DIGITAL ECONOMY FOR LATIN AMERICA AND THE CARIBBEAN

Country Diagnostic:

Jamaica

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ABBREVIATIONS

ACH	Automated Clearing House
AGD	Accountant General's Department
AI	Artificial Intelligence
AML	Anti-Money Laundering
API	Application Programming Interface
ATM	Automated teller machine
BELLA	Building the Europe Link to Latin America and the Caribbean Initiative
BEPS	Base Erosion and Profit Shifting
BIGEE	Boosting Innovation, Growth and Entrepreneurship Ecosystems
BOJ	Bank of Jamaica
BOJA	Bank of Jamaica Act
BPO	Business Process Outsourcing
CARICOM	Caribbean Community and Common Market
CBDC	Central Bank Digital Currency
CDD	Consumer Due Diligence
CERT	Cyber Security Emergency Response Team
CFT	Combating the Financing of Terrorism
CII	Critical Information Infrastructure
CIRT	Cyber Incident Response Team
CSEC	Caribbean Secondary Education Certificate
CTMS	Central Treasury Management System
DBJ	Development Bank of Jamaica
DEA	Digital Economy Assessment (World Bank)
DECU	Digital Evidence and Cybercrimes Unit
DFS	Digital Financial Services
DPA	Data Protection Act
DPO	Data Protection Officer
DTI	Deposit-Taking Institution
ePPS	Electronic Public Procurement System
ESO	Entrepreneurship Support Organization
EU	European Union
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
GDPR	General Data Protection Regulation
GFMS	Government Financial Management System
GNI	Gross National Income
GOJ	Government of Jamaica
HEART/NSTA	Human Employment and Resource Training/National Service Training Agency
ICT	Information and Communications Technology
ICTA	Information and Communications Technology Authority

IDB	Inter-American Development Bank
IGNITE	Innovation Grant from Ideas to Entrepreneurship
IoT	Internet of Things
ISO	International Standards Organisation
ITO	Information Technology Outsourcing
ITU	International Telecommunication Union
IXP	Internet Exchange Point
JaCIRT	Jamaica Cyber Incident Response Team
JAM-DEX	Jamaica Digital Exchange (Jamaica's Central Bank Digital Currency)
JAMPRO	Jamaica Promotions Corporation
JBDC	Jamaica Business Development Corporation
JDXP	Jamaica Data Exchange Platform
JTA	Jamaica Teacher's Association
JTEC	Jamaica Tertiary Education Commission
KPO	Knowledge Process Outsourcing
KYC	Know Your Customer
LAC	Latin America and Caribbean
MDAs	Ministries, Departments, and Agencies
MIIC	Ministry of Industry, Investment and Commerce
MLSS	Ministry of Labour and Social Security
MOCA	Major Organized Crime and Anti-Corruption Agency
MOEY	Ministry of Education and Youth
MOFPS	Ministry of Finance and the Public Service
MSETT	Ministry of Science, Energy, Telecommunications, and Transport
MSME	Micro, Small, and Medium Enterprises
NCA	National Cybersecurity Authority
NCB	National Commercial Bank Jamaica Limited
NCS	National Cybersecurity Strategy
NIDS	National Identification System
NIN	National Identification Number
NIRA	National Identification and Registration Authority
NIRI	National Identification and Registration Inspectorate
NQF-J	National Qualifications Framework
NSC	National Standards Curriculum
OAS	Organization of American States
ODPP	Office of the Director of Public Prosecution
OIC	Office of the Information Commissioner
OUR	Office of Utilities Regulation
PAFI	Payment Aspects of Financial Inclusion
PATH	Programme of Advancement through Health and Education
PCSA	Payment Clearing and Settlement Act
PIMIS	Public Investment Management Information System
PIOJ	Planning Institute of Jamaica
PPP	Public-Private Partnership
PSP	Payment Service Provider
QR	Quick Response

