity, remain foundational challenges. Inefficient postal services and getting technology through customs are other barriers. Important population groups struggle to find and pursue business opportunities. This is especially the case for many women and people in rural areas.

There are many opportunities to support the digital business ecosystem. These comprise easing the processes to start and maintain businesses, increasing financial resources and establishing support networks. Developing an integrated e-government platform for submitting business

registration, tax and custom documents can help streamline processes and reduce costs. Many countries have a growing number of residents living abroad, presenting an opportunity to leverage the diaspora for digital upskilling and international connections for start-ups. Exploring alternative financing options such as working with mobile providers for MSME packages and microloans could also bolster the burgeoning start-up ecosystem.

Case study

The Cook Islands launched an online business registry in 2019, the Companies, Incorporated Societies, and Personal Property Securities Registry. It allows citizens to file and access business and personal property records. It has digitized a number of processes and improved efficiency and transparency. In addition, it improves lending options by allowing banks to register physical assets as collateral and ensure that these assets have not already been pledged to other lenders.



Recommendations

Key opportunities to support digital businesses in SIDS include:

- **Developing a digital economy strategy.** This would set out how the government can best catalyse, support and leverage the digital economy. The strategy could include mapping key priorities and challenges, with a focus on identifying sectoral opportunities as well as emerging markets. Fintech could be one such area, given promising developments in mobile payments and other areas in SIDS. Other options include the creative ‘Orange Economy’, outsourcing and digital professional services. The strategy should also identify the role of each ministry, department and agency in driving the digital economy.
- **Improving business registration.** Registering and maintaining a business in many SIDS can still be onerous, requiring lengthy application processes, extensive documentation and, in some countries, considerable expense. Governments should work with the private sector to identify opportunities to streamline these processes, but focusing on the digitization of registration should be a priority. This should be accompanied by broader digital transformation, including options for digital payment for licenses and other approvals, digital tax filing, digital marketplaces and the ‘government-as-a-customer’ approach discussed earlier.
- **Shaping financing opportunities.** For many MSMES in SIDS, accessible and sustainable funding and financing remain challenging. This can be due to existing lenders being more familiar with ‘traditional’ lending opportunities, such as real estate or tourism, or MSMEs struggling to demonstrate creditworthiness due to a lack of documentation or business

information. SIDS should explore how to shape useful financing streams. This can encompass improving the range of lenders and funding available as well as considering more innovative approaches such as crowdfunding and leveraging investment from national diasporas.

- **Supporting technology adoption in business.** Many businesses are improving their online presence and incorporating various digital technologies but there is still room for growth. Often, larger businesses are more easily able to integrate technology into their practices, but MSMEs struggle to do so. This can be due to challenges with financing new technologies and solutions, and gaps in digital skills among business owners, including an unfamiliarity with the potential or role of technology in their sector. SIDS governments, in collaboration with the broader private sector, should identify opportunities to improve technology adoption. These could comprise mentorship, community classes facilitated by business associations and engaging digital platforms to provide digital skills training, among other options.

4.2 FINANCIAL SERVICES

Starting a digital business or digitizing an existing enterprise requires access to capital, whether through banks, venture capital, family or friends, or other mechanisms. Significant shares of citizens in SIDS remain ‘unbanked’ due to challenges in both delivering and accessing formal and digital financial services. The process to obtain financial support needs to be straightforward and equally accessible to all, especially for MSMEs who sometimes struggle to demonstrate creditworthiness. Government and other financial incentives to drive investment in research and development, particularly in relation to digital and emerging technologies and their role and implementation in SIDS, are important components in achieving digital dividends.

SIDS Context

Access to useful finance remains a challenge for digital MSMEs across many SIDS. A lack of documentation and sometimes the absence of evidence of the business' track record, combined with the risk aversion of financial institutions, leaves them with few reasonable credit opportunities. When opportunities do exist, they are not widely known, firms are unclear about the eligibility requirements or the application process is complex (or costs may be prohibitive). Financial resources specifically for the digital transformation of MSMEs are often lacking. Financial institutions are more familiar with lending to firms from established or familiar sectors, such as tourism or real estate.

More effective communications efforts are required to increase the visibility and accessibility of new and existing government support schemes. A number of governments are exploring microcredit schemes to support entrepreneurs and MSMEs. Building the digital financial skills of MSMEs, such as bookkeeping and using spreadsheets and other tools, is an important priority - including in promoting a virtuous circle in MSMEs' interactions with finance. Shaping the financial and digital literacy of the broader population is also crucial.

Some governments have introduced numerous capital incentive schemes, such as research and development grants, preferential loans to fund digitalization efforts, and tax concessions. These are intended to stimulate innovation and entrepreneurship in the digital economy, including through financing incentives. Many measures are aimed at attracting foreign investment, especially businesses operating in the emerging digital space, but several target domestic MSMEs and microenterprises. Uptake can vary, including due to a lack of awareness and the complex application processes of some schemes.

Case study

In 2022, the National Export-Import (EXIM) Bank of Jamaica launched the EXIM E-commerce funder initiative. It has created a pool of J\$100 million in loan funding to support MSMEs in expanding their e-commerce presence. The initiative allowed MSMEs to apply for loans between J\$1 million and J\$5 million to finance up to 80 percent of their project costs, with a five-year repayment window. The initiative was developed in collaboration with the Jamaica Manufacturers and Exporters Association.



Recommendations

Key opportunities to shape financial services in SIDS include:

- **Shaping a flexible and inclusive regulatory framework.** Financial services interact with a considerable range of regulations, such as those governing digital payments, security, and data protection, and financial regulatory frameworks that support alternative channels, payment gateways, and other critical financial infrastructure. Financial services are often offered via a 'know your customer' process, where financial institutions and other providers need to verify the identity of individuals or businesses. These processes can exclude those without the correct documentation, particularly women, who may lack formal identity documents. SIDS need to shape an inclusive and enabling regulatory framework for financial services and adopt iterative approaches that allow for rapid review and adaptation.

- **Developing a comprehensive approach to digital financial literacy.** Building digital, financial and digital financial literacy across the population is essential in terms of formal education and opportunities for those outside school. Leveraging mobile technologies can be impactful, particularly as many people in SIDS are familiar with these for receiving remittances. The private sector can also play a role in building skills, particularly through digital platforms incentivized to increase the number of MSMEs using their products. Such platforms can often engage MSMEs through different dynamics than civil society or government.
- **Supporting businesses to engage with financial services.** With many MSMEs excluded from formal financial services, there is an opportunity to improve the range of funding support available to SIDS entrepreneurs. SIDS businesses can also catalyse wider financial service adoption such as through digital payment platforms and gateways to encourage consumers to transition away from using cash. This, in turn, can increase digital explorations among people at large. Many MSMEs lack the digital literacy to embed digital payment processes, however, or may not be aware of these options. Collaborations with business associations to support MSMEs on these journeys is important. Supporting infrastructure, from innovation hubs to accelerator programmes, can accelerate a market-level shift towards a more digitalized financial sector.
- **Leveraging digital infrastructure rollout.** Foundational digital infrastructure is a crucial component of financial service delivery, particularly given the role of technologies such as mobile money in improving access to financial products and services. With this in mind, governments should encourage connectivity providers to collaborate with financial institutions and service providers to explore innovative models and align efforts in reaching last-mile and other excluded customers.

4.3 STANDARDS OF RESPONSIBILITY

Businesses can play a valuable role in advancing good practices, standards and positive norms, including around digital and data (for example, data privacy and protection), transparency requirements, and methods for reporting social impact (including environmental, social and governance or ESG principles). These elements are all important in encouraging responsible behaviour among companies, which, in turn, can inspire positive behaviours across the wider digital economy and society. These efforts can be guided by State-mandated standards of responsibility, although industry self-regulation is also pursued in some sectors.



SIDS Context

Currently, many SIDS do not have formal guidance or governance on standards of responsibility for the private sector. Digitally focused principles, including on data privacy, are also still emerging. Some SIDS are moving forward on these issues. For example, Curaçao instituted a Corporate Governance Code in 2009 as an accountability and responsibility mechanism for State-owned enterprises. Mauritius aims to develop an ESG framework as part of “positioning the country as a sustainable international finance centre.”³⁸ These approaches demonstrate the opportunity for governments to lead the way in shaping norms and directions.

This topic has particular relevance to SIDS in preserving scarce natural and marine resources, supporting transitions away from fossil fuels, and developing new industries and opportunities through digital technologies. The Multidimensional Vulnerability Index highlights the wide range of threats facing SIDS that need to be addressed within standards of responsibility. They include “economic vulnerabilities, structural development vulnerabilities and exposure to climate risks and natural disaster.”³⁹ Digital also poses new ESG challenges, including in relation to e-waste – and broader ‘circular economy’ considerations - and the risks of misinformation and disinformation damaging the social landscape.

SIDS could lead global discussions and directions for ESG and other priorities, recognizing the importance of these issues for national development. This process could extend to leveraging standards of responsibility as differentiators. For example, SIDS can develop sustainable tourism offers to attract more socially conscious consumers and also advise on the implementation of these

38 Mauritius intends to develop an ESG framework to position the country as a sustainable international financial centre, states PM - <https://govmu.org/EN/newsgov/SitePages/Mauritius%20intends%20to%20develop%20an%20ESG%20framework%20to%20position%20the%20country%20as%20a%20sustainable%20international%20financial%20centre%20states%20PM.aspx>

39 The Decade of Action and Small Island Developing States: Measuring and addressing SIDS’ vulnerabilities to accelerate SDG progress - <https://resources.unsdsn.org/the-decade-of-action-and-small-island-developing-states>

standards globally. Regional collaborations could establish regulatory or broader frameworks to steer commitments from the private sector to better business operations. More widely, SIDS could be pioneers in advancing ‘environment-centred design’. This could include advocating to ensure that global digital exploration and usage does not exacerbate local climate challenges in SIDS.

Case study

The Central Bank of Curaçao and Sint Maarten recently revamped the corporate governance code for the financial sector, including to clarify the roles and responsibilities of senior management within financial institutions and how decision-making shapes organizational culture. The code includes ESG principles, protections of consumer rights and emphasis on an ethical business culture.



Recommendations

Key opportunities to drive standards of responsibility in SIDS include:

- **Exploring opportunities for harmonization.** A number of ESG standards, reporting frameworks and disclosure mechanisms exist but have been developed by different organizations and for different needs. SIDS governments, at a national level (with the private sector) or in regional groupings, should explore opportunities to harmonize standards of responsibility to strengthen their relevance to SIDS. This could extend to focused ESG standards and reporting for particular areas, such as tourism. The UN World Tourism Organization is currently assessing the potential for a harmonized ESG framework for tourism businesses.⁴⁰
- **Shaping overarching standards and frameworks.** Governments can play important parts in setting directions for businesses and other entities and inspiring progress in aligning with broader national development priorities. Mauritius, for example, is considering a national ESG framework to drive the growth of its financial sector. Governments can formulate broad principles and standards or use a ‘vertical’ approach focusing on key sectors, such as finance, tourism, oil and gas, or others. Digital and data components will be important for reporting and driving broader change.
- **Increasing public engagement.** Standards of responsibility are an important obligation for the private sector, but citizens and consumers also have parts to play in creating positive environmental and social ecosystems within SIDS. These roles include positive consumer

40 UNWTO, ESG Framework for Tourism Businesses - <https://www.unwto.org/tourism-statistics/environmental-social-governance-tourism>

behaviours relating to digital, such as e-waste management and recycling, but also good civic behaviours in online and digital spaces. These aspects interrelate with government priorities in regulating the digital economy.

- **Embedding reporting metrics in digital government.** Governments can inspire businesses and other entities to adopt such metrics but should also embed sustainability in their own decision-making, including in commissioning and developing digital initiatives and reporting success. This extends to the use of digital channels and platforms to measure ESG and other sustainability metrics.

4.4 INNOVATION ECOSYSTEM

An ‘innovation ecosystem’ refers to the education, training and empowerment of digital innovators and entrepreneurs within a broader framework of collaboration, policies and regulations. It includes fostering digital education and an entrepreneurial mindset from a young age as well as building a digitally skilled population through opportunities for lifelong digital learning. A supportive entrepreneurial ecosystem consisting of education, finance and mentorship for innovators through tech hubs, incubators and accelerators is necessary for digital transformation to develop and grow locally.

SIDS Context

Robust innovation ecosystems in SIDS facilitate the development of new technologies and the local digital economy. A digitally skilled population is a key ingredient, but many SIDS struggle with a small talent pool of local digital experts. Although digital has been embedded in many curricula, local employment opportunities are often lacking. Many graduates in STEM (science, technology, engineering and math) emigrate to other countries with strong digital ecosystems and better paying jobs, causing a ‘brain drain’.

Recent digital nomad programmes in some SIDS are an important step. But a broad analysis of other immigration and international opportunities should be conducted to consider, for instance, more formal links with diaspora communities and efforts leveraging digital assets for ‘e-residencies’ or similar programmes. Such steps could accelerate the digitalization of public services.

Initiatives to support digital entrepreneurs, including skills development, incubation and mentorship, and MSME development, are not always present. Countries can partner with private companies and others to build digital skills and support entrepreneurship. For example, in 2019, Suriname organized an ICT week where Facebook and GSMA, the mobile phone industry trade association, held training workshops on the Internet of Things and digital skills for businesses.

Governments can work with local and regional universities or other partners to fund and establish centres specializing in digital priorities. These centres can be key facilitators of student innovation through hackathons and competitions, funding and grants, as well as mentorship programmes and networking opportunities. The Samoan Innovation Park at the University of Samoa is a promising example. Collaborations with business associations can establish incubators or other support mechanisms. Mentorship by local digital experts or those in the diaspora can be powerful catalysts of further innovation.

Case study

The Ministry of Trade and Economic Development in Tonga has developed three initiatives to support the post-pandemic recovery of MSMEs. The MSMEs Product Development Programme offers coaching and training. The Buy-Tonga Made Business Development Support initiative provides financial assistance to manufacturing businesses. The COVID-19 Credit Relief Instrument improves cashflow. The Ministry has also worked with the Pacific Labour Facility and the Market Development Facility Pacific to launch a Tonga Business Accelerator Pilot Recovery project. It supported 18 MSMEs with training and coaching in business modelling, operational efficiencies, and financial and human resource management.

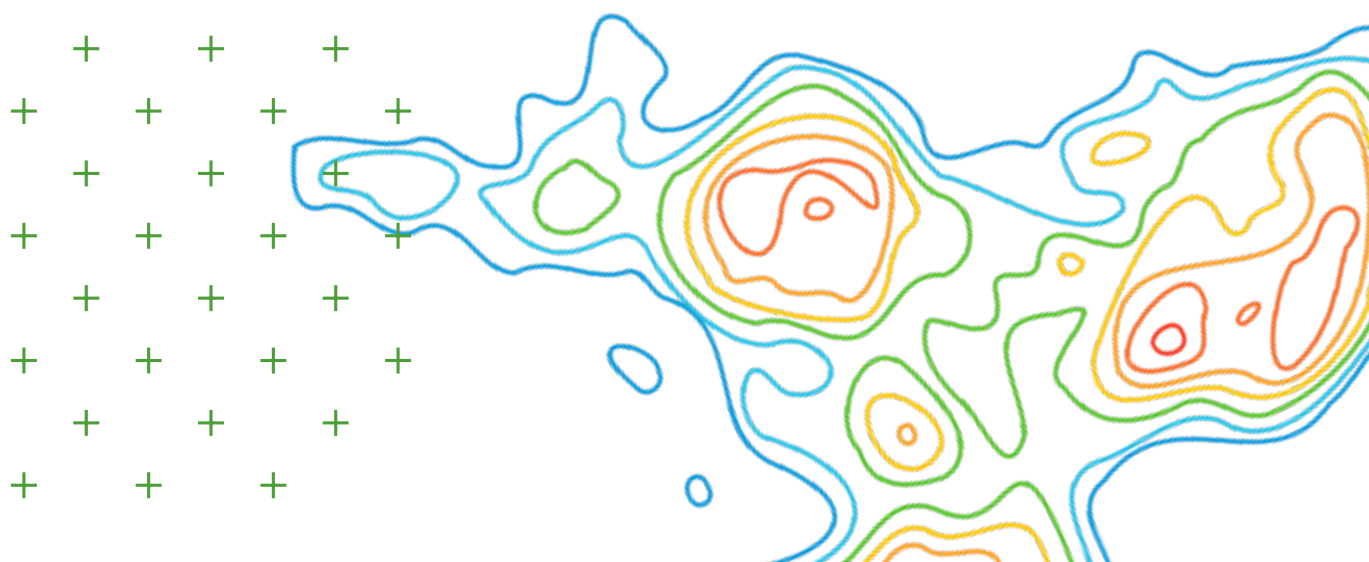




Recommendations

Key opportunities to shape and strengthen innovation ecosystems in SIDS include:

- **Exploring focused interventions to drive ecosystem development.** This could comprise, for example, the establishment of innovation hubs, accelerators and incubators, open access to shared facilities or coworking spaces, and even the use of government buildings to co-host digital entrepreneurs. These efforts should focus on rural areas with fewer opportunities for accessing and integrating technology and business, and where digital entrepreneur networks are more limited.
- **Considering ‘centres of excellence’ as catalysts.** National or other central institutions can give direction to innovation ecosystems, including in serving as national digital and innovation hubs. For example, Malaysia’s National Technology and Innovation Sandbox adopts a multi-industry approach and provides testbeds and technology demonstrations, funding and market access facilitation, and reviews of regulations to quickly commercialize research and development.
- **Leveraging the digital diaspora.** The capital and knowledge resources of the digital diaspora across many SIDS is significant. These could help retain local talents and support the broader development of the digital economy. In Sierra Leone, the Government established the Presidential Office for the Diaspora to coordinate a national strategy for diaspora engagement. The office advertises jobs for the diaspora on its website. It has launched a public sector reform programme to involve diaspora experts, especially in ICT, in government capacity-building. It also facilitates diaspora investment in local entrepreneurship by engaging diaspora experts as advisers to and funders of innovation hubs.
- **Improve communication to the ecosystem.** Many SIDS governments and private sector entities are providing, or supporting, a wide range of useful digital and innovation initiatives. But it is not always easy for an entrepreneur or MSME owner to navigate these. Developing a coordinated approach to supporting the innovation ecosystem is important. This includes improving communications and outreach to businesses, and ensuring that current and planned policies and initiatives have the greatest impact.





5. PEOPLE

Digital transformation should be driven by the needs, realities and aspirations of individuals. It should be people-centred and founded on participation, engagement and co-design wherever possible. Digital is a tool to improve lives and livelihoods. For everyone to benefit from its includes building strong digital literacy across society, starting with more marginalized groups. Digital literacy can be wide-ranging, however, and it is important to look beyond access to technology. Usage and ownership of digital tools and devices is also crucial in building sustainable and relevant digital skills.

SIDS have good human capital foundations, with higher basic literacy rates. They often possess skilled workforces. Because many have a young population, their economic potential may further improve as this digitally savvy group joins the workforce.⁴¹ Most SIDS struggle to advance digital skills, however, particularly among key populations such as women, the young and old, and rural communities. Weak digital literacy rates and gaps in digital skills slow digital transformation and curtail the benefits of the digital economy and emerging technologies. This digital divide is particularly concerning as it could become entrenched.

41 ITU Measuring Digital Development: Facts and Figures 2022 - <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022/>

Brain drain is a continual challenge. With few digital opportunities, many graduates with digital skills move overseas—or those studying abroad do not move back. Broader efforts to shape national digital economies and associated opportunities are important in retaining this talent. Building meaningful digital career opportunities in the public sector is another useful approach. Supporting the development of locally developed digital content and services can encourage citizen uptake and strengthen opportunities for digital talent to remain or return to SIDS. Introducing digital skills from early stages of education and upskilling local workers could amplify the use of technology, catalyse digitalization and develop local talent to benefit from these opportunities.

As digital transformation is founded on a country's population, governments should prioritize developing skills while providing resources to prevent brain drain. Various SIDS are engaging with initiatives to include digital literacy in education curricula, introduce talent development schemes, enhance connectivity and transform local digital cultures. These efforts could be accompanied by cross-sector collaboration and private sector involvement to identify key digital skills. COVID-19 has accelerated the adoption of technology and thus the demand for digital skills, presenting SIDS with opportunities to upskill their workforces and leverage local digital talent in the post-pandemic recovery.

5.1 SKILLS AND LITERACY

Digital literacy covers a wide range of tangible skills. These comprise basic literacy and knowledge of technology as well as skills in web and application development, data science and sectors such as digital health and precision agriculture. Digital literacy is not just about formal, in-school education. The provision of digital in traditional academic curricula is important but should be accompanied by broader digital learning opportunities to ensure lifelong learning and engagement with the digital economy. This may include collaboration with private sector technology and platform providers. Digital literacy is an important driver of increased technology usage and adoption, a pivotal tool to help close the digital divide.

SIDS Context

Digital literacy in a number of SIDS is low, despite a higher percentage of gross domestic product (GDP) coming from the ICT sector compared to other countries.⁴² Limited investment in ICT skills development in the education system and upskilling programmes prevents countries from

42 ITU, Small island developing states (SIDS) and ICTs - <https://www.itu.int/en/ITU-D/LDCs/Pages/Publications/SIDS/ICTs.aspx>

meeting the needs of the digital economy and digital transformation more broadly. Some SIDS face shortages of skilled labour, which reduces productivity, affecting entrepreneurship and the adoption of emerging technologies.

In various SIDS, a shortage of digital literacy skills occurs because these are still not embedded, mainstreamed or present in some core educational curricula. Digital skills initiatives may not keep pace with the digital economy or the needs of digital employers within SIDS. Collaboration with the private sector is particularly important in building skills, including to identify opportunities for blended and applied learning. The absence of a dedicated and focused digital inclusion strategy in some countries risks exacerbating digital divides, hindering certain communities from accessing the benefits of digital transformation.

Some SIDS are starting to informally map the digital and other skills that will add the greatest value to their digital transformation journey. Various SIDS are also implementing initiatives to improve digital literacy, from expanding broadband connectivity to incorporating ICT training in education programmes to piloting digital learning platforms. Digital itself also presents learning opportunities. It can improve the delivery of content, such as by connecting SIDS with a global repository of courses, including microcredentials. With human capital one of SIDS' greatest assets, investing in the development of a skilled workforce with the ability not only to handle current technologies but also to contribute forward-thinking ideas will be decisive in digital transformation.

Case study

In 2021, the Government of Barbados, through its National Transformation Initiative, partnered with an online course provider, Coursera, to provide access to a significant library of online learning opportunities tailored to the knowledge and skills priorities of Barbadians. The initiative includes 20,000 scholarships for women in Barbados to develop entry-level digital skills. The collaboration builds on a previous partnership where over 5,600 Barbadians completed nearly 40,000 online lessons.



Recommendations

Key opportunities to improve skills and literacy in SIDS include:

- **Mapping digital skills gaps.** Few SIDS have undertaken extensive mapping of the digital skills gaps and assets within their countries. Yet higher-end digital skills are likely still in short supply. Mapping of successful initiatives in other countries, such as code clubs, incubators and broader digital economy resources such as maker spaces, could lead to a focused strategy or programme to drive progress. This is an important area to close the digital divide as locally

produced content can encourage uptake and usage of digital devices and the Internet. Marginalized groups should be specifically targeted and supported to develop higher-end digital skills, in addition to the wider population.

- **Developing a digital skills strategy.** Further mapping of current incentives, initiatives, opportunities and gaps could lead to a formal strategy to drive digital and broader skills development. This should take a whole-of-society approach and aim at lifelong learning. Collaboration with higher and vocational education sectors to develop more advanced digital skills is also necessary. The private sector should play a key role in this discussion and ensure skills development in SIDS meets labour market needs. This includes identifying which skills are most in demand (including basic digital literacy) or will be particularly required in the future (considering how the growing accessibility of tools such as AI could impact sectors such as outsourcing and the creative economy). Strategies should promote participation in microcredential and accessible professional certifications such as those offered by the private sector. They should include broader professional skills training on office skills, business management, communications, project management, etc.
- **Focused digital capacity interventions to mitigate existing gaps, with a focus on upskilling young people.** Incorporating basic and more advanced digital skills into all parts of the national curriculum is an important direction to maintain in SIDS. This should include embedding digital financial education in the secondary and tertiary curricula of schools. SIDS governments should focus on increasing the percentage of young girls and women studying digital subjects and ensure suitable provision of ICT-qualified teachers. As the pace of connectivity and digital transformation continue, policymakers and academics should study the extent of exposure among vulnerable populations to digital harms, including disinformation, exploitation, scams, hate speech and polarization, and projections for the future. This will be a first step towards strengthening safeguards, awareness and mitigation measures.
- **Shaping an early career pathway in the public sector.** The public sector in SIDS can be an exciting career opportunity for young digital talent with real potential to affect positive change. Digital career pathways and progression can be opaque, however. In addition to tackling these challenges, as discussed earlier, SIDS governments should explore opportunities to engage young people at the start of their careers, such as through digital internships or focused digital early-career roles and associated learning opportunities.

5.2 CULTURAL NORMS

Culture surrounding technology usage dictates many other aspects of digital transformation, such as ownership of devices, Internet and social media usage, and broader engagement with the digital economy. Drivers of digital culture are trust and interest in technology use, with younger populations generally being early adopters. Social norms around technology use and tolerance for entrepreneurial risk are also important to evaluate to understand a country’s digital economy as well as possible barriers to faster and more inclusive digital adoption and innovation.

SIDS Context

There is growing digital uptake across SIDS, with social media use in particular increasing substantially in recent years. SIDS populations are using more online services for email, shopping and remote working. Further engagement requires tackling more structural barriers, including the affordability of data and devices. More broadly, strong digitalization efforts by the public and private sectors, including in developing digital products and services relevant to the population, can galvanize digital engagement. Cultural attitudes and gender norms may contribute to the digital and entrepreneurial divide in some countries.

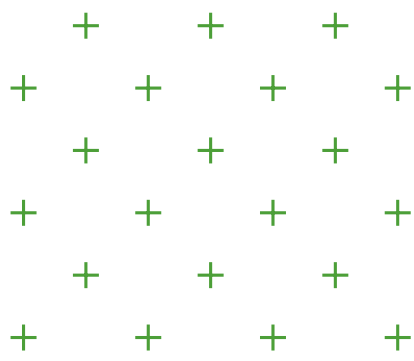
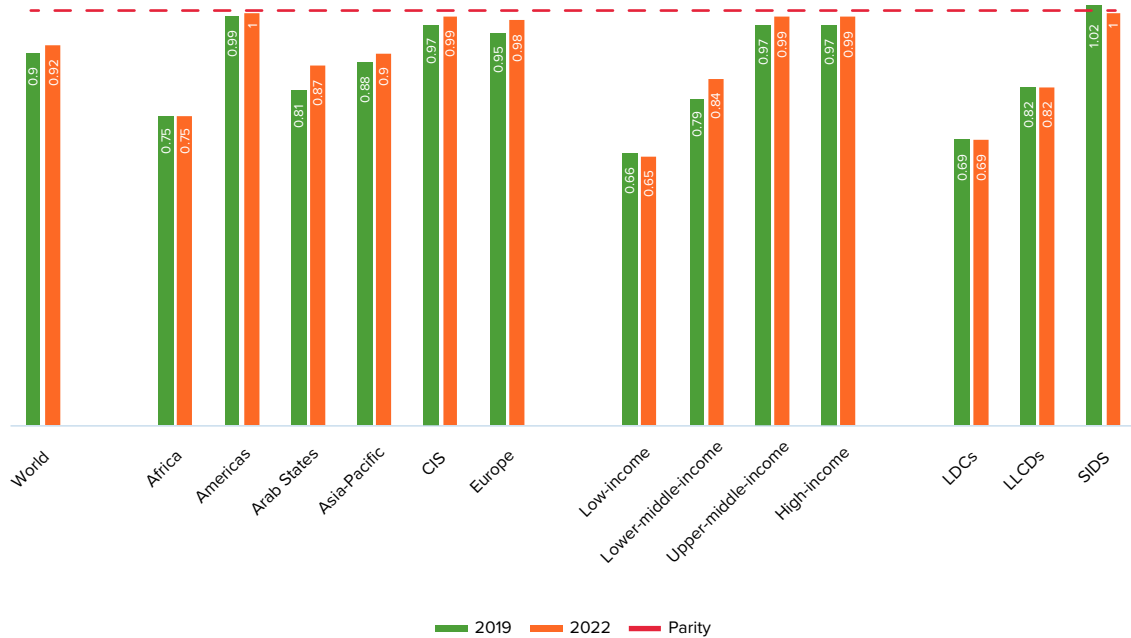


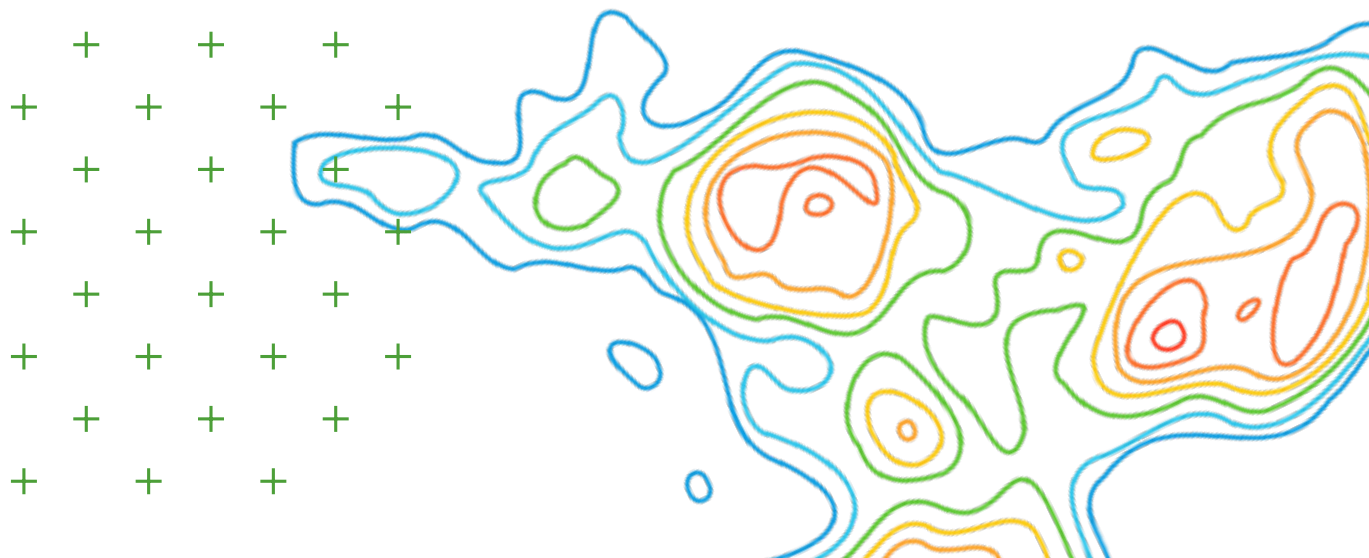
PHOTO: UNDP PACIFIC

Although internet connectivity is lower in SIDS, they are one of the few countries to have reached gender parity in internet use



Despite strong digital foundations, SIDS need to make more efforts to develop local digital content, products and services. This includes the continued digitalization of core public services as well as SIDS entrepreneurs developing digital products and services that meet the needs of their communities. Building digital literacy and supporting the next generation of SIDS digital developers are crucial steps, along with demonstrating that digital careers, whether in the public or private sectors, are feasible for young and older people.

High general interest in digital and positive confidence in the benefits it brings present an opportunity for SIDS to implement programmes, tools and resources that further spark popular interest. The existing appetite of citizens for digital products and services, coupled with the growing use of Internet services, demonstrate potential for vibrant and sustainable local digital cultures. In addition, digital should be seen as a tool to protect, preserve, and champion local culture and heritage – from showcasing SIDS' unique culture to a global audience, to ensuring that digital products and services do not erode this heritage.



Case study

In 2021, the Government of Curaçao and its partners, including Smart Nation Curaçao, Curaçao Data Driven, Curaçao Tech Meetups and the Curaçao Investment & Export Promotion Agency, ran the three-day Curaçao Data Days virtual event. It aimed to increase engagement and understanding of data, including by exploring the role of data in education, public health and communication. Designed to be accessible to a wide audience, it had three programme tracks: beginner, intermediate and advanced.



Recommendations

Key opportunities to continue to shape a digital culture in SIDS include:

- **Undertaking extensive community engagement.** For some populations in SIDS, digital may not seem relevant to their lives or livelihoods—or tangible. SIDS governments, in partnership with the private sector and other digital actors, should identify events, roadshows and other opportunities to showcase the power and potential of digital. These could include initiatives such as the Curaçao Data Days but also more extensive approaches, such as ‘train-the-trainer’ programmes to trigger public and private sector innovation and demonstrate the impact of digital on national development goals. For example, Rwanda has a Digital Ambassador Programme that trains young people to deliver basic digital literacy workshops to the general public. In three years, this programme reached 41,000 Rwandans in 12 districts.
- **Shaping lifelong learning opportunities.** Many SIDS have made important and impressive efforts to improve digital and ICT education in traditional curricula. They need to broaden these to include technical and vocational education and training, and opportunities outside educational institutions. This encompasses promoting digital and online learning opportunities from technology companies and online course repositories such as microcredentials. It may also extend to SIDS governments creating, or white labelling, national digital courses or ‘massively open online course’ (MOOCs). For example, the Government of Finland developed the MOOC ‘Elements of AI’ to improve understanding of AI across society.
- **Ensuring a positive digital culture.** Awareness of the negative aspects of digital is not widespread across SIDS. Although technology in general has had a broadly positive effect on people’s lives, governments and the private sector could be doing more to address the emergence of risks in the digital space, including online scams, cyberbullying and disinformation. In most SIDS, initiatives for digital well-being are still emerging, and more attention is needed to raise awareness and communicate the opportunities and challenges of digital for individuals’ lives and livelihoods. These risks are only likely to increase, particularly as SIDS become increasingly connected through new submarine cables and developments in satellite Internet. Governments will need to play a central role in a number of areas, particularly

by enshrining protections in legislation, with enforcement capacity. Governments and the private sector are also important actors in driving broader behaviour change, including by disseminating information on scams and other risks associated with e-payments, e-commerce and digital transactions.

- **Sharing learning across the SIDS community.** Many SIDS face similar challenges in cultivating positive digital norms, closing digital divides and improving trust and engagement with digital technology. They should share successes and challenges, and consider replicating South-led initiatives, especially those already deployed in other SIDS, to increase digital well-being and inclusivity, and address other priorities such as connectivity access and affordability.

5.3 USAGE AND ADOPTION

Access to devices and technology is not sufficient in itself to build meaningful and sustainable digital literacy. Usage and ownership or adoption of digital devices must be equitable so that all members of society benefit from digital transformation. This means the use of technology across all parts of society, active promotion of financial inclusion and easy access to information. The Alliance for Affordable Internet has set targets for meaningful digital connectivity: access to a smartphone, daily Internet access with 4G mobile connectivity and unlimited broadband connection.⁴³

SIDS Context

While SIDS have made progress in improving the digital engagement and digital adoption of their populations, especially during the pandemic, digital divides still exist, where socioeconomic or demographic factors such as gender, education, age, disability and location are contributing or central factors of exclusion. The digital divide is particularly stark when comparing urban and rural areas, with almost all urban populations in SIDS benefiting from 3G and 4G mobile Internet coverage - compared to 62 percent of rural inhabitants.⁴⁴

Marginalized and minority groups are particularly affected as their digital presence, Internet access and digital literacy skills are often the lowest across the population. With no coherent digital approach in place in some SIDS, and with the accelerated pace of digital transformation,

43 Alliance for Affordable Internet (A4AI), Meaningful Connectivity - https://a4ai.org/wp-content/uploads/2021/02/Meaningful-Connectivity_Public-.pdf

44 ITU Facts and Figures: Focus on Small Island Developing States 2024 - <https://www.itu.int/itu-d/reports/statistics/facts-figures-for-sids/>

these divides can become entrenched. Governments could benefit from collecting disaggregated data to assess the needs, realities and aspirations of particular segments of the population, marginalized groups and those with little digital access. These insights will be key to achieving universal access to digital and information as well as supporting broader opportunities, such as financial inclusion, that in turn can drive digital engagement and adoption.

Many SIDS are on the right path to start bridging the digital divide, bringing Internet access, digital tools and devices to underserved communities. Initiatives to improve inclusivity could be framed in a wider digital inclusion strategy and informed by disaggregated data to identify the needs of marginalized groups. Using data from digital inclusion surveys and even direct inputs from citizens and civil society to design digital content, products and services to drive inclusion and adoption could shape a truly people-centred digital transformation.

	Infrastructure	Affordability	Consumer readiness	Content and services
Bahamas	58.5	70	85	53.2
Bahrain	90	66	85	70.8
Barbados	60.9	38.9	86.4	52.8
Belize	56.6	48.3	78.5	61.6
Cabo Verde	48.8	46.8	75.9	49.1
Comoros	44.8	20.2	36.6	19.4
Dominican Republic	60.3	43.7	84.8	72.8
Fiji	65.6	46.3	88.2	47.1
Guinea-Bissau	48	34.8	32.6	18.4
Guyana	43	63.4	74.2	47.2
Haiti	38	41	53.4	30.1
Jamaica	59.2	29.6	79.9	49.8
Maldives	69.4	43.1	77.1	45.6
Mauritius	57.4	58.2	81.9	73.4
Papua New Guinea	51.9	52.1	47	27.8
Saint Lucia	53.2	45.8	78.4	49.9
Saint Vincent and the Grenadines	57.1	37	78.9	57.1
Samoa	57.8	42.3	79.8	64.2
Singapore	90.9	99.1	93.6	89
Solomon Islands	40.3	33.7	62.2	27.1
Suriname	56.3	50.1	78.9	47.9
Timor-Leste	53	53	59.7	30.4
Tonga	41.9	50.2	79.5	56.8
Trinidad and Tobago	64.3	54.8	80	63
Vanuatu	53.9	45	71.2	39.6

Source: GSMA Mobile Connectivity Index

Case study

In 2021, the Telecommunications Authority of Trinidad and Tobago, in collaboration with the country's Central Statistical Office, conducted a nationwide survey to measure the digital divide. This built on two previous surveys in 2007 and 2013. The 2021 survey collected a wide range of data, including in relation to the digital divide and digital inclusion (and related areas such as trust in digital). It explored the digital characteristics of households and citizen engagement in areas such as e-commerce and digital public services.



Recommendations

Key opportunities to improve usage and adoption in SIDS include:

- **Positioning digital inclusion as a central priority in SIDS.** This includes the development of a national digital strategy with a focus on digital inclusion, and targeted approaches to particular priorities (such as digital financial inclusion and digital literacy efforts in technical and vocational education and training and other settings) as well as broader engagement with digital well-being. Steps forward could include increasing online safety and security content in educational curricula. Tackling and closing digital divides should include a guiding strategy or framework, active engagement of relevant stakeholders, practical tools to catalyze action such as checklists for developers; monitoring and evaluation, including data collection to identify digital inclusion challenges; and focused interventions to ensure that no one is left behind.
- **Supporting the development of local digital content, products and services.** Digital does not always seem relevant to many people's lives and livelihoods, particularly more marginalized communities, who may not recognize their needs and realities in content developed in other countries. SIDS governments and other digital actors should identify opportunities to support the local development of digital content, products and services, including content that aligns with the needs of their communities. This approach should accompany broader efforts to support digital entrepreneurs.
- **Collecting data on digital usage and digital adoption.** Data are important tools for policymaking. Governments should work with private sector partners and others to build an evidence base on usage and behaviours in the digital economy. This will be essential to inform policy, legislation and other interventions, and to increase understanding of digital inclusion gaps and priorities. A digital inclusion survey or other outreach approach could provide further insights. Currently, data are limited to those collected in censuses and a small number of other infrequent assessments; a more expansive data set would be valuable. As an example, the Government of Trinidad and Tobago launched a digital inclusion survey in 2021 to support national digital efforts.
- **Leveraging schools and community centres to drive digital adoption.** In some areas, including rural locations, access to devices varies across students. By investing in schools as digital hubs, educational institutions could be better positioned to shape digital literacy in

students from younger ages, while doubling as communal digital service centres for residents. This could drive uptake and adoption of digital, bringing connectivity and access to broader populations. Echoing the earlier recommendation on public sector asset reuse, this approach can be extended to health institutions, libraries and transport hubs and combined with the offline community centres also recommended earlier.

5.4 CIVIC ENGAGEMENT

Digital provides new and exciting ways to connect governments to their citizens and also new channels to engage citizens in improving their societies, including through political and civic participation. More diverse voices can take part in open government and policymaking. Digital tools and technologies provide an opportunity for all parts of the population to access information and propose solutions to problems they face.



SIDS Context

Many SIDS have dynamic civil societies, including national and international organizations, religious and faith groups, and non-profits working on a range of different development priorities. Many have strong links with communities but are often not leveraging digital tools extensively, beyond social media platforms or email lists. There is scope to strengthen the digital literacy of civil society to increase its reach and impact. This extends to improving the enabling environment for civil society more broadly. One analysis noted a disparity in rating opportunities for civil society to engage with development. SIDS governments saw these as 'moderate' while civil society organizations considered them 'basic'.⁴⁵

Digital provides an opportunity for governments to build stronger connections with civil society and the population at large. This includes collaborating with civil society through 'collective intelligence' mechanisms to improve the collection of data and insights that can inform policymaking and service design, including by identifying the impact of digital transformation efforts. Civil society could also collect disaggregated data through crowdsourcing and community microtasking methods. This could ensure that data are more representative of vulnerable groups that may not be adequately represented in official national statistics mechanisms.

45 See the Global Partnership for Effective Development Cooperation: https://effectivecooperation.org/system/files/2021-03/SIDS_TAG%20Meeting_Room%20doc_draft_.pdf

Civic engagement in relation to digital in SIDS could also broaden, touching on the benefits, realities and challenges of technology, including through publicly available materials and courses. Engagement should extend to the diaspora, aimed at involving them in the digital transformation of their homes and communities. Some research is emerging in this area.⁴⁶

Case study

Mauritius launched its Citizen Support Portal in 2017. It allows citizens to submit ideas or concerns. Aiming to improve citizen-centricity, the portal is *“more than just a platform to address individual requests of citizens, [it] provides the Citizen Support Unit [with] a broader picture of the needs of the population. It therefore enables the Government to allocate resources more efficiently based on the different categories of complaints received in the different regions”* (Mauritius Citizen Support Portal). The portal was launched in an inclusive fashion, allowing citizens without connectivity or a device to submit requests to a local Citizens Advice Bureau.



Recommendations

Key opportunities to drive civic engagement in SIDS include:

- **Leverage existing civic engagement tools.** Many aspects of digital citizen engagement, including feedback platforms, problem reporting and crowdsourcing, have been developed by other governments and innovators. Often, they are freely available and open source. For example, the FixMyStreet platform allows citizens to report problems to local authorities. The Ushahidi crowdsourcing and mapping platform engages citizens on particular topics. Governments should avoid building these from scratch if they can reuse existing components or solutions.
- **Go where citizens are.** Digital provides a wide range of tools and channels to engage people. If citizens are active on a particular platform, governments should avoid asking them to engage through a different one. They should use channels that citizens prefer, including social media groups (see the section on ‘Digital Youth’ for details on a citizen engagement chatbot focused on channels favoured by young people in SIDS).

46 Navigating digital inclusion and the digital vā among Niue mamatua through the provision of mobile phones during COVID-19 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9902779/>

- **Close the feedback loop.** With digital, governments can build meaningful connections and dialogue with their citizens. There is an incredible opportunity to engage citizens in new and richer ways. Governments should avoid simply ‘broadcasting’ information, however, as is common in offline settings such as posters or mailings. Instead, they can leverage the two-way mechanism of digital to drive meaningful engagement, consultation and discussion.
- **Build the digital skills of civil society.** In many SIDS, civil society organizations are starting to explore digital tools and channels, including a presence on social media. Building the digital literacy of the leaders and staff of these organizations could improve the reach and quality of citizen engagement, including through digital tools such as customer (or citizen) relationship management systems, chatbots to connect to messaging platforms and some of the platforms discussed above. Improvements in literacy should extend to broader priorities such as cybersecurity and efforts tackling misinformation and disinformation, providing an opportunity for civil society organizations to improve broader population literacy on these topics.



DIGITAL PUBLIC INFRASTRUCTURE

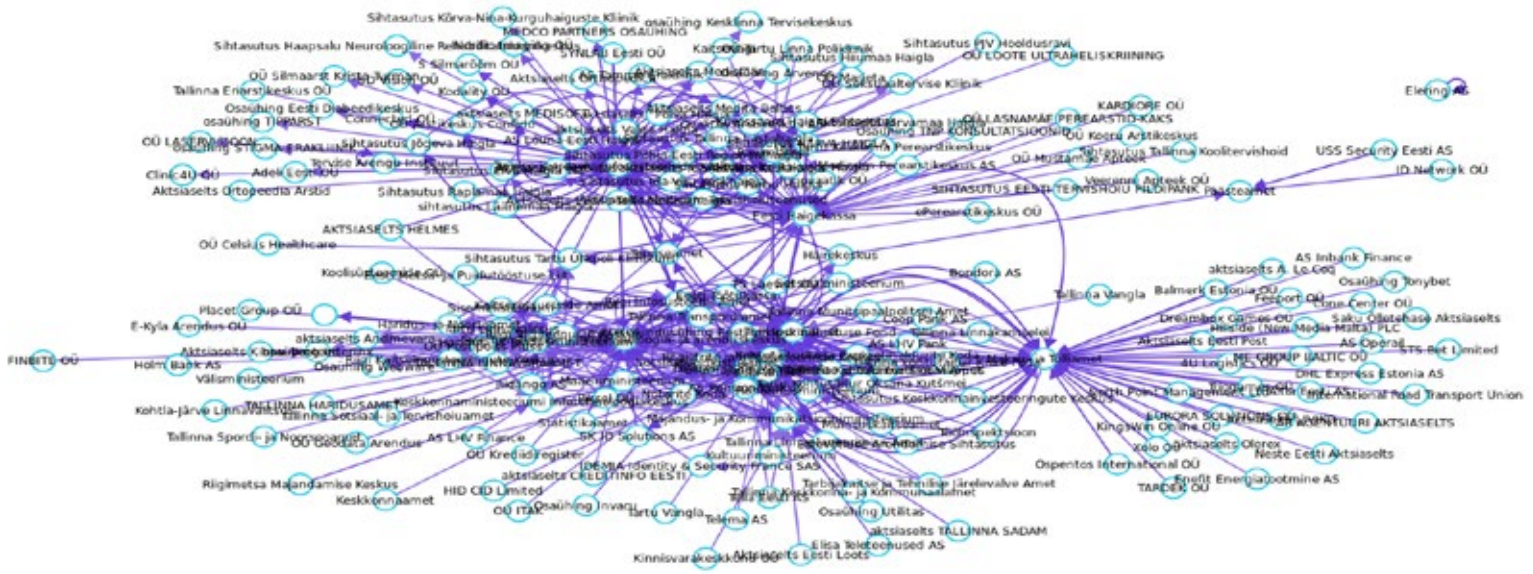
Although digital transformation is truly a whole-of-government and whole-of-society endeavour, it is also founded on and accelerated by a small number of digital catalysts. These are key products, services or systems that improve the functioning, inclusivity and sustainability of digital transformation. UNDP has identified three foundational digital ‘commons’ that have supported the digital development of countries around the world. First, digital transformation is driven by data, making data exchange a crucial component of a country’s digital progress. This comprises systems of open government data and canonical data registries. Second, data exchange is closely related to the need for a digital legal identity, covering the entire population to ensure participation in the digital—and broader—economy. This legal identity is often the unique identifier used in databases and other digital government components. Finally, a digital payment architecture is needed to drive government-to-person payments and to catalyse e-commerce and private sector digital efforts.