RAiS	Revenue Administration Information System
RPJ	Retail Payments Jamaica Limited
RTGS	Real-Time Gross Settlement
SMA	Spectrum Management Authority
SME	Small and Medium-Sized Enterprise
SSO	Single Sign-On
ST&I	Science, Technology, and Innovation
TAJ	Tax Administration Jamaica
TIU	Technology and Information Unit
TRN	Tax Registration Number
TVET	Technical and Vocational Education and Training
UMIC	Upper-Middle-Income Country
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USF	Universal Service Fund
UWI	University of West Indies
VAT	Value Added Tax

EXECUTIVE SUMMARY

Jamaica's progress in digital transformation is paving the way for a foundational change in how the economy and society operate and create value. The broadband initiative, implemented by the Ministry of Science, Energy, Telecommunications, and Transport (MSETT), aims to provide internet connectivity to all households and communities and has helped establish high-speed broadband connectivity in 90 schools across the country. The same initiative brought together public and private sector investments for an emergency broadband backbone amounting to more than US$2 million. The Government of Jamaica (GOJ) is also modernizing its processes and functions and developing citizen-centric digital platforms; for example, at least 80 percent of core tax declarations are currently being submitted online, and the Programme of Advancement through Health and Education (PATH) pays 40 percent of beneficiary families through electronic payments. The central bank of Jamaica has also taken a leading role in the region by granting legal tender status to the Jamaica Digital Exchange, or JAM-DEX, a central bank digital currency to promote financial inclusion. The Human Employment and Resource Training (National Service Training Agency) Trust is educating 6,000 people per year to meet the needs of the burgeoning business process outsourcing industry. Moreover, foundational elements for trust in data and digital transactions are being strengthened, such as in cybersecurity, data governance, and digital identification.

Jamaica's ambition to transform itself into a digital economy has been rooted for many years in the country's long-term development plan "Vision 2030," but progress in realizing those objectives has been slow. Multiple factors are contributing to the delay, including weakness in the institutional and coordination mechanisms of government, the lack of a digital transformation strategy and roadmap, and limited human and financial resources devoted to the task. Senior technical staff throughout Jamaica have a clear understanding of global developments and opportunities within the digital space and the specific challenges Jamaica encounters in exploiting them. The appointment in May 2023 of a new Minister without Portfolio for Skills and Digital Transformation provides a fresh opportunity for the GOJ to draw lessons from its past approaches to digital development and to build on the foundation that has been laid.

Going forward, the GOJ needs to embrace a whole-of-government approach to digital transformation and move away from the more fragmented policy environment in which authority for digital initiatives has generally been dispersed across MDAs with only limited steering from the center. Although there may be no single institution alone that can be responsible for all aspects of the digital transformation, a strong political and institutional mandate would be beneficial to driving the implementation of the digital agenda. Initiatives need to be guided by a single strategic framework that provides clear policy direction for all MDAs. Developing a digital transformation strategy would also help to reconcile the sequencing of multiple policy objectives and guide the trade-offs among competing public investment priorities. An "interim" digital strategy and a data governance framework would be a prudent first step in laying the groundwork for future interoperability across government.

To further advance its digital transformation, the GOJ would need to address the barriers that currently impede the inclusive and productive adoption of digital technologies. High prices for reliable internet services are among these obstacles; it is estimated that Jamaicans pay on average 7.9 percent of their average monthly gross national income for fixed broadband service compared to an average of 5.0 percent on the continent. Structural issues, such as limited competition and restricted access to upstream broadband infrastructure, contribute to higher costs and lower access to digital technologies compared to neighboring countries. Adoption of digital financial services (DFS) is limited, with only 40 percent of adults having made at least one digital payment in the past year. An ecosystem to incentivize the use of DFS is necessary to promote financial inclusion and maximize the reach of social protection programs. Moreover, Jamaica's score on the World Economic Forum's 2019 Global Competitiveness Index (93rd out of 141 countries) indicates that many Jamaicans lack the required skills to participate in and benefit from the digital economy. The government therefore needs to strengthen institutional capacity and reform certain laws and regulations to increase trust in digital technologies and to boost the digital economy ecosystem.