DATA EXCHANGE

Despite growing initiatives to improve data infrastructure, SIDS still struggle to operationalize open-data projects, systematize data collection and implement standards for public service data-sharing practices. Many SIDS governments are highly siloed. Data are not routinely shared among departments and agencies, and digital data exchange mechanisms are often lacking.

Interoperable data architecture facilitates the exchange of data among entities, enhancing the effectiveness of digital public services, many of which rely on similar citizen databases or require the same data. The absence of interoperable systems in many SIDS results in duplicated and overlapping databases and can undermine the user friendliness (and uptake) of digital public services. Most importantly, it unfairly places the burden on the citizen, requiring the public to repeatedly share the same data with different parts of government to mitigate the shortcomings of public sector digital architecture.

Better data-sharing procedures can improve government services and inform policymaking, providing greater understanding of how the public sector is (or is not) meeting the needs of the population. A culture of open data and data exchange also improves transparency. It can catalyse mutual partnerships with civil society and harness citizen science efforts to improve public well-being, and in doing so, reveal the potential of data and digitalization in transforming society. Open data can also be crucial catalysts for the private sector, leading to new data-based digital products and services.



The Estonia 'X-Road' data exchange layer

DIGITAL LEGAL IDENTITY

A unique digital legal identity is necessary to seamlessly access digital services. The identity can take different forms and include various personal data, such as an ID number, e-signature and biometric data such as fingerprints or facial scans. Most SIDS lack a standardized digital or analogue identifier that works across government and private sector databases and services. This presents a challenge to the development and functioning of e-government systems.

A reliable digital ID system relies on strong data protection and privacy, cybersecurity, electronic transactions legislation and strong population data, including birth certification. Currently, most SIDS governments lack capacity to implement a comprehensive digital ID system. They are constrained by funding, legislative and technical gaps, and a lack of technical expertise. Some SIDS are looking to digitize existing identity components, such as national ID cards, or are consolidating various identity documents and processes into a single identifier. But this can be a complex journey.

Additionally, low digital literacy, especially in vulnerable segments of the population, prevents the implementation and uptake of digital ID systems. Stakeholders in SIDS highlight a lack of trust, resistance to change, deficient digital infrastructure, personal data security and privacy concerns, and high technology costs as barriers to bringing all citizens into digital legal identity systems. Data protection, in particular, needs to be at the forefront of any national identity system to establish trust and ensure the inclusion of all citizens.

DIGITAL PAYMENTS

A digital payments ecosystem is crucial in enabling the benefits of e-commerce and financial inclusion. The ecosystem includes digital financial service providers and national and global enablers, such as platforms, agents, processors and a commitment to interoperability. The digital payments environment in SIDS is promising but still emerging. Formal financial inclusion and mobile money use tend to be low despite increasing mobile penetration rates. Some key barriers to digital payment tools include a lack of consumer trust, and low financial literacy and awareness of digital solutions. Some SIDS also lack technical components, such as payment gateways. Legislative foundations are missing in a number of SIDS.

Fintech innovation has been increasing, mainly driven via private sector investment, but high operating and transaction fees continue to constrain business and consumer usage. Many MSMEs lack the technology or technical literacy to process digital transactions. With cash payments remaining the predominant payment method in most SIDS, governments need to increase formal banking penetration rates, drive competition to increase the affordability of products and services, and conduct digital and financial literacy programmes.

Despite challenges, SIDS have an opportunity to build on the foundations of the digital economy to scale up the development of country-wide digital payment solutions. This will require strong public-private collaboration – from building foundational regulation and technologies, to catalysing fintech innovation. Expanding the reach of digital finance would also support SIDS in reaching financial and digital inclusion objectives. This requires governments to play active roles in increasing access and affordability through initiatives such as passing legislation for interoperability, facilitating the use of e-payment gateways, streamlining procedures for MSMEs to adopt local payment solutions, and encouraging payment operators to offer bundled services.





DIGITAL PUBLIC INFRASTRUCTURE

An emerging topic in digital development is digital public infrastructure. It is a toolkit of digital components, processes, standards and concepts to improve the roll-out, inclusion and impact of digital transformation. It includes a combination of networked open technology standards built in line with the public interest, an enabling governance and regulatory environment, and a community of innovative and competitive market players working to drive innovation, especially across public digital transformation.

More broadly, digital public infrastructure leverages digital public goods. These are open-source software, open data, open AI models, open standards and open content designed to improve lives and livelihoods. By design, they adhere to privacy and other applicable laws and best practices, do no harm and help to achieve the Sustainable Development Goals (SDGs). Digital public goods cover all 17 of the global goals, from digital solutions to improve data collection and analysis in rural areas to open-source and adaptable carbon registries.

Examples of these approaches were particularly visible during the COVID-19 response. In particular:

- **Jamaica** implemented a pair of digital public goods: CommCare to facilitate real-time monitoring of vaccine delivery and distribution, and DIVOC to provide digitally accessible vaccine certificates.
- **Mauritius** leveraged an open-source digital public good, OpenELIS, to provide crucial laboratory infrastructure to process COVID-19 testing and other biomedical samples. This approach, building on an existing solution, saved the Government more than \$1 million.⁴⁷

Digital public infrastructure allow other innovations to flourish. These building blocks can include digital identity platforms or digital payment systems, both of which can unlock new solutions such as to increase the inclusiveness of financial or public services.

47 How open source made a difference in Mauritius' pandemic response - <https://www.undp.org/policy-centre/singapore/blog/how-open-source-made-difference-mauritius-pandemic-response>

PRINCIPLES OF DIGITAL INCLUSION

At the heart of UNDP's digital inclusion framework are principles that steer digital transformation based on a whole-of-society approach. These principles apply across the five pillars of digital transformation discussed in this first section of this report. They can also be aggregated and explored as standalone priorities and categories. While it is currently difficult to measure some aspects quantitatively with existing data and methods, it will be important for SIDS governments to be both aspirational and ambitious in using these principles to enable better measurement and outcomes over time.

ENSURING UNIVERSAL ACCESS

The Internet and digital technologies are among the key drivers of social and economic benefits, such as by increasing access to essential services or employment opportunities. They can also enhance the functioning and transparency of governance and improve the delivery of digital public services. The principle of universal access to the Internet and digital technologies ensures that these benefits are shared by all. In some settings, this will require tackling digital divides related to socioeconomic factors, gender, geographical location, culture, skills, disability and demographic traits, among other dimensions.

PROTECTING HUMAN RIGHTS

Digital transformation can uphold human rights but also limit them. UNDP's inclusive digital transformation framework centres on the rights-based approach to development. This includes priorities such as the right to privacy, freedom of expression, equality and non-discrimination and freedom of association. The framework both directly supports human rights and creates an enabling environment so they can be upheld.

FOSTERING TRUST

Digital transformation can strengthen trust among citizens by enhancing transparency, accountability and efficiency in interactions among different entities. It can also empower citizens to transform their lives and livelihoods. Trust is also an important pre-condition for the adoption and use of digital technologies. Fostering strong individual and collective trust in all aspects of digital transformation must cover the use, creation and management of digital technologies and platforms.



SECTION 2

Digital standards for development

The UNDP Digital Standards provide guidance for UNDP teams on best practices in creating digital solutions for development. UNDP is sharing these publicly, edited lightly for brevity,⁴⁸ as they may help other digital teams and innovators think through the process. They may not work for every context or country, but SIDS governments and other digital actors may want to consider them when shaping digital development roles, building digital institutions, and developing digital products and services. The 10 standards here can be combined with local, national and other international standards and best practices, including the Principles for Digital Development⁴⁹.

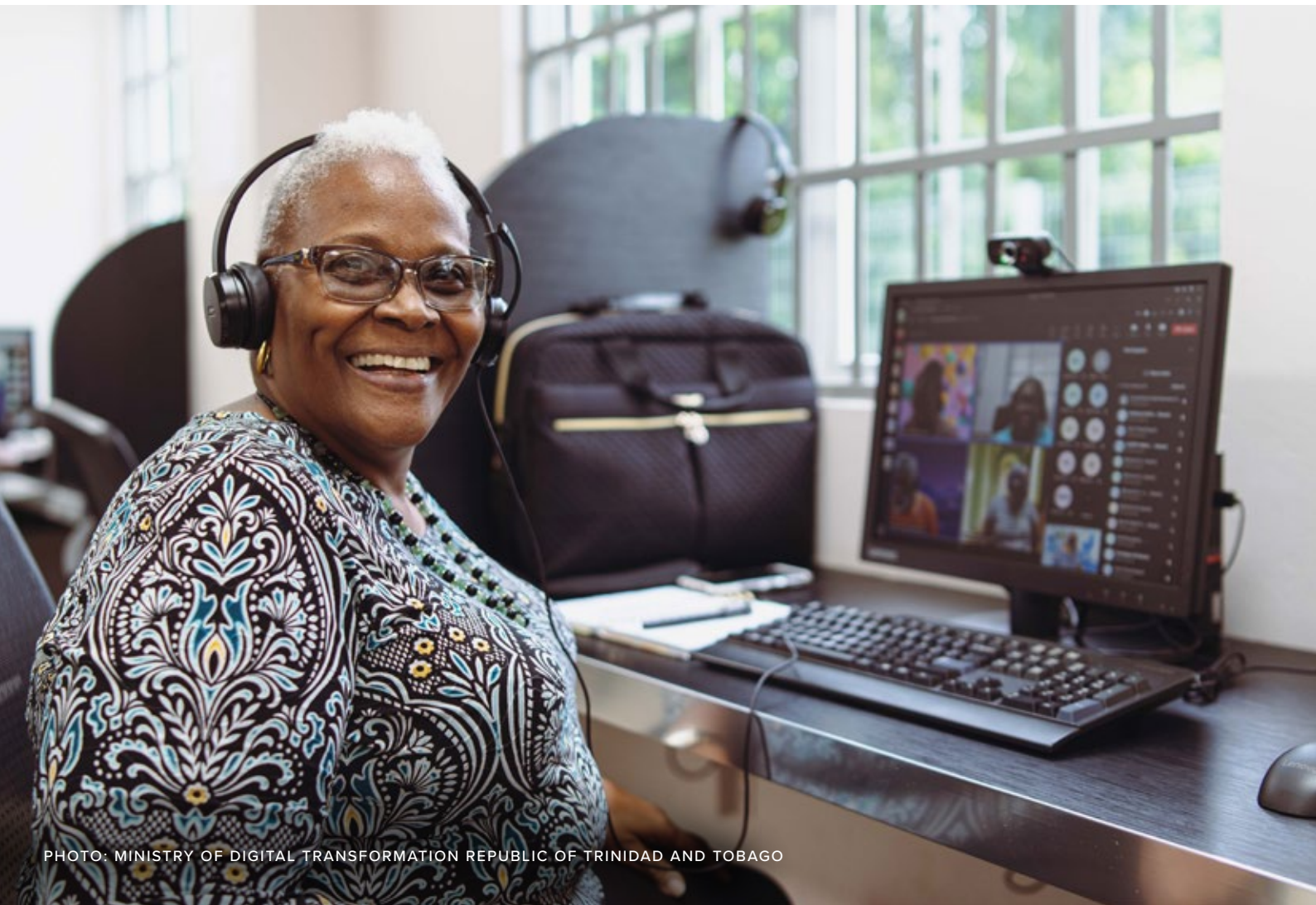
48 The full standards can be found here: <https://www.undp.org/digital/standards>.

49 See: <https://digitalprinciples.org/>

1. START WITH THE NEED

Building something that is not needed is the most significant risk in digital. Most technology start-ups and products fail. This is not because the technology does not work. It is because they have built something that people do not need or cannot use. By understanding the needs of real people, SIDS can ensure that they do not make this mistake, and more digital initiatives will have a real and lasting impact. Do not start with a solution or technology and then search for a way to use it. Start with a clear understanding of the challenge that you are looking to address.

Understand your intended user's needs, context and technology constraints. Only then should you focus on solutions that address the problem. There is no such thing as a perfect problem statement but there are definitely good and bad examples. A good problem statement should be clear, concise and specific. It should be achievable and relevant to your country, community or organization. A bad problem statement can be vague, overly ambitious or simply irrelevant.

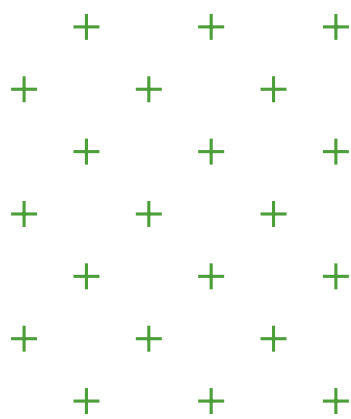


Do

- + Interview at least five people who directly experience the problem. Make sure your questions are not biased.
- + Experience the problem first-hand where possible.
- + Write a clear problem statement to frame the problem.
- + Use quantitative research, where possible, to measure the magnitude of a problem. This type of research can help you determine whether the problem you are trying to solve impacts enough people. If it does not, then you might need to rethink your approach.
- + Understand users' technology constraints (smartphone use, cost, availability of the Internet, digital literacy, network infrastructure, etc.).
- + Create user journeys that show how things are currently done.
- + List and prioritize the current pain points.
- + Review previously attempted solutions.
- + Explore co-creation wherever possible.

Don't

- × Build digital products or services without confirming real end-user needs.
- × Ask leading questions during interviews.
- × Rely purely on third-party research on the problem.
- × Start by writing a list of business requirements or system functionalities.
- × Start with technology in mind and look for a solution.
- × Let interviewees tell you the precise solution they need.
- × Only speak with proxies or representatives of those who experience the problem.
- × Only speak to people at the start. Understanding needs is an ongoing process.



2. BRIDGE THE DIGITAL DIVIDE

Digital solutions can bring positive changes and opportunities. Yet even with the best intentions, a solution could exclude certain people. To leave no one behind, it is vital to understand the barriers to accessing digital solutions. To build inclusive digital services, be intentional about tackling the digital divide and follow accessibility best practices. Be aware of your own bias, and how solutions co-created with people and communities help meet shared objectives. Understand who is affected by the digital divide and what barriers exist in your country and context.

Remember, the digital divide is not just about differing levels of Internet access. It also encompasses affordability, safety, access to devices and the availability of infrastructure, digital literacy and skills, social norms that inhibit some people from using digital solutions, and literacy and language barriers. No single digital solution can close the digital divide. Its causes are often complex and systemic and cannot be solved by technology alone. But SIDS digital solutions should exemplify how good design can help. Specify which barriers are most relevant to your goal and context—and plan to tackle them intentionally. Be ambitious, set targets and collect disaggregated data to measure how you are doing.



Do

- + Speak to people from groups more likely to be excluded.
- + Build for low literacy when possible by using visual signals and illustrative content instead of heavy text.
- + Observe real people using an early version of the solution to make sure it is accessible.
- + Consider barriers and pain points where users might be excluded and work out how to address them.
- + Look at examples of how similar digital solutions have excluded people—and why.
- + Research the digital divide and prioritize barriers most important in your context.
- + Create a plan to tackle the digital divide and set measurable targets proactively.
- + Regularly review if your solution is unintentionally excluding people, and make sure someone (usually the product owner) is accountable for addressing them.
- + Localize your application by translating it into local languages.
- + When working within the government, encourage a whole-of-government approach (instead of building for one sector or ministry only).

Don't

- × Design for yourself.
- × Assume the solution will work for everyone.
- × Continue without honest discussions about how you will address potential risks of exclusion.

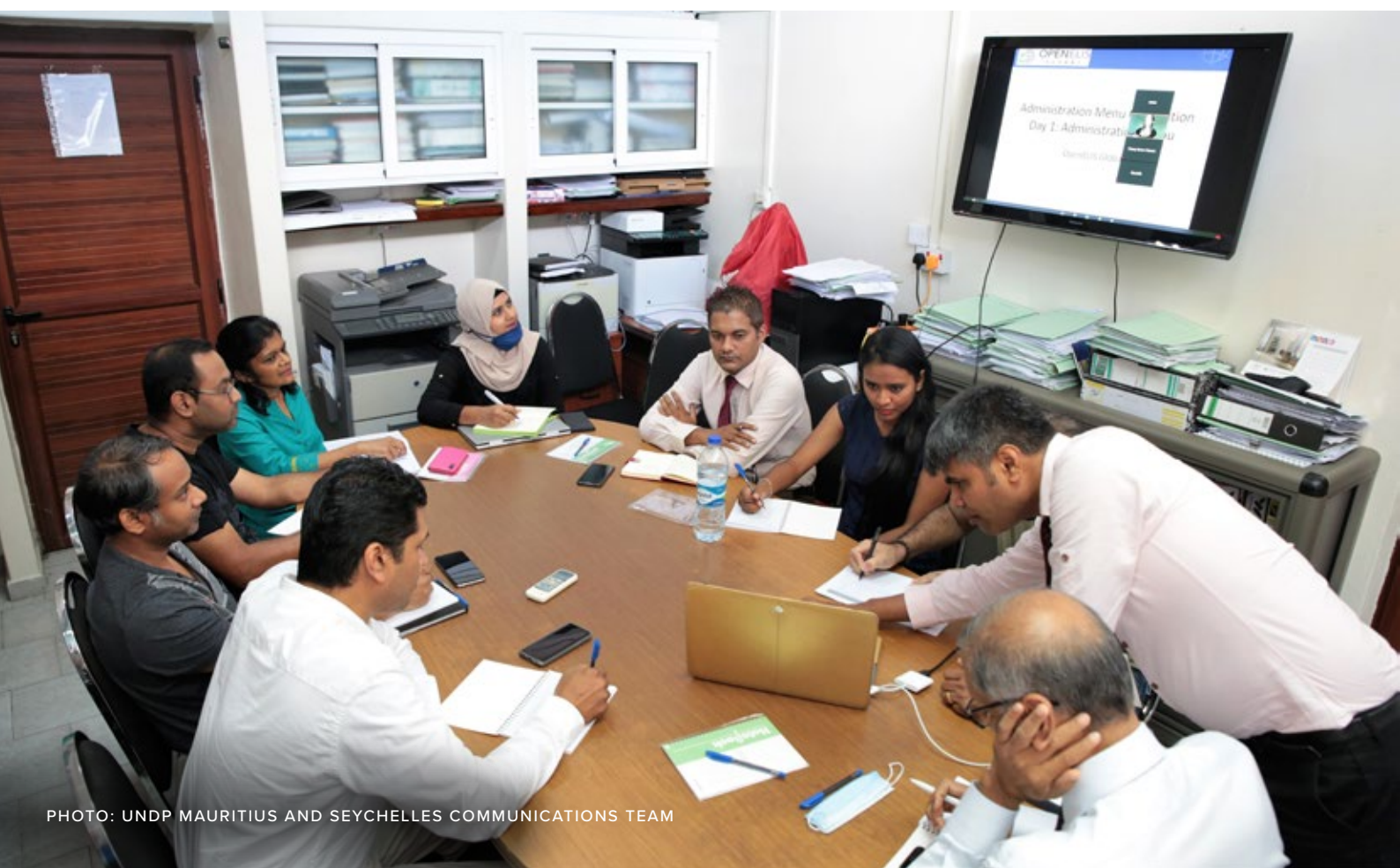


3.

TEST EARLY AND OFTEN

Testing reduces the risk of failure later on. Every product or service is built on a series of hypotheses and assumptions. The larger the assumption, the more likely it needs to be tested. For instance, testing can help determine if a product or service is desirable (Do users want this? Are we meeting their needs?), viable (Can we create enough value that people will use it? Can the solution exist in this context?) and feasible (Can it be built with available technology? Do we do this internally or with a partner?). Testing involves creating simple prototypes, such as a series of sketches or a design prototype made in a tool such as Figma. Prototyping tests ideas in real life instead of just describing solutions.

The feedback from testing prototypes can help you make better decisions about your product or service before embarking on the more time-consuming and expensive route of building it. The typical process is: Idea → Build → Launch → Learn. Prototypes can help skip the build and launch phases; you can go straight from Idea → Learn. Testing should then be done repeatedly in your project life cycle, since building a digital product or service needs continuous user feedback to keep it on track. Be prepared to be wrong. Stay open to changing your original plan based on feedback. If things do not work, iterate based on user feedback. Use this opportunity to prototype and learn!

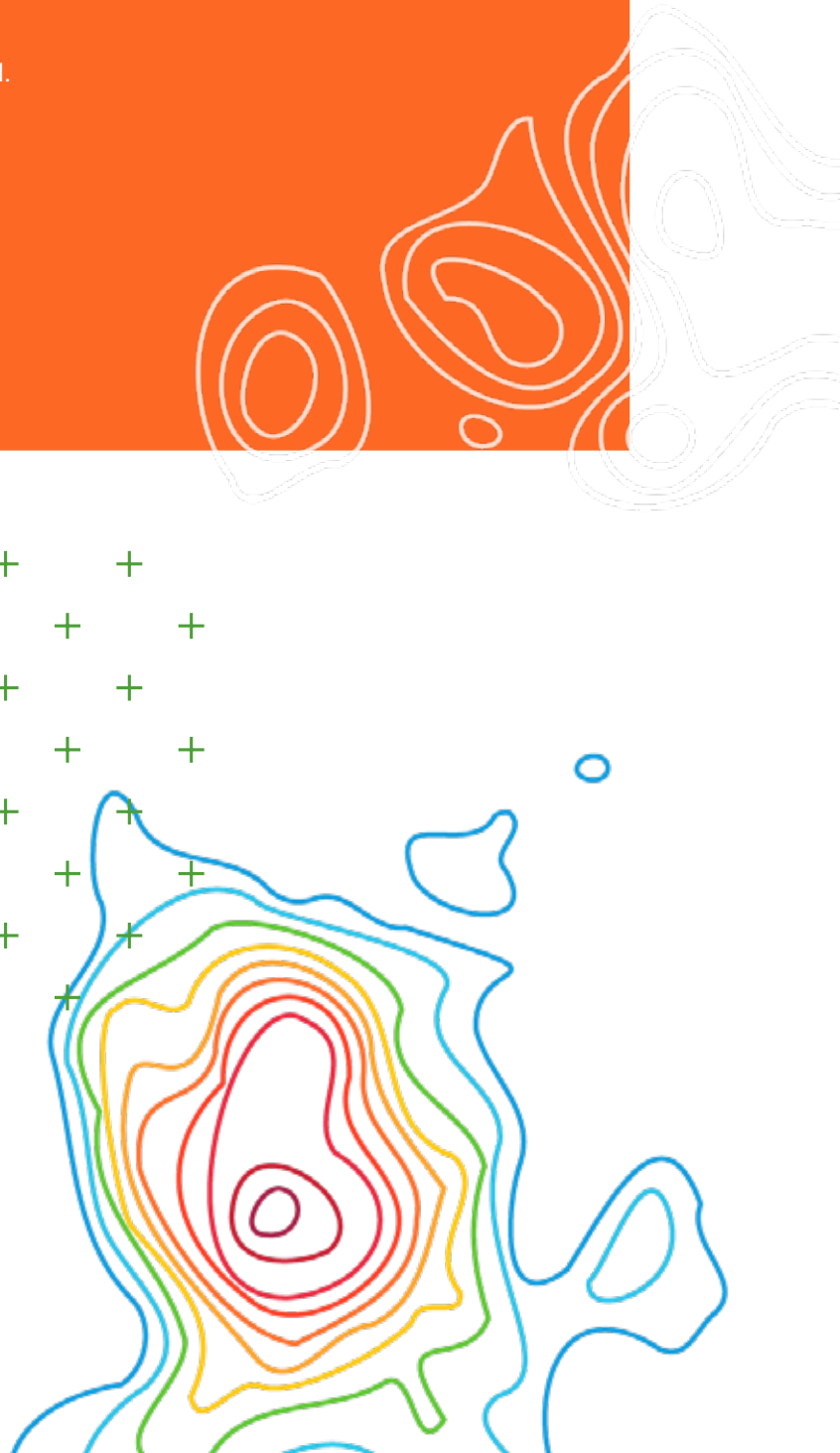


Do

- + Base your decisions on actual user data and feedback.
- + Create prototypes before building anything.
- + Gather feedback on early ideas from at least five users.
- + Create a list of your assumptions.
- + Test any existing solutions you plan to use to make sure they can be adapted.
- + Conduct usability testing to ensure you understand how the solution can be improved before, during and after going live (launch).
- + Start small and leave room to iterate and reevaluate decisions.

Don't

- × Base your decisions only on managerial opinions.
- × Ask leading questions during usability testing.
- × Test functionality without the users.
- × Over test: Focus on the most important parts of your solution.



4. (PERHAPS) DON'T BUILD IT

Most of the time, building something new is a mistake. Think: There is no need to 're-code' the wheel. The three options for any project:

1. Use an off-the-shelf platform.
2. Build on top of or use existing open-source platforms and digital public goods.
3. Build something new.

The quickest and most effective option is to buy an 'off-the-shelf' platform using the software-as-a-service model. You will not be able to change the code but you will be able to change settings to customize the platform. There will be no need to hire a technology team, and you can focus on roll-out and implementation. For example, Microsoft Teams is an off-the-shelf platform.

Beware: it is not an off-the-shelf product if it takes longer than two to three days to set up, and you have to speak to a human being before buying it.

Building on top of existing platforms generally means taking open-source components and editing the code to meet your requirements. The benefits are that you will be leveraging years of other people's experience and effort. You can have many small platforms working together instead of one giant system. You can launch products five to 10 times faster this way than by building something completely new. Many digital public goods are built in a modular way and will allow you to do this.

The third option is to build something new. Only consider this for smaller products or extensive opportunities where the solutions can be reused globally. The reason is that successfully making something new is incredibly difficult, time-consuming and expensive. To create a mature, scalable product or service, you'll need to ensure a team and budget are in place for a minimum of three years.

The critical question to ask yourself is: Can you get 70 to 90 percent of what you need for 10 to 20 percent of the effort? If so, do not build anything; try the other two options. There are exceptions, especially when building government solutions. Open-source and digital public goods may be favoured over off-the-shelf software-as-a-service solutions because of the nature of government data. But in general, the rule applies.

Do

- + Check if other people in the government (or other governments) have developed or procured a similar tool.
- + Check the UNDP Digital X Solutions Catalogue, DIAL catalogue and the Digital Public Goods Registry for similar solutions.
- + Check if readymade commercial solutions are available.
- + Review all three options and report on your findings.
- + Create a Lean Digital Impact Canvas.
- + Consult with technical experts.

Don't

- × Build it without first considering other options.
- × Get distracted by shiny technology.
- × Default to building from scratch. This should be the last consideration.



5. DO NO HARM

Digital technology can be an incredible force for good. But technologies are often developed without adequate consideration of potentially negative impacts. Technology is not neutral. Most has been built with inherent bias (because it is built by humans). It can therefore have unforeseen negative impacts on people and the planet.

The list of potential harms from digital technology is daunting, including the suppression of speech, privacy violations, data leaks and algorithmic discrimination. It is therefore your responsibility to integrate a human rights-based approach in all digital projects and effectively manage human rights risks associated with digital technologies. It is important to keep in mind that harm may not be immediately obvious. For instance, AI models built by averaging population data can side line marginalized communities and minorities, even as they are disproportionately subjected to the technology's impacts. If your AI data set is biased against a certain population, AI will integrate and perpetuate those biases.

It is important to think about *who* is going to use and interact with the technology as well as their motivations and goals. For example, an algorithm on social media that optimizes for engagement may as a by-product promote fake news or extremist political content, since users will react strongly and share this content more than content that does not enrage them. Map potential consequences and risks of a digital solution, including first-, second-, third- and fourth-order consequences, and plan mitigation measures.

Technology can improve our ability to live in ways that regenerate ecosystems and mitigate climate change. It is helping us to use less energy, produce cleaner energy, grow food in more sustainable ways, shift to circular models of production, have cleaner transport options, better monitor our impacts on the planet and easily share ways to do better. Yet technology can also cause harm to the planet, directly and indirectly. Among the biggest biggest direct environmental impacts are increased energy consumption and material mining and waste generation. To mitigate and prevent harms to the environment caused by technology, it is first important to understand how the technology actually works. What are the sources of energy? What is the life cycle of a product? How is waste managed? What might be additional consequences of introducing this technology to an environment or ecosystem?

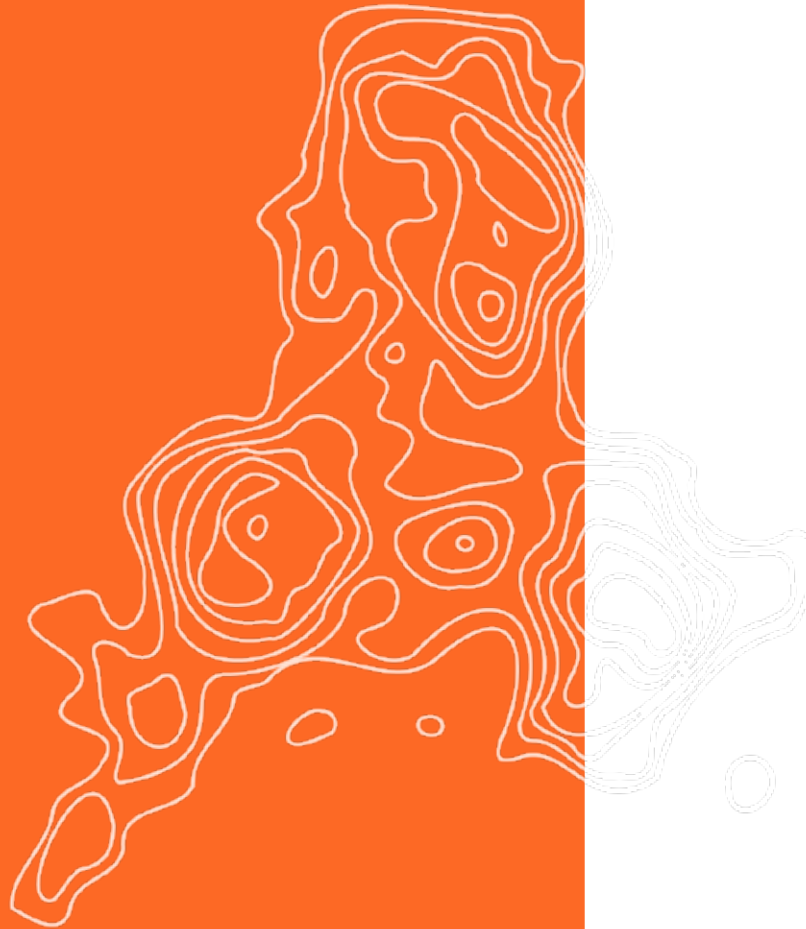


Do

- + Consider potential human rights impacts and take mitigation measures.
- + Consider potential harms for the planet and take mitigation risks.
- + Consider long-term consequences of your digital projects.
- + Think carefully about how you present choices (especially default choices) in any technology solution and user interface.
- + Make sure that you follow data principles when collecting data from users.
- + Map out the potential first-, second-, third- and fourth-order potential impacts of implementing any solution, and look for ways that technology could do harm to different populations, environments or ecosystems. Make sure you consider the whole life cycle of any solution, including energy and material use and disposal.
- + Have a fresh pair of eyes (ideally someone who is not involved in the project) to check for biases and assumptions as well as what could possibly go wrong.
- + Be aware of biases in data sets and technology that you feed into your projects.
- + Understand the political environment and cultural context in which your product will be launched and use this understanding to map social risks.
- + Define mitigation strategies and protection mechanisms for the identified potential harm.
- + Make sure you have a good understanding of the context your design will be part of and the power dynamics at play within it.
- + Read the *Ledger of Harms* by the Center for Human Technology.⁵⁰ This will provide you with an understanding of how technology has a certain degree of agency, and unintended consequences can often outweigh the original intended goals.

Don't

- × Assume technology is neutral.
- × Make technology choices that would reinforce stereotypes or any form of discrimination.
- × Optimize for only one goal; ensure you understand the potential knock-on implications for the ecosystem in which your solution will operate.
- × Assume the government or partners prioritize the best interests of their populations.
- × Assume a technology is 'green' even if it is sold as such.



50 See: <https://ledger.humanetech.com/>

6. FORM THE RIGHT TEAM

Launching a digital product requires diverse skill sets. These include software engineering, user research, UX (user experience) and UI (user interface) design, product and project management, and sector, industry, and issue-specific knowledge. At a minimum, three core skill sets are required for any project.

- **Designer:** someone who understands the problem and can design a solution. This is about designing how something works, and not just what it will look like.
- **Developer:** someone who builds solutions and understands technology.
- **Project manager:** someone who manages stakeholders and keeps things on track.

For digital public services, policy and other experts would be included in this initial list. Some of the above skill sets are scarce in some SIDS contexts. Where possible, work with local digital practitioners and vendors to support the local digital ecosystem. Build relationships and partnerships with local universities, accelerators and boot camps. You should only start to build the team once you fully understand the problem and the proposed solution. Otherwise, skill sets may not align with the problem you are trying to solve. When creating a team, aim to include individuals with similar lived experiences and organizations that have solved similar challenges before. This will ensure alignment and inclusion in your solutions. You can leverage this experience to build better products, faster.



Do

- + Understand the expertise you need.
- + Map skill sets you have in your team.
- + Include people with lived experiences.
- + Interview vendors before contracting them.
- + Meet with vendors regularly.
- + Ensure vendors continuously share insights and research that support decision-making.
- + Ensure sufficient internal capacity is in place to manage the work.

Don't

- × Outsource project management—take full ownership and responsibility.
- × Hire a vendor just based on their proposal—meet and speak with them.
- × Engage designers just to make something pretty.
- × Hire a vendor with a few milestones and wait until they deliver the final product.



7. MEASURE WHAT MATTERS

Every project needs a clear, upfront definition of success and failure. This means attaching numbers to measurable outcomes. You can then implement changes to move a project towards success. The ideal scenario is where an analytics platform automatically gathers numbers from your product. Examples of numbers are how many daily, weekly or monthly active users you have (and what 'active' means), and how many 'outcomes' are achieved where value is created for the person using the product. Think about the cost per outcome. For a telemedicine product, you would want to know the cost per virtual consultation. This is the number of virtual consultations divided by the total costs of launching and maintaining the platform.

Stay away from vanity metrics. These metrics make the project look good but do not shape future strategies. Page views and downloads are examples of vanity metrics. You can measure and track them but they are not success metrics. Think of the steps required to give users value from the platform. Track the number of people that reach each step and how many drop off compared to how many continue to the next step. You can use these metrics to fix usability issues in your product. Measuring product usage allows you to correct bias and blind spots. There is often a big difference between what users will say to you compared to what they do on the product.

Measuring the performance of a digital solution is an integral part of improving it. Measuring continuous improvement requires a shift in mindset. Rather than only thinking about long-term programme outcomes, you will need to gather short-term, immediate insights using analytics and qualitative insights. These insights will guide your decision-making. This can also help when working with and managing vendors and implementers. Technology solutions are intended to drive development outcomes. Keep your programme outcomes at the forefront as you contemplate, guide the development of and implement digital solutions.

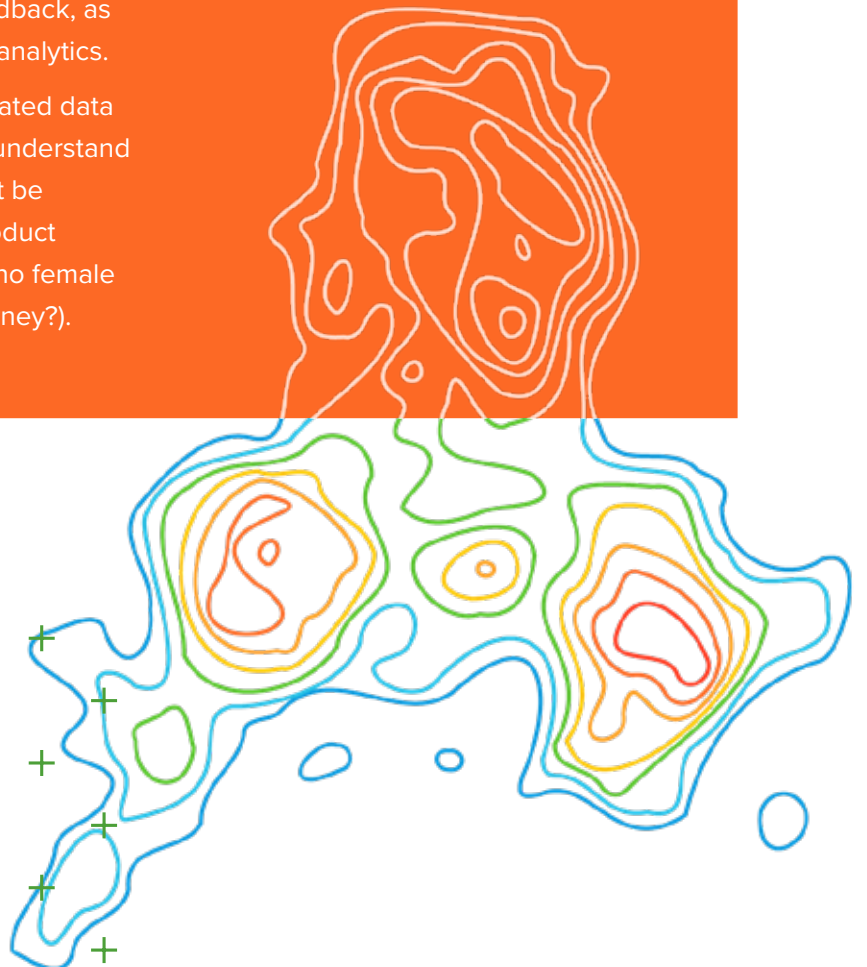
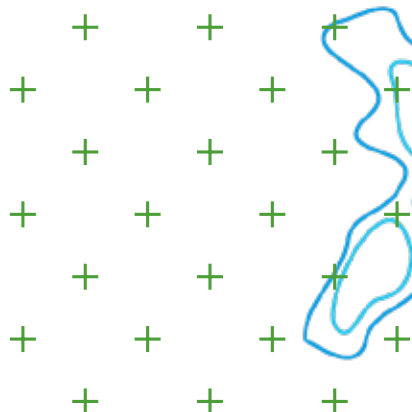


Do

- + Track the number of users, their gender and level of engagement, whenever possible.
- + Install analytics (e.g., Google Analytics) if you have a web or mobile component.
- + Feed data into a dashboard automatically.
- + Collect data on product crashes or outages.
- + Define your success metrics before launch.
- + Check your metrics and course correct your product or service regularly.
- + Use data to make informed design and business decisions.
- + Establish feedback loops using qualitative insights developed through ongoing testing and user feedback, as well as web and programme analytics.
- + Track metrics from disaggregated data (while respecting privacy) to understand where the digital divide might be showing up (i.e., does the product work well for male users but no female users are completing the journey?).

Don't

- × Build your own data or metrics platform from scratch.
- × Leave monitoring and evaluation until the end of the development cycle; instead, think about it from the beginning
- × Only measure vanity metrics or technology performance. Make sure you focus on impact as well.



8. FOLLOW DATA PRINCIPLES

Organizations must uphold the highest technical, ethical and other standards when protecting data. The critical risks with data collection are:

- Security issues and vulnerabilities that leak data to malicious third parties
- Collecting unnecessary personal data
- Oversharing collected data with authorized third parties
- Breaking local privacy laws

Organizations should manage data responsibly and effectively through the data life cycle, from collection to sharing, to maximize their value. They should work with data experts to limit the collection of personally identifiable data and manage storage, and be clear about who owns data; who can access and manage them; what data can and cannot be used for; where, how and with whom they will be shared; and how data will be collected continuously. Assume your product has security issues, and work with cybersecurity experts to embed privacy and security in the design and audit of the final code and infrastructure.



Do

- + Have a third-party security audit on your product.
- + Refer to local data guiderails, principles or policies, and ensure that the process aligns with the policy and procedures available on data privacy and information classification.
- + Minimize the collection of private data.
- + Where possible, leverage existing data sets to avoid collecting information that already exists.
- + Get specific consent from users, and ensure that they know what data you are collecting and how they will be used.
- + Plan for reusability and interoperability through using standards.
- + Allow users to request to delete their data entirely.

Don't

- × Start capturing data without defining its ownership, management and use.
- × Capture personal information and data without user consent.
- × Share personally identifiable information with third parties without user consent.



9. DEFAULT TO OPEN

Building solutions ‘in the open’ allows for better collaboration and reduces silos. This applies both to the methodologies of the work and the digital solutions we use and build. Make your project open-source and use open-source components when possible. Publish your project code to Github and make it public after validating that it can be shared. This allows other country offices and projects to leverage and build upon your work. Key digital products can be turned into digital public goods and used by other governments. Be careful when sharing data, however. Ensure that you are not oversharing or providing personally identifiable information to third parties. Write about your key learnings to help others, and publish both a road map (your plans for the future of the product or service) and release notes (the monthly changes to your product or service).

Before you build something, check the Digital Public Goods Advisory website for solutions. Digital public goods are software, data sets, AI models, standards and content that are free to use and contribute to sustainable international digital development. This will help encourage reuse and interoperability. Where possible, provide open APIs (application programming interfaces) to allow others to integrate into your platform and leverage your data and features to build upon your work. When building or implementing in a government, make sure the solution is interoperable with other government systems (and, where applicable, those of the private sector) to help build digital public infrastructure.

Do

- + Publish a public road map.
- + Publish release notes.
- + Check if a similar tool already exists in the DIAL Catalogue, the Digital Public Goods Catalogue, the UNDP Digital X Catalogue or the country or context in which you work.
- + Apply an open-source code license to your code and make it freely available.
- + Publish your code to a Github repository.
- + Where possible, turn your solution into a digital public good.
- + Write about what you learn.

Don't

- × Share encryption or private keys in your code.
- × Work in secret.
- × Use closed tools when there are good open-source alternatives.



10.

PLAN FOR THE LONG TERM

Before you start a project, consider two key issues:

1. The plan for maintaining your product
2. The plan for engaging the user who will use the product

First, the cost of maintaining and improving a digital product will be significantly higher than building the initial version. Digital products need continuous maintenance and must provide a reliable service to end users. There may be technical bugs (errors in the code) to fix, underlining software libraries to update, and hosting/licensing fees for the website, app or platform. On top of technical updates, end-user needs will change so their feedback needs to be implemented. This is why we advise only building products from scratch if necessary.

Ensure clarity in long-term roles and responsibilities. Who will fund the solution? Who will maintain it? How will it scale? Who is allowed to reuse it? How will data be used or shared – including identifying success factors? How will end-user feedback be continuously gathered and implemented?

If a partner organization will manage the product in the long term, this requires clear documentation and a handover guide and plan. Only providing the source code, servers, access information and vendor details is insufficient. A handover guide needs to detail the critical processes required to run the product daily. Ideally, the documentation should be clear enough that little or even no communication should be necessary on an ongoing basis.

When considering longer-term funding, the costs to run the product are typically subdivided into maintenance, hosting/data storage costs and licensing fees. Ensure that there are precise projections for these costs for the next two to three years so you understand the funding requirements. You may need to consider if there is a business model that can be created around your product. In addition, if your product is open-sourced, and you work to replicate it in new countries and/or settings, you may consider if the government should be the long-term product steward or the product should be handed over to another entity (e.g., a foundation, university or social enterprise) as the legal guardian, funder and centre of operations and maintenance.

Second, creating a digital product or service is not enough; you need to ensure that end users adopt it.

This requires a robust user-engagement plan that includes how users will discover, adopt and use the product. This can be a digital engagement plan, a change management plan or a communication campaign.

The onboarding process and first-time user experience are fundamental to ensuring that users do not try your product once, have a bad experience and then never use it again. To prevent problems for first-time users, you need to design an onboarding process, trigger word-of-mouth referrals and optimize user acquisition, engagement and retention. With these considerations in mind, you can create products that are not just successful but also sustainable over time.

The best strategy to enable word-of-mouth referrals is to solve a specific problem really well. But word-of-mouth is not a strategy that you can rely on. You need to have a plan that assumes word-of-mouth will not work and find a way to reach your target audience regardless.

User acquisition, engagement and retention need to be part of product development from the start. This requires a specific set of skills (you may need to hire people with these skills). Be clear about who will design and implement the engagement strategy. The cost and time to inform and engage end users are likely more than you think.

One key element of developing digital products or services is building strong relationships with users at *all* stages of the development process. You must have a proactive approach to ensuring users get the most value from your product or service. This involves working with users to help them achieve their desired outcomes using your product. It could include providing training, offering best practices or simply being available to answer questions. Customer success needs to be built into your product development process from the start.



Do

- + Store code in a Github repository.
- + Ensure software code is documented.
- + Check the skills that exist locally to maintain the tool in the long term and support digital ecosystems.
- + Think about interoperability from the start.
- + Ensure you have budgeted for a minimum six-month maintenance period.
- + Make documentation available online, not as an email attachment.
- + Clarify roles and responsibilities with vendors and implementing partners for ownership.
- + Clarify roles and responsibilities with institutional partners for ownership.
- + Design and implement a user-engagement plan from the start of product development and remember to adapt your plan often.
- + Plan for time and budget for the user engagement plan.
- + Have clear goals for the number of users who will use your product or service.
- + Have a clear budget for growing your product or service.
- + Track your cost per user acquisition for each growth channel.
- + Consider the longer-term business model of the product.

Don't

- × Leave handover planning for later.
- × Hand over a solution to a partner without a clear capacity-building plan.
- × Build it if there are tested solutions available to use.
- × Store access passwords and documentation in emails.
- × Be reliant on one vendor to improve or update your digital solution in future.
- × Assume that people will use your product just because it is a piece of great technology.
- × Rely only on word-of-mouth as a strategy.
- × Leave an engagement plan for the end of the project.







SECTION 3

Deep-dive: data in SIDS

Data have been called the ‘new oil’, sand, gold, currency, water—and everything in between. Often these assertions do not reflect the realities of making data valuable for national development. For SIDS, data play key roles in supporting the structural, financial and technological transformation necessary to realize the 2030 Agenda, to build upon the SAMOA Pathway, and to enable the Paris Agreement. Data are crucial tools for SIDS to thrive and survive. Their remoteness renders infrastructure optimization more complex, supply chain challenges more pervasive, and climate resilience through monitoring and data-driven mitigation more urgent.