This report serves as input to guide Jamaica's digital transformation strategy, in line with the country's aspirations and its Vision 2030 National Development Plan. The report is based on the World Bank's Digital Economy Assessment methodology, which analyzes the digital economy across six pillars: digital infrastructure, digital public platforms, digital financial services, digital businesses, digital skills, and trust environment.

It examines the current state of Jamaica's digital ecosystem, including its strengths and weaknesses, and outlines a set of priority actions for the GOJ to accelerate its digital transformation. The report also provides a comprehensive set of recommendations that the GOJ may consider incorporating into its short- and medium-term policy and budget planning cycles to leverage digital technologies across the six pillars outlined above. Although the implementation of some of the recommendations entails new legislation or regulation, many actions can be pursued without legal changes.

The report organizes the findings of the six pillars into three main digital economy work streams that have an impact on the overall economy or that can be implemented across different sectors: **the digital economy enabling environment, digital public infrastructure and platforms, and digital skills and technology adoption**. Specific recommendations for the GOJ in these work streams are highlighted below:

PRIORITY REFORMS AND INITIATIVES ACROSS KEY PILLARS OF THE DIGITAL ECONOMY

1. The digital economy enabling environment translates into putting into place the legislation, decrees, and regulations required to encourage competition, investment, and innovation while promoting trust in and the security of online transactions. It also entails a reform of the institutional setup with the appropriate roles and mandates for implementing large-scale projects across diverse government entities and fostering a well-defined and streamlined government institutional architecture. The priority actions for Jamaica include:

- **Establish a well-defined institutional arrangement to drive digital government transformation,** including operationalizing the Ministry with portfolio responsibility for digital transformation and skills, and establishing an Information and Communications Technology Authority (ICTA).
- **Develop a digital transformation strategy and roadmap** with a sequencing based on the readiness and capacity of institutions, the level of investment needed, and/or the impact on people's lives.
- **Improve the affordability of internet services** by assessing the impact of direct and indirect taxation and levies on the services and strengthening competition in the telecommunications market.
- **Establish a comprehensive legal and regulatory framework for electronic retail payment services**, along with amendments to fintech sandbox guidelines.
- **Strengthen institutional capacity** and accelerate the implementation of the data privacy and cybersecurity frameworks.

2. Digital public infrastructure and platforms refers to developing the core infrastructure, information systems, and platforms needed to manage government operations efficiently and effectively and building on them to make public services widely accessible online. This will also ensure the interconnectivity and interoperability of data and information systems and the continuity of government operations and services, including DFS, among others. The priority actions for Jamaica in this workstream include:

- **Develop a basic enterprise architecture vision document** that sets the main directions and standards for future initiatives in information and communications technologies.
- **Promote advanced digital infrastructure to transform key sectors**, including investment in next generation infrastructure (fiber to the premises, 5G, and cloud computing) that can enable the modernization of the logistics sector and accelerate the adoption of smart agriculture in priority regions.

» **Continue the modernization of the DFS ecosystem** to promote DFS adoption and advance financial inclusion. This entails continued enhancements of the payment system infrastructure to improve interoperability and enable fast payment functionalities. Efforts should also be directed toward advancing the digitization of cross-border remittances and government-to-person social transfers.

3. Digital skills and technology adoption entails providing individuals and businesses with the tools needed for an advanced digital economy while fostering innovation and productivity. The supply of basic to intermediate skills requires a continued effort to strengthen school curricula and lifelong training for the private and public sectors. Yet, emerging high value-added sectors need advanced or specialized digital skills to grow. This calls for more coordinated and targeted public and private sector programs to create a pool of advanced digital talent that in turn can attract more investment by digital firms. Greater technology adoption also relies the growth of digitally enabled business models to drive demand for newly skilled employees. The priority actions for Jamaica in this workstream include:

» **Develop a shared vision for digital skills development.**

» **Improve the coordination,** monitoring, and evaluation of key initiatives.