SIDS FACE CHALLENGES IN THE DISCOVERY, ACCESS, ANALYSIS AND INTERPRETATION OF DEVELOPMENT DATA

Although many SIDS have started to engage with data and data-driven decision-making, important gaps exist. These range from foundational data literacy to analyse, model and draw data insights to gaps in underlying technical infrastructure. Limitations in technical capacity,⁵¹ including in shaping data and research ecosystems, in particular, continue to limit the full potential of data in SIDS. Globally, less than 20 percent of low- and middle- income countries have modern data infrastructure, such as co-located data centres and direct access to cloud computing facilities.⁵²

Foundational data infrastructure is crucial in enabling the sharing of innovations and learning among and within SIDS. Scalability, interoperability, security and sustainability are all similarly critical in ensuring that data contribute to sustainable development, especially through partnerships among governments, the private sector and civil society. Decision-makers need to be well informed of the resources and road maps required to shape high-quality data collection infrastructure and its relevance in decision-making.

Support to SIDS should be focused on strengthening financial, technical and human resources and developing ministry-specific capacity-building action plans to improve data infrastructure. This support can help to strengthen government capacity for data creation, processing, administration and dissemination. A particular priority should also be to accelerate support to develop the capacity of national statistical offices, which are essential actors in making data useful for national development and bringing data into the policymaking process. New and innovative tools and data products can support national statistical offices to work more effectively and efficiently.

51 Review of the Scientific and Institutional Capacity of Small Island Developing States in Support of a Bottom-up Approach to Achieve Sustainable Development Goal 14 Targets - <https://www.mdpi.com/2673-1924/1/3/9>

52 World Bank, World Development Report 2021: Data for Better Lives - <https://www.worldbank.org/en/publication/wdr2021>

DATA GAPS LIMIT RESPONSES TO THE CLIMATE CRISIS

SIDS face several constraints in leveraging data to drive national priorities, including data gaps due to inherent data collection challenges across remote and diverse geographies; their smaller sizes, leading to exclusion from global data indices; and limitations in data infrastructure. The low availability of data on issues such as climate, governance and socioeconomic priorities limits policymaking and other responses. A lack of subnational or more granular data, needed for evaluating interregional variability and the needs of vulnerable groups, limits capacities to design targeted approaches to key development challenges.

Insufficient canonical data (and associated data components, such as registries), an absence of collated data from ministries as well as difficulties in obtaining updated information create gaps in foundational data infrastructure. Governments can help to address these challenges by placing data at the centre of development agendas. For example, the Government of Aruba has institutionalized the National SDG Commission, creating a knowledge management ecosystem that localizes the SDGs and anchors them in a national framework to deliver on local and global priorities.⁵³

Global, regional and national efforts to measure and collect data on SIDS' vulnerabilities, especially the impact of climate change, are essential for improving access to finance to support SIDS in achieving their climate ambitions. Recognizing this, development partners must considerably increase and simplify access to climate financing for ocean and coastal climate monitoring and research, risk assessment, and mitigation and adaptation efforts. Data-driven climate observation facilities, for example, can strengthen SIDS' weather and climate observations, improve early warning systems, guide measures to protect livelihoods and enhance climate adaptation for long-term resilience through the sustained collection and international exchange of weather and climate insights.



53 See: https://www.government.aw/news/news_47033/item/the-government-underscores-the-importance-of-a-robust-framework-of-indicators-for-moving-towards-sustainable-development_59434.html

OPEN DATA ARE A CATALYST FOR THE DIGITAL ECONOMY IN SIDS

Open data are a foundation for the digital economy in SIDS, including in supporting the public and private sectors and civil society to build products and services that meet people's needs. Many SIDS are still devising the policies, infrastructure and broader frameworks to drive open data within their countries. Data could be an incredibly valuable resource for national development once countries overcome technical and regulatory hurdles.

Foundational data infrastructure is particularly important accessing and sharing data, from canonical data registries, to API policies and infrastructure enabling data exchanges among ministries and departments, to mechanisms to mandate or otherwise require governments to share data publicly. Infrastructure efforts include national open-data portals such as those found in Jamaica⁵⁴ and Papua New Guinea,⁵⁵ spatial data infrastructure and data communities. Open-data standards play a crucial role in making data accessible and fostering data communities within SIDS.

SIDS have tackled data challenges and worked to avoid becoming siloed 'data islands'. They are shaping data communities through digital tools, open-data platforms, capacity-building workshops, training curricula and financing mechanisms. Since SIDS can face challenges in achieving economies of scale, data science and automation tools can be powerful assets, but they need to be complemented by open-data initiatives and data infrastructure. The latter includes the above mandates and incentives and data privacy and security protections to safeguard the rights of individuals.



54 Jamaica's Open Data Catalog - <https://data.gov.jm/>

55 Papua New Guinea Environment Data Portal - <https://png-data.sprep.org/>

BUILDING GEOSPATIAL DATA CAPACITY COULD IMPROVE USE OF MARINE EXCLUSIVE ECONOMIC ZONES

As geospatial data improves in resolution, accuracy, coverage and access, it should become an increasingly central part of policymaking and the development agenda. One defining feature of SIDS is their small land area, but they are increasingly considered large ocean States⁵⁶ due to their vast exclusive economic zones. The size and scale of these environments can render traditional data monitoring and surveillance methods ineffective, however. SIDS face challenges with scarce baseline information for training or validating models and research studies, topographic and thematic invisibility⁵⁷ due to their size and remoteness, and difficulties in building geospatial skills and sourcing key tools and hardware.

Tackling these issues and leveraging the power of geospatial data will require SIDS to shape 'marine spatial data infrastructure'.⁵⁸ This entails a comprehensive set of tools and processes to collect, analyse and use marine data, including those related to bathymetry, geology, blue economy infrastructure, marine ecosystems, climate and oceanography. Satellite and sensor-data can be important components. Insights gained can be complemented with 'on-the-ground' data collection to deepen insights and understanding. Participatory mapping is an essential method for integrating local and traditional knowledge into SIDS' decision-making processes, especially related to the governance of ocean and land resources and ecosystem services.

By harnessing geospatial data and creating policies that support innovative and accessible digitalization, SIDS can visualize and engage with complex and interconnected challenges and opportunities. For example, some countries are stewards of dense irrecoverable carbon ecosystems⁵⁹ that are essential for the protection of ecological systems. Others have considerable global potential for marine aquaculture,⁶⁰ far exceeding global foreseeable seafood demand. Optimizing these development opportunities requires data analytics capacity at the regional and subregional levels. There is scope for shared learning, with many SIDS engaging in this area. Vanuatu has implemented a National Geospatial Data Policy.⁶¹

56 IISD, Small Islands, Large Oceans: Voices on the Frontlines of Climate Change - <https://www.iisd.org/system/files/2021-03/still-one-earth-SIDS.pdf>

57 Topographic and thematic (in)visibility of Small Island Developing States in a world map - <https://www.tandfonline.com/doi/full/10.1080/17445647.2020.1736194>

58 ESRI, Marine Spatial Data Infrastructure - <https://www.esri.com/en-us/industries/national-maritime-hydrography/strategies/marine-spatial-data-infrastructure>

59 See: <https://www.conservation.org/press-releases/2021/11/18/study-pinpoints-the-places-humanity-must-protect-or-face-climate-doom>

60 Nature, Mapping the global potential for marine aquaculture - <https://www.nature.com/articles/s41559-017-0257-9>

61 Vanuatu National Geospatial Data Policy - https://www.nab.vu/sites/default/files/documents/The_National_Geospatial_Data_Policy_2020-2030.pdf

ARTIFICIAL INTELLIGENCE COULD BE A VALUABLE TOOL FOR ENHANCING SIDS' DATA LEADERSHIP

There is significant potential to explore AI and associated processes such as machine learning. Realizing these opportunities requires increased and inclusive investment to address limitations in data infrastructure. Some SIDS are already exploring AI tools in areas such as fishery and coral reef management, ocean pollution clean-up, and socioeconomic and environmental assessments. For example, the BlueBot Project⁶² in Barbados uses underwater robots supported by AI to monitor coral reefs. A number of SIDS in the Pacific have used the AI-driven Digital Earth Pacific⁶³ initiative to assess responses to extreme weather events.

The intersection of geospatial intelligence and machine learning has emerged as a key area of innovation for SIDS as they continue to lead the world in climate-related action and advocacy. In Fiji, the Commonsensing Project⁶⁴ is using satellite data to analyse and evaluate baseline conditions and to measure climate-related changes over time in aspects such as deforestation, sea-level rise, flooding, land degradation, fisheries, coastal protection and food security. Similarly, the Pacific Islands Passive Acoustic Network⁶⁵ uses an index and machine learning to automate surveys of marine habitats for changes in biodiversity. Machine learning techniques such as fully convolutional neural networks, logistic regression, linear support vector machines and the Naïve Bayes classifier have all been explored in analysis of satellite images to identify deforestation in the Caribbean⁶⁶.

Innovations in cloud technologies, machine learning and analytic techniques offer enormous potential but must be matched by local technical capacity-building as well as a larger analysis of the threats and challenges that accompany any AI endeavour. SIDS, with their strong commitment to sustainable development, can be champions of interpretable, and expert and validated machine learning and AI systems to support various aspects of their development. This will require increased data availability and transparency, particularly high-quality administrative data. Policy and other efforts will also be important in mitigating the challenges and risks of AI, including approaches such as reskilling and engaging with the new roles, sectors and opportunities that AI could create.

62 See: <https://thebluealliance.org/project-bluebot/>

63 See: <https://www.spc.int/updates/blog/partners/2022/03/vulnerable-pacific-islands-look-to-data-to-cope-with-disasters-and>

64 See: <https://www.globalissues.org/news/2021/09/10/28720>

65 See: <https://www.fisheries.noaa.gov/pacific-islands/population-assessments/passive-acoustics-pacific-islands>

66 See: https://lab.tt/wp-content/uploads/2021/11/12_IDSTA2021_RC_16-compressed.pdf

LOOKING FORWARD

There has been considerable innovation in data science, geospatial intelligence, AI and digital more broadly in recent years. Data costs have fallen. Potentially powerful tools such as Large Language Models are increasingly available. SIDS could be leaders of this digital and data era, given their agility, strong political and senior engagement with these topics, and imperative for innovation due to inherent vulnerabilities. Such leadership will require improved data availability, digital and data literacy and digital infrastructure. A participatory approach will be needed to ensure that all types of data drive policies. As stewards of the ocean, local communities have seen their coastlines change over a lifetime and possess valuable knowledge about the local environment. This needs to be a crucial datapoint in the journey forward. Combining indigenous and expert knowledge on critical global issues such as climate change with the considerable potential of emerging technologies could make a powerful and unique contribution.





THE UNDP DATA PLATFORM FOR SIDS



The UNDP Data Platform for Small Island Developing States 67 is a freely available digital tool for accelerating development in SIDS. It provides policymakers, research institutions and development partners with access to updated, standardized and comprehensive data on SIDS. These include country-level indicators, geospatial data and data on the UNDP portfolio of projects and investments across the SAMOA Pathway priorities and SDGs. Over 4,000 country-level indicators have been compiled from more than 20 databases and research studies, and presented alongside analytic tools, country profiles and the customizable Multidimensional Vulnerability Index.

The geospatial data portal on the platform features over 80 research studies and databases, with custom interfaces and visualizations and analytical tools in four languages. These allow users to discover, access and export data. Machine learning models have been developed to allow socioeconomic and environmental analyses, through interactive interfaces, so users can test different data modelling approaches for mitigating data gaps.

The UNDP Data Platform for SIDS was launched in late 2022 at the global climate talks. It was lauded as an innovative solution in addressing key data gaps in SIDS and as a step towards more robust data infrastructure to strengthen national and regional data systems. The platform was identified as a priority in a UN General Assembly resolution⁶⁸ on the follow-up to and implementation of the SAMOA Pathway and the Mauritius Strategy.

67 UNDP SIDS Data Platform - <https://data.undp.org/sids/>

68 A/RES/77/245: Follow-up to and implementation of the SIDS Accelerated Modalities of Action (SAMOA) Pathway and the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States







SECTION 4

Deep-dive: digital youth in SIDS

Young people drive the digital and technological age. They are uniquely positioned, with skills and motivation, to leverage digital technologies for the benefit of their own lives and for the good of their countries. This is particularly the case in SIDS, where young people comprise nearly a fifth of the population, and in some countries, almost a quarter. Many young people in SIDS are excited by and actively engaging with the benefits of technology. They are starting new businesses and exploring new opportunities, learning new knowledge and skills, and building global connections. But challenges remain. Sustainable and accessible digital infrastructure is not present in many countries. There are concerns related to online harassment and cybercrime. A significant proportion of young people do not think that they have the necessary skills to meaningfully participate in the digital economy, compounding the challenges of sizeable youth unemployment in some SIDS.

YOUNG PEOPLE ARE LEADING THE EXPLORATION AND IMPLEMENTATION OF DIGITAL IN MANY SIDS

Young people in SIDS are using digital tools and technologies to become creators, innovators, entrepreneurs, community leaders, friends and civic participants. They are using digital to explore new business opportunities and new ways of connecting and communicating. They see digital as playing an important role in their lives – with around 80 per cent of young people surveyed in SIDS seeing digital as a tool that has a positive impact on their life.

More specifically, young people are especially engaged with the potential of digital for:

- **Advancement** — using digital to provide knowledge, communication and opportunities to support development and innovation in their countries and for themselves.
- **Connectivity** — creating new ways to connect with friends, family and opportunities around the world, which is particularly valued in the context of island living.
- **Efficiency** — leveraging digital to increase the speed and success of carrying out daily tasks on personal and professional levels.

Young people also recognise the important role that digital can play in addressing the development challenges specific to smaller countries. This includes the usefulness of digital technologies in improving local agricultural production, supporting disaster risk reduction efforts, and improving preparedness and protection against climate change.

Overall, young people believe that digital has wide-ranging potential in SIDS.



DIGITAL INFRASTRUCTURE CHALLENGES MAY BE CONSTRAINING THE POTENTIAL OF YOUNG PEOPLE

Rolling out digital infrastructure is a sizeable undertaking, as highlighted earlier in this report. It includes the costs of importing, installing and maintaining wired and wireless technologies and the complexities of extending high-quality coverage to all areas and islands. However, the availability and accessibility of digital technologies remain barriers to getting young people engaged with digital. Nearly 40 per cent of young people in SIDS want to see improvements in digital infrastructure.

Many respondents flagged gaps in signal and coverage and broader unreliability. Data costs remain high, dissuading entrepreneurs and potential customers from e-commerce. But when it works, this connectivity is essential. Digital offers young people options to develop partnerships with like-minded people and peers around the world. Online networking has become easier, while technologies such as cloud computing, cross-border data flow and continued advances in connectivity are bringing more people online.

Young people surveyed noted new opportunities to conduct meetings, interviews and other professional interactions from anywhere as a key benefit to working in the digital age, increasing opportunities to connect and exchange ideas. Young people are particularly keen to collaborate, an area of interest to all youth in SIDS, but particularly among women (47 per cent of female respondents compared to 36 per cent of men).



DIGITAL PUBLIC SERVICE DELIVERY IS AN IMPORTANT ENABLER OF YOUNG PEOPLE'S DIGITAL AMBITIONS

Young people in SIDS are keen to see digital used more extensively across governments and for the delivery of public services. Existing digital public services are saving young people time and money – avoiding the need to spend time in queues, or away from their work or families. Digital services were of particular interest to young people aged 24 to 35, perhaps reflecting their efforts as entrepreneurs and the difficulties of navigating business registration and reporting requirements. Women are also especially interested in improvements in this area.

Young people are also supportive about the potential of digital technologies to cut costs for poorer governments, fight corruption, reduce bureaucracy and facilitate increased participation by citizens, even in remote and underserved areas. This includes the potential of open data in improving the effectiveness and efficiency of government – and driving the catalytic role of government in relation to national digital transformation, as highlighted earlier in this report.

Digital can also play a valuable role in bringing young people into the policymaking and service design process. As highlighted by this global survey across SIDS youth (see boxout), the potential is considerable. The study reached more than 5,000 young people through channels they use every day: WhatsApp, Facebook Messenger and Telegram. It leveraged an open-source and freely available chatbot tool, and provided young people with a safe and comfortable platform to share their thoughts and feelings. There is scope to use these kinds of channels and platforms to shape a feedback loop that engages young people in design and delivery – and to position governments as advocates for the interests of young people.



REGULATION IS IMPORTANT IN CATALYSING DIGITAL TRANSFORMATION – AND TO PROTECT YOUNG PEOPLE FROM DIGITAL HARMS

Although young people in SIDS are exploring and engaging with all aspects of digital, they also know that digital is a double-edged sword. They are alert to – and experiencing – very real digital divides, and digital challenges. This includes regular online experiences of harassment, bullying, scams, and other negative behaviours. Young people are keen to build their skills to engage with these realities, but also want regulation and other support to mitigate and tackle them in a more systemic way.

However, it is not just about protection. It is also about the role of regulation in driving digital transformation. In this context, regulation has not kept pace in some SIDS, including in recognising the distinction between online and offline settings. As one young SIDS entrepreneur noted in discussing education technology:

The laws in [my country] are too antiquated to facilitate digital learning...To be certified as a [digital school] - for us to get official school registration, status and the benefits that come with that: we have to have a physical space, we have to have a fire evacuation plan, we have to keep physical records – we have to print student records and store it in this physical space...

The importance of effective and inclusive regulation will only increase. Young people across SIDS noted concerns about AI displacing human talent or ingenuity, reaffirming the need to apply such tools in inclusive ways, accompanied by education, training, protections and regulation. This includes shaping regulatory and enabling environments to ensure that AI complements and augments human efforts.



DIGITAL NEEDS TO BE INCLUSIVE – AND LEAVE NO ONE BEHIND

Digital transformation remains vulnerable in many SIDS. Although young people are using digital tools and technologies to build businesses, more structural barriers remain that could constrain the growth and dynamism of the digital economy across the SIDS community. From outdated regulation and processes, to challenges in securing funding and financing for digital entrepreneurship, and lower levels of research and development and nascent innovation ecosystems.

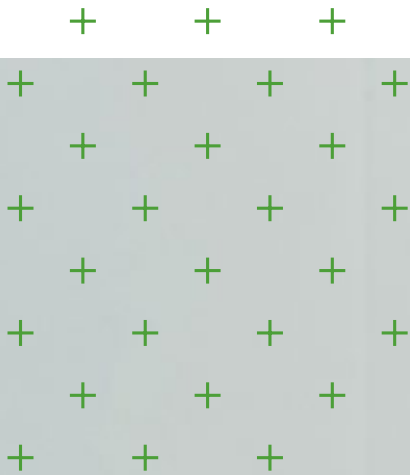
And, digital is posing specific challenges and considerations for SIDS cultures and communities. Many young people are concerned that digital could lead to the loss of traditional values and cultures – and also distract and distance them from their families and friends. They highlight concerns of digital addiction and alienation, and the erosion of personal and national identity. Others see digital creating distance and isolation, even as digital tools increase the global presence of SIDS.

Despite these challenges, young people are going digital. And SIDS need to support and empower them on this journey. From ensuring crucial digital foundations such as high-quality connectivity, to building the digital skills of the present and the future, and ensuring that no one is left behind or excluded from the potential that digital can offer for SIDS. This is a whole-of-society effort – from regulation and policy, to education and lifelong learning, and making digital real and relevant for young people in SIDS.



LOOKING FORWARD

Young people in SIDS are digital advocates, ambassadors, and leaders – and digital is transforming their lives and livelihoods. It is providing new learning and business opportunities, and fresh connections, and shaping how young people in SIDS live, work, and play. But it is also exacerbating inequalities – and presenting new harms. It is crucial for young people to gain empowerment and support to leverage the potential of digital, while remaining protected from potential risks and harms that can accompany increased digitalization. Young people – with these tools and technologies - can drive digital transformation in SIDS.





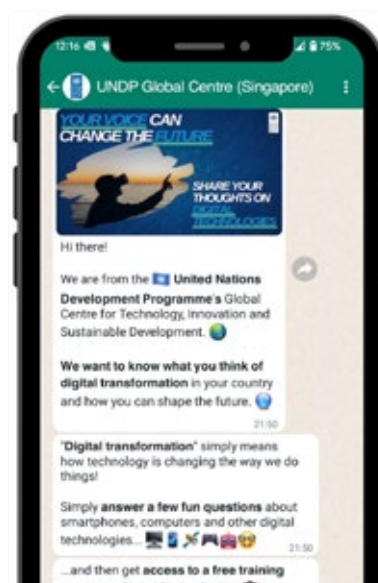
EXPLORING THE PERSPECTIVES OF YOUTH IN SIDS

In 2022 and 2023, UNDP ran a global youth survey to identify the digital hopes, concerns and aspirations of young people aged 18 to 35 in SIDS around the world. The survey combined quantitative and qualitative questions and used a chatbot interface leveraging the RapidPro platform. It was accessible via Facebook Messenger, WhatsApp and Telegram, channels most used by SIDS youth. A global advertising campaign, implemented through Facebook, Instagram and Twitter, helped to promote the survey.

In total, the survey received more than 5,000 responses from over 30 SIDS, making it among the most comprehensive engagements of SIDS youth ever undertaken. Respondents represented a range of sociodemographic characteristics. 45 percent identified as female, and 38 percent were between 24 and 30 years old. They came from all levels of education, from high school to completed postgraduate studies.

The study demonstrated the potential of using digital tools to engage with young people, whose voices often go unheard. The study spotlighted their thoughts, ambitions and concerns and developed findings to inform global conversations and facilitate youth involvement in local and national decision-making.

The report splits the digital journey of young people in SIDS into three categories: 'live', on how young people use digital tools and technologies to support their day-to-day life; 'work', regarding the role of digital in building new skills and opportunities; and 'play', on how digital is driving entertainment, culture and creativity. This grouping allows a deep dive into the potential of digital in all facets of life for young people. The report concludes with policy recommendations founded on this analysis.









SECTION 5

Deep-dive: digital sector priorities

Digital encompasses a wide range of different tools and technologies that are enabling last-mile access to connectivity and devices. They are changing behaviors, services and livelihoods across SIDS. Several sectors are particularly impacted or are well-positioned to leverage digital potential. This section explores how digital is enabling positive change in public transport, e-commerce, renewable energy, tourism, financial inclusion, agriculture, health and education.



PUBLIC TRANSPORT



SIDS Context

Moving people and goods around and between islands is of crucial importance to SIDS, which rely on trade and connections between different communities and sectors. This is particularly relevant for larger SIDS with significant rural and remote populations that risk being excluded from digital transformation and broader national development. Extending public transport infrastructure and accompanying systems is often a significant challenge, however, due to the cost and complexity. Geography poses a particular challenge, including in terms of limited land and conflicting land use priorities.⁶⁹

SIDS' vulnerability to climate change means that public transport networks will be increasingly threatened by extreme weather events such as intensive rainfall or high temperatures. Recognizing the risks of climate change, SIDS are leading efforts to decarbonize, starting in their own economies and including their transport systems. This requires a comprehensive approach to public transport

69 UN-Habitat, Urbanisation and Climate Change in Small Island Developing States - [https://sustainabledevelopment.un.org/content/documents/2169\(UN-Habitat,%202015\)%20SIDS_Urbanization.pdf](https://sustainabledevelopment.un.org/content/documents/2169(UN-Habitat,%202015)%20SIDS_Urbanization.pdf)

development, including multisector and multimodal solutions. Given scarce land resources, for example, the expansion of road networks can often be costly and disruptive. Intelligent traffic management systems can help optimize the installation and use of transport infrastructure.

Developing core digital and data infrastructure will be crucial in building inclusive and resilient transport systems. Public transport has been an early adopter of digital tools and technologies in many locations, including advances in ticketing and routing and the use of Big Data and predictive analytics to improve effectiveness and efficiency. Technologies such as the Internet of Things can tackle priorities including air pollution and traffic congestion. Digital can also play a role in behaviour change by improving the citizen experience in using last-mile or low-carbon transport solutions. Growing digitalization of public and private services could also reduce the need to use transport.