» **Develop an upskilling and reskilling program for public sector employees** to accompany the development and implementation of digital public platforms.

» **Accelerate the demand for digital businesses and promote the growth of the innovation ecosystem** by expanding targeted digital transformation initiatives that address specific vertical competitiveness and cross-cutting strategic objectives, including business formalization, operational competitiveness, and export market readiness.

OVERVIEW

Digital technologies are transforming how individuals, businesses, and governments interact, creating new opportunities to address long-standing development challenges. Defined as electronic tools, systems, devices, and resources that generate, store, or process data, digital technologies have already changed how people learn, work, shop, socialize, and access information.[1] The impacts of this transformation are diverse and dynamic, from productivity gains across economic sectors to improvements in the efficiency and quality of service delivery and the creation of new sources of value. For policy makers in emerging markets, digital technologies also offer new pathways to address long-standing development challenges and to make strides in the growth of core economic activities.

In Jamaica, the Vision 2030 document and the Midterm Socio Economic Policy Framework 2021–2024 recognize the potential of digital technologies to help boost the country's social and economic development. Jamaica has prioritized its digital transformation agenda, and Prime Minister Andrew Holness has sought support from the World Bank and international partners to ensure that Jamaica becomes a digital society. Vision 2030, Jamaica's National Development Plan, recognizes the fundamental role of science, technology, and innovation (ST&I) in advancing sustainable prosperity. The Midterm Socio Economic Policy Framework 2021–2024 places a priority on creating a technology-enabled society and addresses the challenges the country faces, such as low investment in research and development, a weak research and innovation culture, gaps in intellectual property protections, and the absence of a national innovation system. The Ministry of Science, Energy, Telecommunications and Transport (MSETT) has played an essential role in developing the country's digital strategy framework. For example, the ministry's 2011 information and communications technology (ICT) policy established a framework for ICT to support economic and social development. With the appointment of a new minister under the Office of the Prime Minister with direct oversight of skills and digital transformation, as well as the new National Identification System (NIDS), the government has demonstrated its commitment to Jamaica's digital transformation agenda.[2]

Following these commitments, Jamaica has made significant progress in its digital transformation in recent years. One hundred percent of the population is already covered by a 3G mobile network, and roughly 47 percent of households have access to fixed broadband (with various degrees of speed). Jamaica's score on the UN's E-Government Development Index reflects this progress, increasing from 0.4552 in 2012 to 0.5906 in 2022. The modernization of government functions is being leveraged to facilitate procedures for Jamaican citizens through eGov Jamaica and the implementation of ICT projects across government by the Transformation Implementation Unit (TIU). According to the Tax Administration Jamaica (TAJ), at least 80 percent of declarations are filed online for each core tax, and 99 percent of large taxpayers file core tax declarations online. Similarly, the Programme of Advancement through Health and Education (PATH), a conditional cash transfer program and Jamaica's main social assistance scheme, delivers 40 percent of payments to families digitally and plans to increase this to 57 percent by 2028. Financial services have also benefited from digital transformation, with the Bank of Jamaica (BOJ) granting legal tender status to the Jamaica Digital Exchange, or JAM-DEX, a central bank digital currency (CBDC) that aims to promote financial inclusion.

The country still faces several barriers to widespread digital transformation, however, hindering the digital economy's potential impact on its social and economic development. High prices for data and devices are among these obstacles. Jamaicans are paying 7.9 percent of their average monthly gross national income for a fixed broadband basket compared to an average of 5.0 percent on the continent. With underlying limited competition, low access and usage of the internet can lead to the exclusion of disadvantaged groups, higher information and search costs, constrained access to markets and new technologies, reduced labor productivity, and limited access to financial services. For example, in terms of financial inclusion through the expansion of digital financial services (DFS), only 40 percent of adults report having made at least one digital payment over the past year. Another barrier to the widespread digital transformation of the government is the weak mandate for implementing digital public platform initiatives, and the country's low digital skill levels present a similar obstacle to the wider transformation of the country's economy: Jamaica ranks 93rd out of 141 countries in World Economic Forum's 2019 Global Competitiveness Index.