Considerations and challenges

Since public transportation is a key element of national infrastructure, the protection of associated digital technologies, data and network infrastructure is essential. In many SIDS, privacy regulations are insufficient in safeguarding individuals' location and activity data. Furthermore, there can be gaps in regulation regarding data collection and access by third-party applications and service providers. This can potentially cause significant security vulnerabilities and privacy breaches.

Transportation can also highlight broader digital inequities. For example, rural and remote communities – who are often under-served by transport infrastructure – experience very real digital divides due to lower digital literacy rates and less connectivity infrastructure. Digital connectivity and access to digital services are crucial for the further adoption of new technologies,⁷⁰ yet limited services and high prices make digital connectivity a pressing challenge for rural or remote areas.⁷¹

AI is gaining significant interest in relation to improving transport efficiency and management. However, the use of AI presents new ethical considerations, including issues of liability should problems arise. While AI can improve decision-making, systems have the potential to make mistakes that can be highly unpredictable. Human oversight is necessary to mitigate against such shortcomings. Operators should use AI to assist in decision-making rather than as a replacement for human staff.⁷²

70 UNOPS, Infrastructure for Small Island Developing States - https://content.unops.org/publications/Infrastructure_SIDS_EN.pdf

71 Small island developing states (SIDS) and ICTs Mid-term review of the Samoa Pathway - <https://www.itu.int/en/ITU-D/LDCs/Documents/2019/SIDS%26ICTS-Midterm-Review-Samoa-Pathway.pdf>

72 Microsoft, Over-reliance on AI: Literature Review - <https://www.microsoft.com/en-us/research/uploads/prod/2022/06/Aether-Overreliance-on-AI-Review-Final-6.21.22.pdf>

DIGITAL TRANSFORMATION PILLARS

Connectivity

The development and maintenance of digital infrastructure is central in improving public transportation. The use of the Internet of Things to enhance traffic management requires strong connectivity. Enabling services such as public Wi-Fi on public transport can drive increased uptake of both digital services and transport. Interestingly, despite the transport sector's importance, few SIDS have focused efforts to support public transport innovation ecosystems.

Government

Governments play a key role in implementing digital tools and technologies in public transport, from foundational digital components such as mapping and geospatial information to developing open-data processes to support the private sector in innovating digital transport solutions. Governments need to build extensive skills across the public sector but also identify opportunities for meaningful public and private partnerships to improve transport outcomes. They should also seek to leverage data to better shape transport strategies and the management of transport systems

Regulation

Public transport is driven by data. Transport usage data can inform journey planning. Ticketing data can support transport policing priorities. Privacy regulations surrounding the collection, storage and use of data are paramount. Most significantly, cybersecurity processes and regulations must be in place to protect vital transport infrastructure from cyberthreats. Broader priorities include open-data policies and frameworks to support government in sharing mapping and other data with the private sector.

Economy

The private sector is an essential partner in public transport, providing digital products and services to drive transport solutions, such as digital ticketing and booking platforms, and digital payment options. Importantly, the private sector is building apps and solutions to increase the uptake of public transport services. Governments can further catalyse advances by providing open data and other assets that drive the development of solutions.

People

Inclusivity is a top priority in public transportation. Access to transport options and digital services should be available to all groups, while ensuring the protection of their privacy and data. Improvements in digital literacy are essential in boosting the uptake of digital public transport solutions. Tailored transport solutions, both digital tools and underlying public and private transport systems, should be co-designed with users to ensure they meet people's needs and realities.

Case Study

Following a study to explore how to improve public transport in Mauritius, the National Land Transport Authority is rolling out a bus transit management and passenger information system. It will provide information on bus arrival times to passengers waiting at bus stops. It will also provide real-time performance data to inform future service planning and improvements.⁷³

Looking forward

Effective public transportation enhances economic development and inclusivity. There is strong potential to apply emerging and existing digital technologies, such as the Internet of Things and Big Data, to optimize operations, predict future trends in demand and shape comprehensive transport solutions. Poor connectivity infrastructure as well as insufficient regulatory and cybersecurity protections may impede the adoption of digital technologies in public transport, however. These remain important issues for SIDS to address. Public transport should be considered part of a wider digital transformation approach, with links to decarbonization, including through the reduced need for transport due to digital services.

73 See: <https://www.intelligenttransport.com/transport-news/96806/mauritius-updates-public-transport-system-with-information-technology/?fbclid=IwAR01xkl0Flev6JyjPphO0mNuDhxezRHvROAH1vvtm5X7tdORkI3TIkLVnwc>



RENEWABLE ENERGY



Context

Many SIDS are isolated and have limited access to reliable sources of energy, making them heavily dependent on imported fossil fuels. They may spend over 30 percent of their annual foreign exchange earnings on fuel imports.⁷⁷ This dependence is expensive and renders SIDS especially vulnerable to price fluctuations and supply disruptions. At the same time, they have renewable energy sources, including sun, wind and ocean tides, that could offer more diversified energy sources and employment opportunities.

Renewable energy has made significant advances in recent years, improving the potential for an energy transition in SIDS. The cost of electricity from solar photovoltaic cells has dropped by 85 percent in a decade.⁷⁸ The remoteness and other geographic characteristics of SIDS may not translate to similar reductions in expense, however. Many energy projects require considerable upfront expenditures. Digital innovations, such as smart grids and smart energy management systems, have potential to improve energy efficiency.

77 UNCTAD, Small island developing States: Challenges in transport and trade logistics - https://unctad.org/system/files/official-document/cimem7d8_en.pdf

78 See: <https://www.irena.org/news/pressreleases/2021/Jun/Majority-of-New-Renewables-Undercut-Cheapest-Fossil-Fuel-on-Cost#>

Energy can galvanize digital transformation. Providing energy to underserved communities enables them to charge mobile devices and increase digital uptake. Blended services, such as pay-as-you-go solar, can improve digital and energy inclusion. Energy can also bolster women's empowerment, including by negating the need for women and girls to gather firewood, and freeing time for women to pursue other opportunities and build new skills, including in the digital economy.

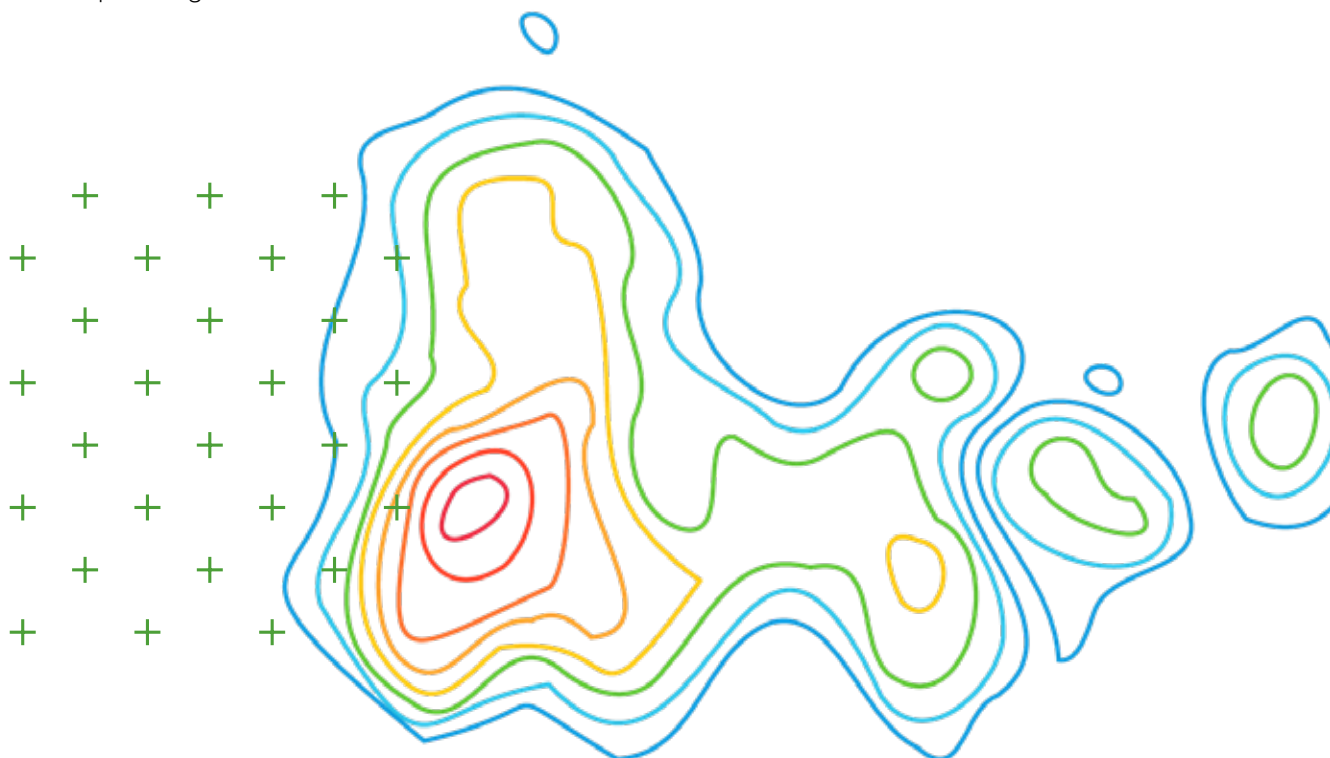


Considerations and challenges

Many SIDS have limited access to emerging technologies and expertise in renewable energy. This may be a result of their geographical remoteness, which increases the costs of technological exchange, as well as the relatively small size of local energy sectors and limited local human capital. These issues erect significant barriers for SIDS in accessing and harnessing the potential benefits of digital and energy solutions.

The transition to renewable energy will require strong support from governments, who must work to ensure that underlying policy structures incentivize the adoption and scale of green technologies. Many SIDS do not yet have regulatory frameworks to support the adoption of digital and other technologies in the renewable energy sector. This can significantly amplify difficulties in adopting green digital solutions.

SIDS could examine more holistic approaches to the energy transition, pursuing renewable energy as a new source of employment and income for local communities while making electricity more affordable for businesses and households. Exploring new partnership modalities with the private sector, including blended business models across sectors, such as pay-as-you-go-solar, could also be worthwhile. This broader focus could also extend to identifying opportunities to catalyse the uptake of greener energy solutions, such as solar-powered drip irrigation systems that can improve crop management.



DIGITAL TRANSFORMATION PILLARS

Connectivity

Energy infrastructure is not always considered in the context of digital transformation even as it plays a critical role in powering connectivity infrastructure as well as devices and other digital tools. Identifying opportunities to coordinate the installation of both digital and energy infrastructure can be beneficial, accelerating roll outs while minimizing disruption. 'Dig once' policies can be a useful tool. Smart grids, even at a smaller-scale, can better integrate energy and connectivity systems.

Government

SIDS require considerable investments in digital and energy infrastructure for a green transition. Pacific SIDS alone will need investment of around US\$5.9 billion to meet their nationally determined contribution targets for climate action.⁷⁹ To make this happen, SIDS governments will need to develop viable business cases and investment strategies, build civil service capacity and lower the political risk that can discourage infrastructure investors. Larger businesses should drive behaviour change by committing to renewable energy solutions. For example, mobile network operators can shift away from costly and polluting diesel generators.

Regulation

On the demand side, there is considerable alignment between regulations related to energy and digital delivery, especially those concerning consumer protections, data privacy, service-level agreements and grievance redressal. This also applies to the supply side, particularly aspects such as right-to-land policies and legislation. Given the need for investment, regulations should help to mitigate risks and uncertainty for investors, from specific financial protections to the foundations of the rule of law.

Economy

The private sector can accelerate the roll-out and uptake of clean energy by leveraging digital solutions. Blended business models have particular relevance in SIDS. For example, pay-as-you-go-solar products drive the installation of connectivity infrastructure in more rural areas while providing energy and financial inclusion through mobile money infrastructure. These and other digital approaches, such as mini-grids, can improve how energy is managed in SIDS by generating energy usage data.

79 See: <https://www.irena.org/Energy-Transition/Partnerships/CIP/Pacific-Islands#:~:text=IRENA%20calculations%20estimate%20that%20the,to%20approximately%20USD%205.9%20billion.>

People

A shift from fossil fuels to renewable energy could trigger more local and decentralized energy systems requiring both skilled workers and skilled consumers. Upskilling and reskilling programs targeting households and business will be necessary to operate localized energy systems - which can include skills such as reading a smart meter, as well as more complex tasks such as choosing between energy providers, tariffs, and technologies. Integration of new technologies could be significantly hindered if consumers lack the skills and awareness of the potential benefits of the smart energy revolution.

Case Study

Comoros, as an archipelago, has a considerably decentralized power grid. Reflecting its disparate population, the country has a number of government and religious buildings spread across the islands. These account for a significant proportion of national energy usage. The country is now looking to install solar rooftops on government buildings, a similar concept to the public sector asset reuse approach discussed earlier in this report.⁸⁰

Looking forward

The adoption of digital technologies in SIDS has the potential to improve the scale and effectiveness of renewable energy and support a just transition to a clean energy future. This can, in turn, end energy poverty, enhance economic development, reduce the impacts of climate change. The success of digital transformation in the renewable energy sector depends on a range of factors, however. These include the creation of conducive policy and regulatory frameworks, the adequate allocation and de-risking of financial resources to the development of renewable energy projects and the increased availability of technical expertise and capacity to support the take-off of local renewable energy industries.

80 See: <https://www.youtube.com/watch?v=eI5PHkybFw8&list=PLyBRsrYRs7Yf-U53qnM9bcUUx6f4AgRzu&index=7>



E-COMMERCE

SIDS Context

Selling goods and services online, or e-commerce, offers considerable potential for SIDS. Geographically dispersed, e-commerce reduces the physical distances for trade and can result in significant cost savings. It can also drive new business opportunities, markets and sectors, and lead to broader digitalization across the economy. It can increase economic diversification, a particularly important aspect for countries reliant on a small number of income streams.

As connectivity increases, from new submarine cable landings to the growing accessibility of satellite Internet, the potential of e-commerce is growing. The COVID-19 pandemic fostered significant increases in e-commerce across SIDS. For instance, the Jamaican e-commerce market could exceed annual revenue of US\$1 billion by 2025.⁷⁴ The growth of e-commerce has multiplier effects on other digital and traditional industries.

E-commerce in many SIDS is still emerging. It requires a comprehensive effort from across the public and private sectors. This includes shaping e-commerce policies and strategies, developing relevant regulations and laws (including for payments and transactions), expanding digital and

74 See: <https://www.siliconcaribe.com/2022/01/26/creating-inclusion-in-jamaicas-us1-1-billion-e-commerce-market/>

e-commerce infrastructure, and shaping a wider digital and trade ecosystem. Many SIDS lack key components such as payment gateways. Gaps in connectivity and skills can limit the growth of e-commerce as buyers and sellers are not able to use digital tools.

Considerations and challenges

Although the COVID-19 pandemic drove a jump in e-commerce it is not clear if this direction will continue as face-to-face interactions continue to remain important, however. That said, digital technology usage rates are also increasing. The proliferation of social media and resultant spread of global trends and advertising has fostered the emergence of social commerce. This refers to the use of social media platforms to directly market and sell products and services to consumers, allowing companies and consumers to complete e-commerce transactions within a singular social Super App.

A number of SIDS have yet to embark on more expansive digital transformations. Many MSMEs rely on online and social media for marketing their products and services, and undertake transactions and delivery offline. Many SIDS lack national digital strategies; only a few have bespoke e-commerce strategies or approaches. Both sellers and consumers require high-quality and reliable Internet connections to maintain digital portals or shop-fronts, monitor and update product inventories, and, most importantly, conduct digital transactions.

In addition to connectivity infrastructure, the development of e-commerce in SIDS will require stronger infrastructure for logistics. Supply chains must be streamlined and optimized to accommodate growing e-commerce activity. This includes effective customs processes. Wider legal and other foundations are insufficient, even as laws governing aspects such as e-transactions, cybersecurity and data protection are crucial in ensuring a safe and secure e-commerce ecosystem. Laws on fair market competition⁷⁵ and consumer protection are also critical to the evolving e-commerce sector.



75 OECD, Abuse of dominance in digital markets - <https://www.oecd.org/daf/competition/abuse-of-dominance-in-digital-markets.htm>

DIGITAL TRANSFORMATION PILLARS

Connectivity

The successful adoption of e-commerce depends on strong foundational digital infrastructure. This enables an online presence and marketing, digital payments, and opportunities for grievance redressal and broader consumer protections. High-quality and reliable Internet connectivity is required alongside affordable data and devices—the latter two could be offered by mobile network operators through tailored ‘MSME packages’. Connectivity is also required for consumers, reaffirming the need for extensive digital infrastructure to grow domestic markets for MSMEs.

Government

SIDS governments are central to developing e-commerce. They can enable foundational connectivity to get businesses online and drive improvements in digital literacy to ensure traders and consumers can successfully navigate digital transactions. Governments should strengthen the efficiency of customs, transportation and logistics systems, and train civil servants and other staff. In some SIDS, governments may also need to provide or crowd-in funding and other support to drive e-commerce uptake.

Regulation

E-commerce requires a comprehensive regulatory framework, covering data, privacy and consumer protections as well as online transactions. In many SIDS, conducting extensive regulatory gap analyses can be an important first step in identifying which regulatory components need refining or may be missing completely. SIDS may then need to commission regional or international technical expertise to support the drafting of regulations, building on broader best practice across the SIDS community.

Economy

Three key factors play a crucial role in encouraging the adoption of e-commerce among MSMEs: perceived benefits amongst consumers, technology readiness amongst businesses, and understanding of technology by both businesses and consumers. Businesses need to be supported on this journey by business associations, financial institutions and governments, including through mentorship, capacity-building and other structures. This process may comprise identifying and amplifying business ‘champions’ who can share their e-commerce journey with their offline peers. It may also entail leveraging the digital diaspora.

People

SIDS' populations are an essential component of e-commerce. They are the entrepreneurs and business owners selling products and services, and the consumers of these offerings. Digital literacy is crucial for both sides. Increasing the digital skills of MSMEs helps get them online. Building the digital literacy of the wider population ensures a customer-base. Governments and business associations should co-design e-commerce platforms and other components with local communities. SIDS consumers should support local enterprises wherever possible to encourage digital adoption.

Case Study

The National Bank of Vanuatu conducted an extensive study, including a household survey, small business survey, and focus group discussions and individual interviews, to learn more about rural customers and the social and economic impact of financial services. It highlighted how local financial services increase MSME and community engagement with banking, and improve savings behaviour for education-related expenses.⁷⁶

Looking forward

While e-commerce can play a central role in supporting large-scale digital and broader development across SIDS, it is a complex undertaking. Adoption depends on strong networks and infrastructure for logistics to support digital transactions and supply chains. Governments must work with businesses to provide funding and training needed for wider societal transition to the digital economy. SIDS must also be alert to the potential risks that e-commerce can bring, from counterfeit products and digital scams to illegal imports. Strong legislative frameworks, encompassing digital security, market competition and cybercrime, among other areas, will be needed.

76 National Bank of Vanuatu, Outer-Island Banking: A Comparative Assessment of the Social and Economic Impact of Access to NBV Services on the Islands of Aniwa and Vanua Lava - <https://www.nbv.vu/assets/files/NBV%20Rural%20Banking%20Comparative%20Study%20Report.pdf>



TOURISM

SIDS Context

Tourism is a key pillar of the national economy for many SIDS due to their unrivalled natural environments, and unique heritage and culture. As highlighted by the OECD, the majority of SIDS rely on tourism for 20% or more of their GDP. In some SIDS, tourism can represent almost - or even more than - half of total GDP.⁸¹ SIDS tourism is distinguished by a high level of dependence on foreign tourism.⁸²

Tourism faces two major challenges. The first is the continued recovery from the COVID-19 pandemic, which severely impacted the global tourism industry and the economic prospects of many SIDS. While tourism has made a gradual recovery following the lifting of international travel restrictions, new ideas and approaches could be important.⁸³ The second challenge involves striking a balance between tourism development and environmental protection. SIDS are

81 OECD, COVID-19 pandemic: Towards a blue recovery in small island developing states: <https://www.oecd.org/coronavirus/policy-responses/covid-19-pandemic-towards-a-blue-recovery-in-small-island-developing-states-241271b7/>

82 Hampton, M. P., & Jeyacheya, J. (2013). Tourism and Inclusive Growth in Small Island Developing States. <https://doi.org/10.14217/9781848591653-en>

83 See: <https://www.undp.org/blog/how-can-small-islands-reimagine-tourism-green-recovery>

particularly vulnerable to extreme climate events, with climate-related hazards costing billions of dollars' worth of damage each year.⁸⁴ Climate hazards are worsened by tourism, which is a major contributor to global warming, accounting for 8 percent of global greenhouse gas emissions.⁸⁵ Tourism can place significant strain on SIDS by generating large amounts of waste, damaging the natural environment and even negatively impacting local culture.

Digital plays a key role in tourism in SIDS, with significant potential to increase. Digital channels are crucial for marketing destinations, processing payments and other components that attract global visitors. Digital can also compliment the tourism experience by providing visitors with high-quality connectivity. Emerging technologies, such as augmented and virtual realities, could showcase environmental and other attractions while reducing environmental damage.



Considerations and challenges

Digital transformation in the tourism industry has accelerated through improved connectivity, transportation and financial payments infrastructure. Internet accessibility has increased considerably through greater mobile broadband connectivity. This has offered local populations more and better means of communication and business collaboration. Local businesses can understand and cater to tourists' needs while showcasing their unique value propositions and reaching broader audiences online.

Though Internet accessibility has rapidly improved, SIDS have relatively underdeveloped telecommunications markets. Connectivity can be high in cost. To the extent connectivity supports tourism-related activities, such as through virtual maps or cashless payment systems, when it is unreliable or expensive, it significantly constrains chances to attract and engage with foreign tourists.⁸⁶

While digital technologies have potential to augment and amplify existing tourist destinations and attractions in SIDS, these explorations require businesses, governments and other partners to adopt and adapt to new and digital ways of working. Research in some SIDS highlights a growing digital divide, with younger people generally quicker to take up digital technologies such as social media. Older business owners, who may be more familiar with local history and culture, experience difficulties in adopting new technologies. The cost and complexity of developing digital tourism products and services also requires technical skills, reaffirming the need for SIDS to cultivate local digital talent.

84 See: <https://www.preventionweb.net/news/new-report-top-10-climate-disasters-cost-world-billions-2022>

85 Small Island Nations Caught Between Tourism Economy, Climate Change - <https://www.hawaiipublicradio.org/national-international/2021-09-27/small-island-nations-caught-between-tourism-economy-climate-change>

86 Digital Technologies and Payments: What are the Challenges and the Opportunities? - <https://www.sparkblue.org/FUT-Tourism/discussion/digital-technologies-and-payments-what-are-challenges-and-opportunities>

DIGITAL TRANSFORMATION PILLARS

Connectivity

Reliable digital infrastructure is crucial for the effective operation of digital and broader tourism initiatives. Strong infrastructural foundations provide customers with seamless, high-quality digital experiences, including in enabling digital payments and communication with friends and family back home. Conversely, poor digital experiences can damage the reputation of local businesses or the tourism industry.

Government

As key stakeholders in the tourism sector, governments in SIDS must actively craft new digital initiatives and encourage investment in promising digital projects. They are also responsible for shaping broader infrastructure, including foundations such as accurate digital location data, and for ensuring a high-quality digital presence for national tourism boards. Such advances can help trigger broader digital transformation across governments. As stewards of national reputations for tourism, governments should guarantee a high-quality visitor experience, including in terms of digital connectivity.

Regulation

Digital tourism interacts with a number of regulatory levers, such as around digital payments and connectivity. Regulation needs to engage with broader areas as well, including grievance redressal for online transactions, cybersecurity to prevent the proliferation of fraudulent marketing efforts, and innovative regulatory mechanisms, such as testbeds, to trial new digital tourism solutions. The role of regulation will only widen, including around digital's potential to mitigate the environmental harms of tourism.

Economy

Businesses are a central pillar of national tourism offers. They provide services and experiences that encourage tourists to return. Many international tourists expect digital processes, requiring businesses in SIDS to adopt key digital tools and channels. Building the skills of business owners and employees is essential. Similarly, businesses will need to leverage digital channels to market themselves, within and beyond the country. Governments and businesses should explore incubators or other avenues to develop local digital tourism products and innovations.

People

To support the digital transformation of tourism in SIDS, broader digital literacy is essential. For example, research shows that women make up more than half of those employed in low-skilled, tourism-dependent activities, such as food and beverage sales, accommodation and services. They are more likely to be entrepreneurs in tourism than in any other sector of the economy.⁸⁷ The digital transformation of tourism could thus make a significant contribution to gender equality and women's empowerment. Skills development should comprise digital literacy to support core tourist activities, such as sales, as well as higher-end digital skills so that female and other entrepreneurs are prepared to develop innovative digital products and services.

Case Study

During the COVID-19 pandemic, Tourism Fiji, the Fijian Government's tourism marketing arm, pivoted to online channels to engage potential visitors, even as the country had closed its borders. An agreement with the major Chinese digital platforms Weibo and Ctrip led to the launch of a live-streaming event with travel influencers promoting Fiji as a post-pandemic destination. The live-streaming collaboration resulted in over 550,000 views.

Looking forward

Financially constrained and geographically challenged, the majority of SIDS rely heavily on tourism for income and employment. As a result, the digital transformation of tourism has strong potential to significantly improve the livelihoods of millions of people. Efforts to leverage digital technologies for tourism will first require countries to address core issues such as better access to reliable, affordable internet connectivity and scaled-up digital training programmes. Accelerating the digital transformation of tourism will also require partnerships among various key stakeholders, including governments, regulators, international development partners and local businesses.

87 UNCTAD, COVID-19 puts women working in SIDS tourism industry at risk - <https://unctad.org/news/covid-19-puts-women-working-sids-tourism-industry-risk>



DIGITAL FINANCIAL INCLUSION



SIDS Context

Financial inclusion, a top priority in SIDS, includes ensuring the entire ‘unbanked’ population is able to access financial services and participate in the economy and society, and supporting MSMEs in securing suitable funding to grow and sustain their enterprises. Financial inclusion is a particular challenge for marginalized populations, including women⁸⁸ and people in more rural areas. SIDS have much lower access to financial services than other countries, on average, due to the challenges of geography and infrastructure that increase transaction costs. They also contend with small domestic markets, dispersed populations and large informal sectors. Historically, areas such as the Pacific are among the least-banked regions in the world.⁸⁹

Financial inclusion is significantly interlinked with other SIDS challenges. It contributes to resilience in the face of climate change and risks in the global economy. It is also strongly aligned with broader digital transformation both as a catalyst (access to finance enables investments in digital transformation) and as an outcome (digitalization, with the innovative digital financial services that it brings, can benefit financial inclusion). The digitalization of government-to-person payments can increase the scale, success and efficiency of social protection and other mechanisms, driving greater financial inclusion, while also delivering broader development benefits. Emerging research

88 See: <https://www.gsma.com/mobilefordevelopment/blog-2/how-mobile-money-could-drive-financial-inclusion-for-pasifika-women/>

89 See: <https://www.ifad.org/documents/38714170/39135645/IFAD's+approach+in+Small+Island+Developing+States+-+A+global+response+to+island+voices+for+food+security/9b62896e-10e3-420a-804a-5fffaa8821d2>

also highlights that digital payments can support in attracting international tourism.⁹⁰ Increases in digital connectivity and mobile penetration can improve financial inclusion through initiatives such as mobile money, while also providing new means of livelihood support. Financial inclusion, digitalization and sustainable development are increasingly interlinked.

An important source of income for SIDS is remittances, particularly in the Pacific. The costs to receive remittances are some of the highest globally, however.⁹¹ Digital can play an important role in reducing such costs. Remittances and further engagement with SIDS' digital diasporas could be powerful tools for funding, financing and catalysing digital transformation, including through crowdfunding and Angel and other types of investment.



Considerations and challenges

Strengthening financial inclusion in SIDS requires increasing digital and financial literacy. The latter includes improving the provision of financial skills and knowledge-building within formal education, and leveraging partnerships with civil society and private sector organizations to deliver financial literacy training. It calls for tackling social and other norms that may prevent marginalized populations, including women, from formally participating in the economy and society. In some countries, women have lower access to land or other assets, limiting an important source of collateral for business financing.⁹²

Financial inclusion can also be constrained by gaps in technical foundations. For some SIDS, cash still plays a central role in the economy but digital payment methods are gaining traction. The use and availability of payment gateways varies, however, which can prevent MSMEs from offering digital or non-cash payments. Overarching financial regulatory and institutional frameworks to accelerate digital payments and associated opportunities such as e-commerce are also behind in a number of SIDS, including to provide protections for digital transactions and ensure interoperability and standardized processes. These challenges extend to connectivity, with gaps in 3G or 4G coverage in more rural locations presenting difficulties in reaching digital financial services.

Some challenges arise in shaping a coherent approach to tackling financial inclusion, as it cuts across areas of regulation as well as actors, including governments and the private sector. It also has international dimensions. Fiji, Papua New Guinea, and Samoa⁹³ have developed financial inclusion strategies that could be important in developing a comprehensive response to a key priority for national and digital development in SIDS.

90 See: https://www.researchgate.net/publication/360898219_Adoption_of_Digital_Payments_for_Travelers_at_Tourism_Destinations

91 See: <https://onlinelibrary.wiley.com/doi/full/10.1002/app5.341>

92 See: <https://www.adb.org/sites/default/files/publication/459551/women-entrepreneurship-lessons-asia-pacific.pdf>

93 See: <https://pacificcommerce.org/reports/pacific-regional-e-commerce-assessment/>

DIGITAL TRANSFORMATION PILLARS

Connectivity

Foundational digital infrastructure is crucial to financial inclusion, particularly given the role of technologies such as mobile money in improving access to financial products and services. High-quality wired and wireless connectivity is required to drive the functioning and adoption of these services and broader financial inclusion opportunities. As highlighted in Trinidad and Tobago,⁹⁴ improved 3G and 4G coverage has enabled more than half of MSMEs to start using online banking service. Many MSMEs in SIDS are using social media platforms to reach new customers and markets.

Government

Governments can provide policy interventions and powerful incentives to jumpstart (digital) financial inclusion, such as by developing financial inclusion strategies to provide a sustained and all-encompassing direction, engaging all stakeholders around common objectives, and accelerating the adoption of payment gateways and development of local fintech enterprises. Governments can also provide leadership and inspiration, such as by ensuring that citizens can use digital payments for taxes and bills, and embedding payment functionalities in broader public service delivery.

Regulation

Financial inclusion interacts with a considerable range of regulations, from digital transaction and data protections to financial regulatory frameworks that support the operation of payment gateways and other critical financial infrastructure. For example, financial services are often offered via a 'know your customer' process, where financial institutions and other providers need to verify the identity of individuals or businesses. These processes can exclude those without the correct documentation, particularly women, who may be more likely to lack formal identity documents. For financial regulations to be effective at supporting financial inclusion, regulatory approaches should strike a balance between financial stability, market integrity and consumer protection objectives; and the need to enable more market innovation through reflexive and iterative approaches. This includes leveraging innovations in RegTech ('Regulatory Technology') and SupTech ('Supervisory Technology').

94 See: <https://www.unCDF.org/article/8236/trinidad-and-tobagos-digital-finance-odyssey-charting-the-course-to-a-cashless-society>

Economy

Businesses in SIDS play a central role in digital financial inclusion. The adoption of digital payment platforms and gateways can encourage consumers to transition from cash as a form of payment. This, in turn, can increase digital explorations in the population at large. Many MSMEs in SIDS lack the digital literacy to embed digital payment processes, however, or may not be aware of these options. Although implementation costs are falling, MSMEs may also lack broader funding or financing opportunities to support these technologies.

People

Digital financial literacy is integral to ensuring that no one is excluded from financial services. It can diminish the factors that marginalize some groups of people in an economy or society. Building digital, financial and digital financial literacy across the population is essential, and should span formal education and opportunities for those outside school. Leveraging mobile technologies can be useful since many people in SIDS are familiar with these tools for receiving remittances. The private sector can also build skills, particularly digital platforms incentivized to increase the number of MSMEs using their products. Such platforms are often able to engage MSMEs through different channels than civil society or government.

Case Study

In 2022, the UN Capital Development Fund in Tonga launched a parametric insurance product to protect household incomes from disasters. Parametric insurance can increase the speed of insurance payouts, as payments are processed immediately following a particular event, without requiring consumers to submit loss or damage claims. In Tonga, payments will be sent to the bank accounts or mobile money wallets of individuals who subscribe to the T\$1000 and T\$2000 coverage packages.

Looking forward

Digital financial inclusion is a foundation and catalyst for the digital transformation of SIDS. It ensures that everyone can benefit from digitally driven initiatives such as government-to-person social protection payments. It enables businesses to explore the potential and opportunities of the digital economy, within their country and in global markets. Achieving inclusion is a truly collaborative effort. Governments must design key regulatory and policy frameworks, and public, private and civil society sectors must work together in improving and strengthening digital and financial literacy, and in delivering services that are relevant, accessible, and affordable. The private sector is critical in building and delivering digital and financial products and services.



AGRICULTURE



SIDS Context

SIDS around the world face similar challenges in agriculture and food security. Domestic food production through traditional open-field agriculture is limited by the scarcity of land, water and other natural resources. Agriculture, including fisheries and aquaculture, is extremely vulnerable to the increasingly severe impacts of climate change, such as rising sea levels and more natural disasters.

Agriculture, fisheries and forestry remain vital to economies and livelihoods in SIDS. Historical drivers, however, have resulted in the dominance of export-oriented agricultural production systems, and consequently, weakened capabilities for the self-provision of food and nutrition.⁹⁵ Reliance on monocultures pressures biodiversity, increases vulnerability to climate change and has an impact on economic diversification. Agricultural exports in SIDS are concentrated in a small number of commodities such as sugarcane, bananas, coffee, tea and various spices, all of which have suffered from declining global prices and slow growth in market demand.⁹⁶

95 John Connell, Kristen Lowitt, Arlette Saint Ville, and Gordon M. Hickey, “Food Security and Sovereignty in Small Island Developing States: Contemporary Crises and Challenges,” in *Food Security in Small Island States*, eds. John Connell and Kristen Lowitt (Singapore: Springer Nature, 2020), 1–24, https://doi.org/10.1007/978-981-13-8256-7_11.

96 FAO, “Adjusting to changes in the global trading environment,” <https://www.fao.org/3/Y5203E/y5203e01.htm>.

SIDS rely heavily on food imports, making them susceptible to external economic and environmental shocks. Fifty percent of all SIDS import over 80 percent of their food, while almost all SIDS import more than 60 percent of their food.⁹⁷ Limited food production capabilities and dependence on energy-dense processed food imports have contributed to food and nutritional insecurity, and led to the triple burden of malnutrition, where undernutrition, micronutrient deficiency and obesity coexist in the same population.^{98,99} The Pacific SIDS, in particular, have among the highest rates of obesity and non-communicable diseases such as diabetes in the world.¹⁰⁰



Considerations and challenges

Digital offers considerable potential for improving agriculture, farming and food and nutrition security in SIDS. This includes ‘precision agriculture’, which leverages digital, data and other forms of technology to improve yields and other outcomes. Precision agriculture can reduce the need for agricultural inputs such as water, fertilizers and pesticides, thereby potentially cutting costs and the environmental footprint of agricultural production. The use of technology also diminishes the need for physical labour and can improve productivity, ultimately enhancing the profitability of farming.

Digital technologies make precision agriculture solutions increasingly affordable and accessible to even smallholder farmers. These technologies include remote sensing using satellites and uncrewed aerial vehicles, and sensors and the Internet of Things—all enabled by advances in data processing and analytics. The adoption of these technologies is being driven by growing mobile phone and Internet penetration and the falling costs of data worldwide.

Advancing technology-enabled farming systems and related innovations such as urban agriculture and fostering enabling ecosystems can have several benefits in SIDS. Growing food domestically can reduce dependence on costly food imports while making fresh and nutritious food more readily available. New farms can create economic opportunities by providing jobs and spurring innovation in related industries, including energy, food processing, logistics and retail. This could contribute to the much needed diversification of SIDS economies. Further elements include e-commerce or digital sales channels to market high-quality agricultural products, connecting input suppliers, local producers, processors and consumers.

97 FAO, *Small Island Developing States Response to COVID-19: Highlighting food security, nutrition and sustainable food systems* (Rome: FAO, 2020), <https://doi.org/10.4060/ca8994en>.

98 FAO, *FAO’s Work with Small Island Developing States: Transforming Food Systems, Sustaining Small Islands* (FAO, 2019), <http://www.fao.org/3/ca5170en/ca5170en.pdf>.

99 Kristen Lowitt, Arlette Saint Ville, Patsy Lewis, and Gordon M. Hickey, “Environmental change and food security: the special case of small island developing states,” *Regional Environmental Change* 15, 1293–1298 (2015), <https://doi.org/10.1007/s10113-015-0849-3>.

100 FAO, *FAO’s Work with Small Island Developing States: Transforming Food Systems, Sustaining Small Islands*.

DIGITAL TRANSFORMATION PILLARS

Connectivity

Innovations in digital agriculture require robust and reliable Internet connectivity, particularly in the last-mile and rural contexts where many farms are located. Precision agriculture is data driven, using sensors and other tools to provide farming insights, while increasingly, agricultural extension and other information is delivered via mobile channels. These developments require 3G and 4G connectivity but can also include approaches such as LoRaWAN, enabling connectivity for sensors across a wide area. Increasingly, Edge applications are bringing data and insights closer to farmers but also require strong connectivity.

Government

Governments are often central actors in the agriculture ecosystem, funding or supporting agricultural extension services, and setting standards and other criteria for supply chains, markets and other components. This role can broaden in the context of digital agriculture. Governments can drive open-data processes to enable digital agriculture innovators to use weather and land-mapping data to build products and services, and also work with the private sector to subsidize or otherwise support the building of last-mile digital infrastructure.

Regulation

Reflecting the data-driven nature of digital and precision agriculture, regulation is often focused on shaping data and privacy protections, including those related to data storage and aggregation, and interoperability among different systems and processes. Regulation can also extend to land rights for digital infrastructure and the use of in-field sensors. Broader aspects comprise the 'right to repair' and preventing farmers from being locked-in to proprietary and other forms of technology.

Economy

The private sector is an exciting component of the digital agriculture ecosystem. Input providers can play a valuable role in supporting the adoption of digitally driven initiatives such as parametric insurance. Mobile network operators often deliver valuable extension and other information. Smaller farming enterprises are often the backbone of agriculture. Building their digital literacy and trust in technology is an essential priority to drive participation in digital and precision agriculture.

People

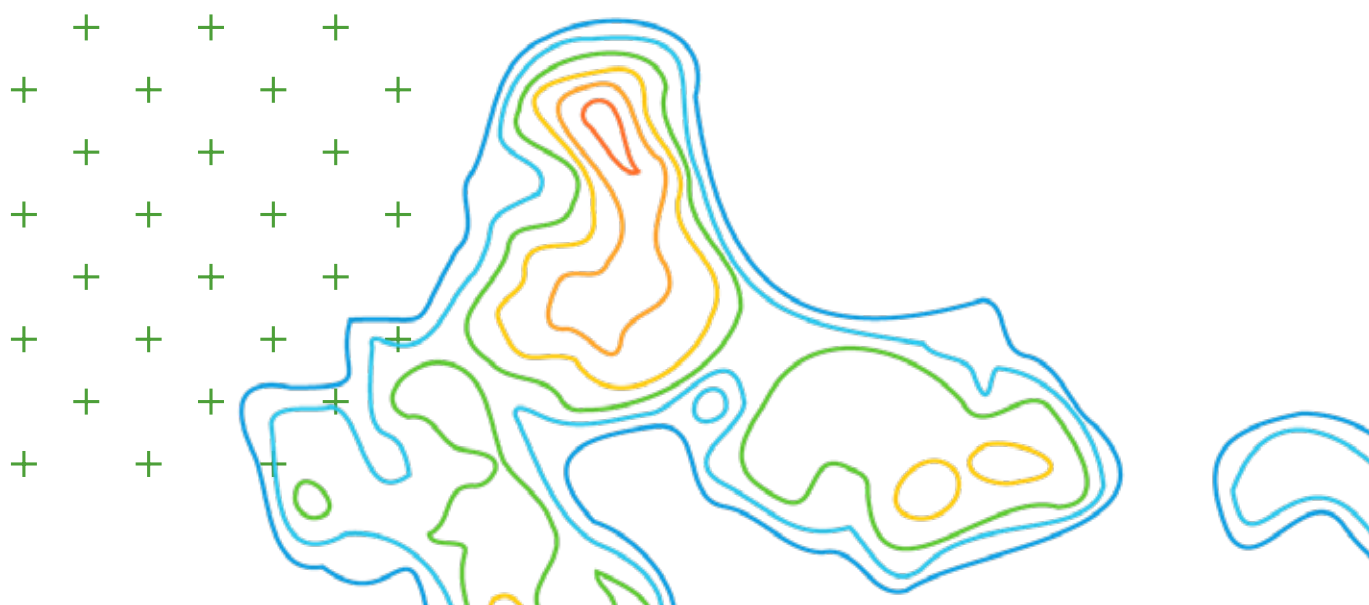
Smallholder farmers may hesitate to adopt new technology or change ways of working. This is often due to the precarity of their situation, with few safety nets. With this in mind, working to highlight the benefits of digital technology is important, including the role of ‘farmer champions’ as trusted advocates of digital. Since farmers and other rural citizens often have lower digital literacy, building their digital skills is a priority, particularly in the context of more technical precision and digital agriculture applications.

Case Study

The Government of Singapore’s ‘30 by 30’ strategy focuses on strengthening the country’s food and nutrition security. It aims for Singapore to produce 30 percent of its nutritional needs locally and sustainably by 2030. This involves co-funding schemes like the Agri-Food Cluster Transformation Fund and innovation initiatives like the Singapore Food Story R&D Programme. Other avenues of support involve campaigns to help promote local produce, a streamlined regulatory environment for agri-food entrepreneurs, and the repurposing of spaces such as rooftops, car parks and industrial areas for food production.

Looking forward

Many SIDS lie in subtropical latitudes subject to extreme weather events such as droughts, floods and hurricanes. Climate change has made these more frequent. Building climate-resilient agriculture systems by leveraging digital tools, technologies and data could ensure more secure food production. It could also yield broader development benefits by shaping export sectors and fostering new digital innovators – from entrepreneurs working on digital agricultural initiatives, to farmers increasing their digital literacy.





HEALTH

SIDS Context

Digital technologies have considerable potential to improve health-care delivery and health equity. Mobile technology can enable telehealth and last-mile healthcare. Emerging technologies can enhance diagnostic capabilities. Digital can improve care for both communicable diseases such as COVID-19 and non-communicable illnesses such as cardiovascular diseases. Digital can also strengthen underlying health-care infrastructure, including by digitizing patient records and other information, safely and securely, and improving the efficiency and effectiveness of health-care supply chains.

In many SIDS, digital is still emerging as a health tool although some have functioning telehealth systems and are driving digital and data transformations across hospitals and other primary care settings. Improving data collection is an important priority, including in last-mile settings where weaker data infrastructure may not facilitate routine and longitudinal data collection or analysis. This challenge can be exacerbated in a context of strongly localized health-care, as found in some SIDS.

More broadly, digital literacy among health-care professionals and patients is a growing priority. Embedding digital tools and technologies in clinical and health pathways is not always simple. Driving behaviour change among clinicians can also take time. Similarly, patients need to be empowered to engage with the increased opportunities afforded by digital, including through sufficient digital literacy to participate in digital health services and meaningfully manage and own their data.

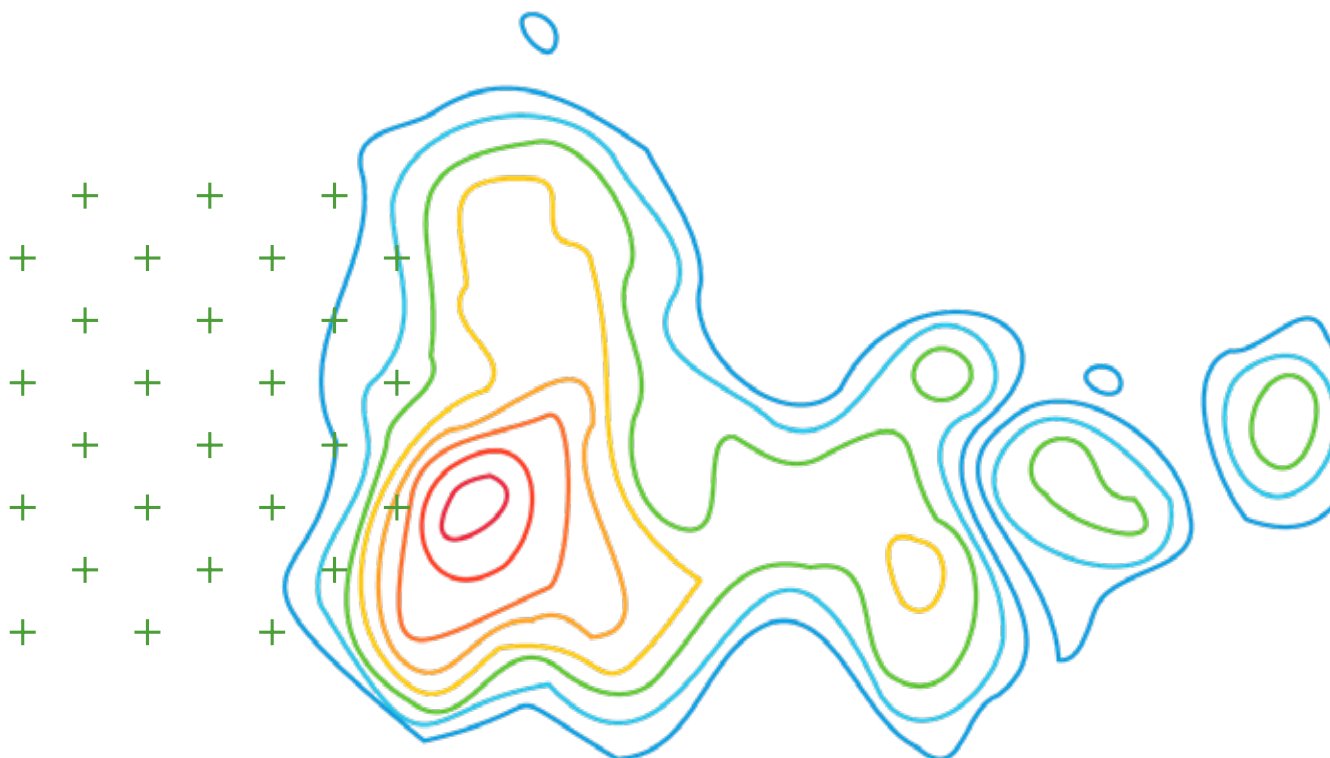


Considerations and challenges

Digital poses exciting considerations for individual, community and national health. It can broaden the options for patients, including beyond primary health-care settings. There is potential for making healthcare available on-demand through telehealth. Leveraging new technologies and tools could drive predictive healthcare and better health-care outcomes through more personalized service delivery. The possibilities include behaviour change prompted by communications through a wide range of digital channels.

These positive directions are not guaranteed. Ensuring access to telehealth and other digital health solutions requires digital infrastructure and access to data and devices. It calls for upskilling and supporting health-care professionals in adopting new ways of working, a challenge exacerbated by burnout and high staff turnover following the COVID-19 pandemic. Interoperability between different digital health solutions can also be a challenge.

Digital health is founded on data, especially sensitive and personally identifiable data on diagnoses, health-care plans, comorbidities and other vulnerabilities. Robust data protections are needed, including regulations on data protections and privacy, and extensive cybersecurity fences to ensure that patient data are not stolen or exploited by malicious actors.



DIGITAL TRANSFORMATION PILLARS

Connectivity

Digital health requires extensive digital infrastructure, including high-quality connectivity to drive telehealth and other applications as well as foundational infrastructure to connect hospitals and primary care facilities, particularly for data-sharing. This latter component requires high-speed Internet and fibre-optic connectivity, which can be costly and complex to install. Data centres and cloud technologies are also needed.

Government

Digital health cannot happen without government leadership and engagement. This includes policies and strategies to guide digital technologies towards positively improving health outcomes, and to steer wider processes, including data collection, analysis and use, from the local to the central levels. Governments should use data to drive public health responses and priorities. They can also collaborate with the private sector to deliver digital health products and services.

Regulation

Recognizing the sensitivity of health topics and associated patient information and data, regulation is a priority. This includes data protection and privacy policies and cybersecurity provisions to safeguard personal data. More focused regulation may be needed to shape the implementation of particular digital health technologies (such as telehealth and electronic health information systems), and their interface with clinical and patient pathways.

Economy

The private sector plays a leading role in digital health implementation, building digital health products, services and solutions to address patient and market needs. The private sector ecosystem can include health payment and insurance providers, and entail extensive collaboration among different entities. For example, mobile network operators can be important partners in delivering digital health services to more marginalized populations.

People

Digital health could have a considerable, positive impact on individual and population-level health outcomes. This can only happen in collaboration with patients, however. Empowering patients to own and manage their data and explore digital health solutions requires ensuring sufficient digital literacy for patients and clinicians. Broader behaviour changes may be needed to demonstrate the value of digital healthcare.

Case Study

Since 2019, UNDP has been supporting the Ministry of Health in São Tomé and Príncipe with implementing its digitalisation strategy. This has included technical assistance, training, and establishing a computer and IT network. The country is using the DHIS2 and M-Supply platforms. DHIS2 is a free and open-source platform that enables the collection, analysis and reporting of data, among other functions. It is a digital public good, used in a number of other SIDS – including Haiti.¹⁰¹ Both platforms are improving decision-making processes and the management of healthcare resources – including drugs, and medical supplies.

Looking forward

Digital technologies could improve how individuals manage their health, drive more effective and efficient diagnoses and treatments, and transform how governments support the health of their populations in the context of communicable and non-communicable health challenges. This will only be possible if digital infrastructure enables access to digital health products and services, and patients and clinicians are skilled, empowered and incentivized to use these solutions. Sufficient safeguards and protections must be in place.

101 See: <https://dhis2.org/haiti-hmis/>



EDUCATION

SIDS Context

The COVID-19 pandemic reaffirmed the potential of digital to improve education delivery and learning outcomes. Many SIDS, in a context of movement restrictions, quickly pivoted to remote education and remote learning. A number had been exploring digital approaches to education much earlier, given challenges in delivering schooling to rural populations and across islands, and disruptions to learning caused by extreme weather events.

Even with this prior experience, delivering inclusive and high-quality education to an entire population is a significant challenge. High-quality digital infrastructure has to be available along with devices for students, teachers and families. Teachers need to have digital skills. Although many SIDS have embedded digital and ICT skills across curricula, some countries do not have enough teachers.

There is also an exciting opportunity for SIDS to expand local digital ecosystems founded on developing digital products and services to improve local, national and SIDS-wide education outcomes. The barriers to entry for developers and innovators can be lower in the 'ed-tech' space than in areas such as 'med-tech' or fintech that require more extensive data mechanisms and other components (as well as different regulatory requirements). Education could be a promising area for digital development.

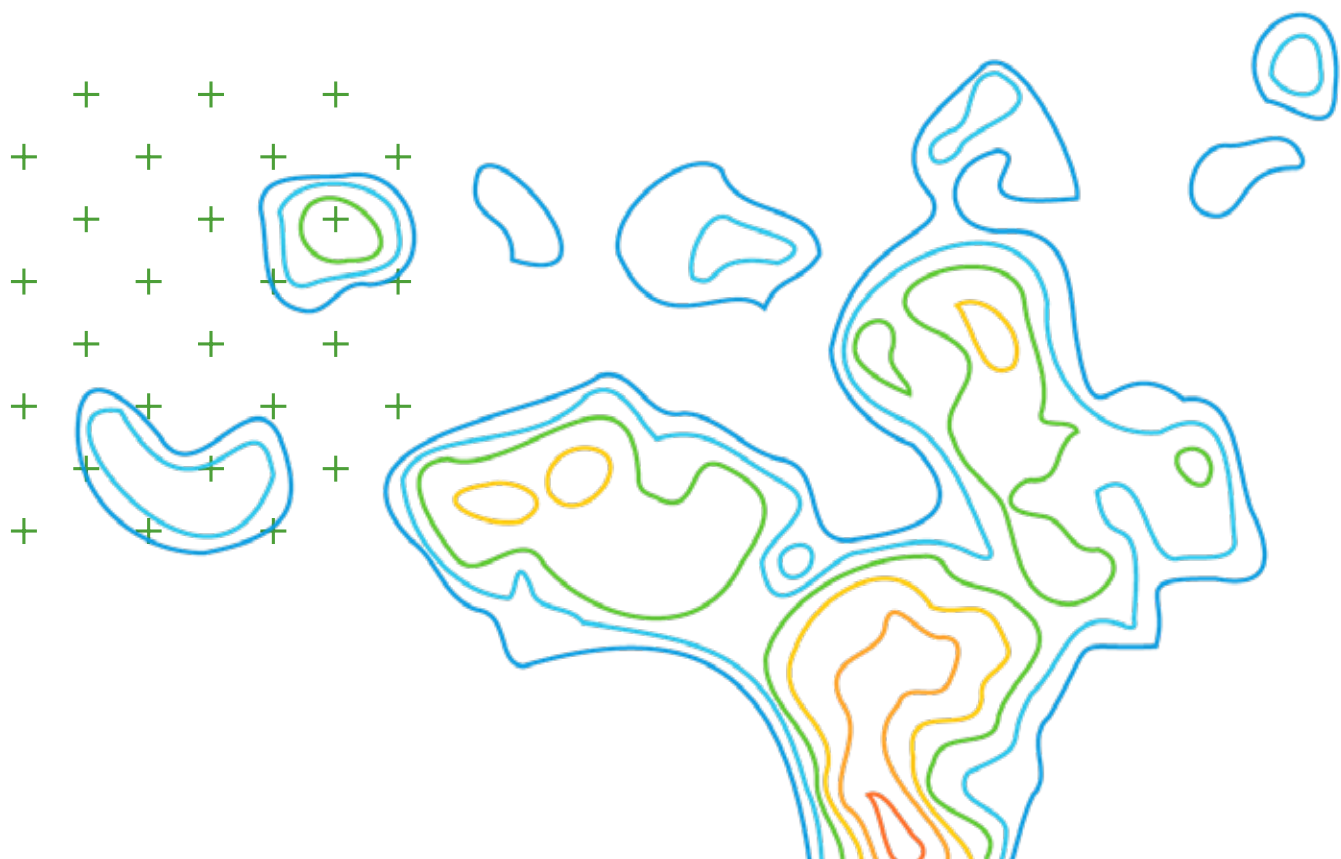


Considerations and challenges

Ed-tech has been growing for some time, accelerated by the COVID-19 pandemic and the embrace of remote learning. This direction is likely to continue, with interest in ‘blended’ or ‘hybrid’ learning that combines online and offline education delivery. This requires digital and physical infrastructure, sometimes referred to as a ‘phygital’ approach. Technologies such as AI could have an impact offline, supporting teachers with administrative or decision-making tasks and freeing their time to focus on education delivery.

Digital offers potential to positively transform education, leading to improved skills and knowledge. For example, digital platforms can create more engaging and immersive learning experiences. Connectivity can link learners in SIDS with a global repository of courses and learning opportunities. These include micro-credential courses to acquire marketable skills in data analysis, project management and communications, among other topics.

One of the main considerations and challenges relating to digital education is not linked to technology at all—it is the underlying pedagogy and use of technology within education. Pedagogy needs to encourage teachers and students to engage with digital modes of learning and delivery while ensuring that digital technologies do not detract from the learning experience. Smart screens and learning hubs are valuable but comprise a small component of digital education. Digital should be a tool in the education toolkit and not a solution in itself.



DIGITAL TRANSFORMATION PILLARS

Connectivity

Digital education products and services often have bandwidth-heavy functionality, entailing online forums and discussion channels, and the livestreaming of classes and lectures. These features need to be accessible to the entire population, which requires considerable digital infrastructure to the very last mile. Ensuring high-quality and reliable connectivity is a particular priority, especially to ensure that learning experiences are not unnecessarily curtailed.

Government

Governments frame and lead digital education opportunities. With education provision often led by national governments, policymakers and others need to identify opportunities to explore, embed and scale up digital education products and services. This includes aligning digital education with national curricula and ensuring curricula develop the digital and other skills of the future.

Regulation

Digital education often leverages the personal data of students, such as on their educational performance or on socioeconomic or demographic characteristics such as gender, religion or others. This personal information should be subject to appropriate safeguards and data protection and privacy regulations.

Economy

Ed-tech is a growing area of digital, with significant leadership from the private sector in developing many digital education products and services. Extensive collaboration among education ministries, schools and developers helps ensure that these solutions complement curricula and learning pathways and augment the broader learning experience. Developers also need to adhere to data and other regulations and safeguards.



People

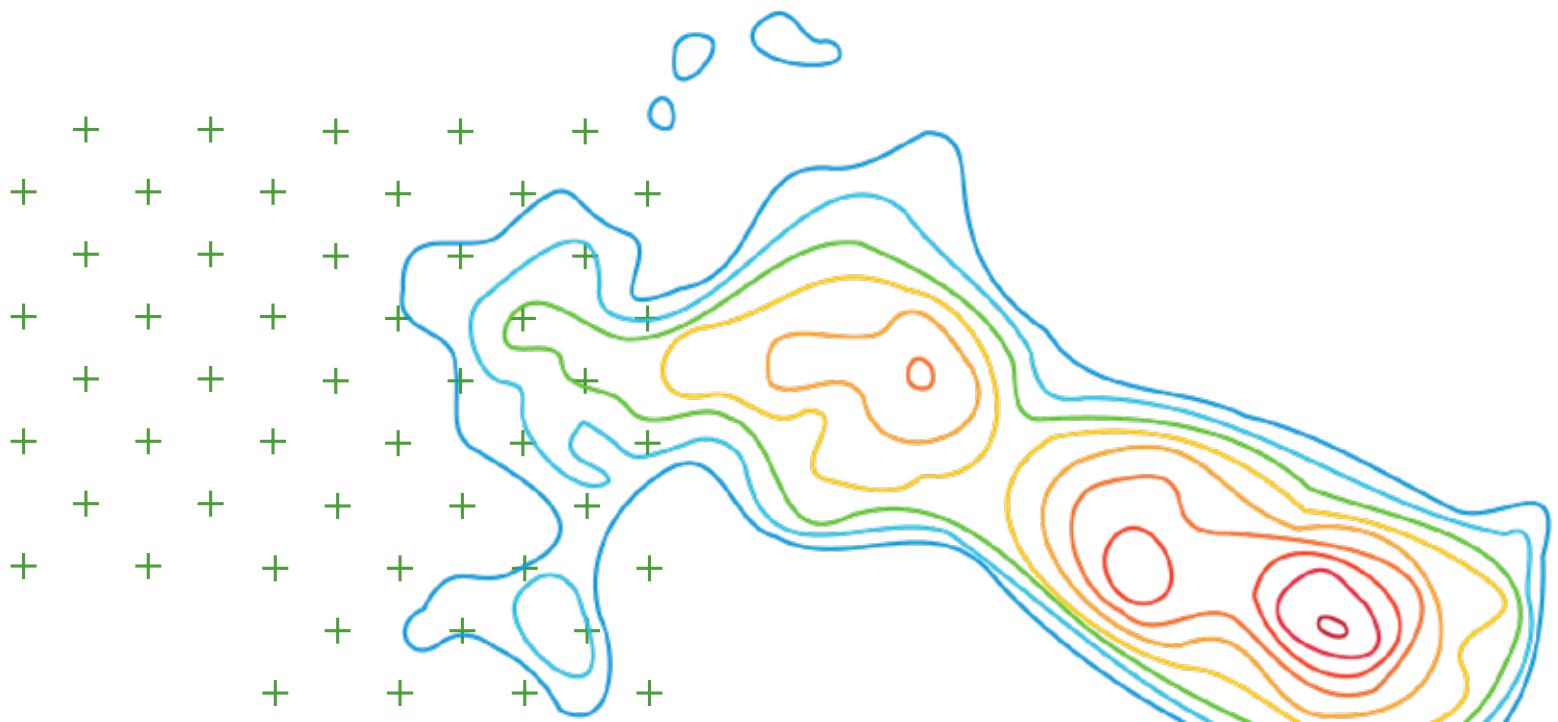
Fundamentally, digital education is about improving the skills, knowledge and abilities of citizens in SIDS. Initiatives should be co-designed with learners wherever possible, to increase relevance and the potential for uptake, and improve outcomes. Approaches such as ‘gamification’ and positive competition can improve learning and knowledge retention. Students need to have sufficient skills, devices, data and connectivity to benefit from digital learning.

Case Study

The Samoa Knowledge Society Initiative supports digital learning opportunities. Funded through the United Nations–India Development Partnership Fund, it recognizes the right of all Samoans to access information and strives to generate more digital resources throughout the country. It is developing a free open-access digital library and lifelong learning platform to facilitate online open learning.

Looking forward

Digital education is not a new area for SIDS but one that is growing in scale and interest. Digital has real potential to improve education delivery, although the most important considerations are not the technology itself. Key issues include reducing the digital divide between students and teachers, ensuring digital complements and augments learning and avoids a ‘veneer’ of technology that undermines core learning outcomes, and providing students with safe and secure offline spaces for learning. The last is a challenge in some land-constrained SIDS, with few spaces for home working or studying.








Looking forward

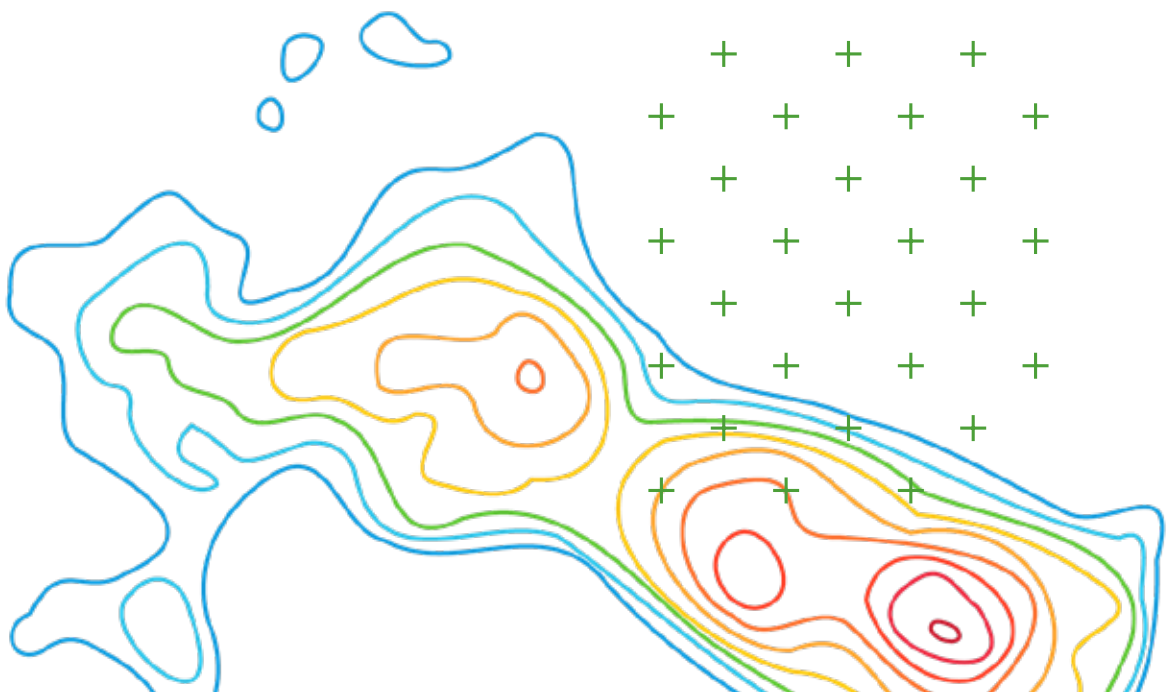
Digital is a fundamental tool in the development toolkit of SIDS. It is creating new opportunities and sectors, improving key outcomes – including in areas such as healthcare, and education – and it is making geographic distance increasingly irrelevant. Digital is also an essential asset for tackling important SIDS priorities. Including the role of data and digital in strengthening SIDS' response to climate threats, the potential of digital tools and technologies to increase the extent and impact of public services, and the opportunity that digital presents in shaping dynamic local innovation ecosystems.



Similarly, digital is a crucial catalyst for the ambitious digital agenda that SIDS are pursuing. As the SIDS community looks to the post-SAMOA Pathway, there is an exciting and important opportunity to position digital as an accelerant and enabler of SIDS' sustainable development. Both in responding to the above challenges, but also to centre SIDS as global digital and innovation leaders – drawing on their strong human capital, and their unique culture and heritage which could shape new thinking on digital.

As this study reaffirms, SIDS are already trailblazers in digital. They are exploring, applying, and scaling digital tools and technologies across all parts of their islands. From the work of the Cook Islands government in catalysing an emerging technology ecosystem, to Trinidad and Tobago's extensive usage of digital to drive financial inclusion, Suriname's new National Digital Strategy, and Mauritius' focus on open-source digital solutions – which are saving the country time, and money. SIDS are also exploring regional harmonization regarding key digital priorities, sharing learning, and building digital collaborations between their countries.

UNDP is a partner to SIDS as they navigate their national, regional, and global digital journeys. We are providing technical and policy expertise, identifying useful and relevant digital solutions, shaping and scaling innovative digital partnerships, providing platforms for SIDS to share their digital experiences, and tackling key skills gaps and priorities through training and capacity building. The UNDP 'Rising Up for SIDS' offer is a holistic strategy of collaboration and support to SIDS – recognising the importance of digital for areas such as climate action, the Blue Economy, and driving innovative development finance. And, as stewards of all 17 Sustainable Development Goals, UNDP is also working closely with SIDS to ensure that digital is inclusive, no one is left behind – and that SIDS are central partners in a global digital community. SIDS are increasingly becoming Small Island Digital States – and their potential is enormous.









Annex: **UNDP Digital Readiness Assessment**


In line with UNDP's Integrated SIDS Offer, the UNDP Digital Readiness Assessment is a tool to guide SIDS in bridging digital divides and creating opportunities for sustainable development, including by strengthening public service delivery, leveraging new and innovative financing opportunities, and forging partnership to drive whole-of-government digital transformation.

The UNDP Digital Readiness Assessment is a survey-based tool that is combined with extensive secondary research and analysis. It provides rapid, high-level insights into a country's digital strengths and opportunities, and aims to identify and prioritize digital interventions as part of a digital transformation journey. It highlights the current digital context, from cases where basic digital foundations may be lacking or incomplete to those where digital is a central tenet of national growth and development.

The Digital Readiness Assessment complements other tools offered by development and private sector organizations. It aligns with and augments existing tools and processes used by governments. By improving coordination and clarity, it seeks to drive a whole-of government and whole-of-society approach to digital transformation. This is crucial in achieving digital inclusion, ensuring that no one is left on the wrong side of the digital divide and enabling countries to leverage digital to achieve the SDGs.

The Digital Readiness Assessment is founded on the UNDP Digital Transformation Framework, which helps governments and other digital actors align their efforts based on the key elements of inclusive digital transformation. The framework allows the public and private sectors and civil society to identify, structure, prioritize and implement national digital transformation efforts and agendas. The framework addresses a broad range of components to inform a successful national digital transformation. It is also a basis for aligning UNDP support to SIDS on their national digital transformation journeys.





UNITED NATIONS
Barbados & the Eastern Caribbean
Anguilla • Antigua and Barbuda • British Virgin Islands •
Commonwealth of Dominica • Grenada •
Montserrat • Saint Kitts and Nevis • Saint Lucia •
Saint Vincent and the Grenadines • SIDS

Digital Readiness Assessment

Preliminary findings

Antigua and Barbuda

Beta Phase: September 2023
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Service	No legislation	Draft or some legislation	Existing major strong legislation
Government-to-citizen digital services	10	15	75
Government-to-business digital services	15	20	65
Government-to-government digital services	20	25	55
Government-to-employee digital services	25	30	45
Government-to-citizen digital services (e-government)	30	35	35
Government-to-business digital services (e-commerce)	35	40	25
Government-to-government digital services (e-procurement)	40	45	15
Government-to-employee digital services (e-learning)	45	50	5
Government-to-citizen digital services (e-health)	50	55	5
Government-to-business digital services (e-finance)	55	60	5
Government-to-government digital services (e-infrastructure)	60	65	5
Government-to-employee digital services (e-transport)	65	70	5
Government-to-citizen digital services (e-education)	70	75	5
Government-to-business digital services (e-energy)	75	80	5
Government-to-government digital services (e-justice)	80	85	5
Government-to-employee digital services (e-social services)	85	90	5
Government-to-citizen digital services (e-culture)	90	95	5
Government-to-business digital services (e-environment)	95	100	5

made progress, stakeholders do not think the government is a priority. Further strategic direction is needed.

digital across the... However, digital is still not seen to be a high national priority for the government (n=12)

ed senior sponsorship will be crucial in leveraging digital – and accelerating digital transformation efforts

There are a number of priority opportunities for legislative and regulation, these include enactment of the country's privacy legislation, and identifying – and implementing – provisions and chapters for cybersecurity (and building on the government's internal cybersecurity policy). The government may also opt to identify the catalyst and enabling role of legislation for broader digital economy priorities, this includes the potential of infrastructure sharing legislation (and pricing regulation) to accelerate the rollout of affordable connectivity, the role of open contracting and other procurement regulations to increase efficiency, and proactive technical and regulatory support to digital SMEs.

The government can also continue its forward thinking work in the early days of the digital economy by exploring the regulatory opportunities for priority areas of digital transformation. One potential opportunity could be the role of regulatory sandboxes in driving the development of British products and services. This would be a natural alignment with the e-commerce and broader digital finance heritage of (Country name).

Finally, 'brain drain' is a very real challenge for (Country name) – and one complicated by recent explorations to attract foreign digital talent, and to leverage the digital diaspora. The country's recent (programme) is an important step, but a broad analysis of other innovative and international opportunities should also be explored. This could include more formal linkages with the diaspora community, but also leveraging the impressive digital assets of (Country name) to develop an 'e-residency' or similar programme. This would also be an important catalyst in accelerating the digitalisation of public services (particularly business registration – a priority amongst survey respondents).