Accelerating the adoption of digital technologies holds great promise for transforming Jamaica's public and private sectors. With more households and businesses using high-quality internet, the range of economic opportunities widens, including remote work and study, e-commerce, online offshoring and outsourcing, application-based activities, and the use financial

technologies. Digital transformation of government systems and public services in Jamaica, such as procurement, budgeting, and customs, has the potential to improve service delivery to individuals and businesses and enhance the attractiveness of the business environment. Adopting digital technology in the private sector and aligning market demand with a digitally skilled workforce can increase productivity growth and export sophistication. Furthermore, an ecosystem to incentivize the use of DFS with broad reach can accelerate the financial inclusion of individuals and micro, small, and medium-sized enterprises (MSMEs), while enabling the shift away from in-person, cash-based transactions. Developing state-of-the-art technologies, such as 5G and Internet of Things (IoT) connectivity, is an opportunity for Jamaica to unlock the potential of sectors that are central to its economy and social development, such as logistics, tourism, and agriculture.

The adoption of digital technologies can also create disparities, though Jamaica can take several measures to mitigate any negative impact from technology adoption in specific sectors. The impact of technology on productivity, employment, and wages is complex to measure, and the literature so far includes varying evidence and perspectives. For this reason, a digital transformation strategy should include an analysis and monitoring of the impact of technologies on various sectors to lay the groundwork for more targeted interventions. The GOJ can also include other mitigating measures, such as investing in retraining and upskilling in the public and private sectors to help workers acquire new skills and transition into emerging industries and ensuring that all citizens have access to digital technologies and the necessary skills to leverage them.

This assessment serves as input to help inform the GOJ's digital transformation strategy. Although it also provides policy recommendations, its main objective is to assist the country in identifying the key areas for expansion and in this way guiding important policy decisions on investments, action plans, and other steps to advance the digital transformation agenda. The report is based on the World Bank's Digital Economy Assessment (DEA) methodology, which, by examining the international experiences of digital businesses and public sector institutions, has identified a set of foundational elements that play a critical role in the digital transformation of economies. In line with this methodology, the report provides a wide-ranging overview of Jamaica's digital economy development across these six foundational elements or pillars: (a) digital infrastructure; (b) digital public platforms; (c) digital financial services; (d) digital businesses; (e) digital skills; (f) trust environment.

Based on the assessment, the report outlines a set of priority actions for the GOJ to accelerate its digital transformation. It also provides a comprehensive set of recommendations that the GOJ may consider incorporating into its short- and medium-term policy and budget planning cycle. Although the implementation of some of the recommendations entails new legislation or regulation, many actions can be pursued without legal changes. The report organizes the findings of the six pillars outlined above into three main digital economy work streams that have an impact on the overall economy or that can be implemented across different sectors: **the digital economy enabling environment, digital public infrastructure and platforms, and digital skills and technology adoption**. Specific recommendations for the GOJ in these work streams are highlighted below:

PRIORITY REFORMS AND INITIATIVES ACROSS THE VARIOUS PILLARS OF THE DIGITAL ECONOMY

1. The digital economy enabling environment translates into putting in place the legislation, decrees, and regulations required to encourage competition, investment, and innovation while promoting trust in and the security of online transactions. It also entails a reform of the institutional setup with the appropriate roles and mandates for implementing large-scale projects across diverse government entities and fostering a well-defined and streamlined government institutional architecture. The priority actions for Jamaica include:

- **Establish a well-defined institutional arrangement to drive digital government transformation,** including operationalizing the Ministry with portfolio responsibility for digital transformation and skills, and establishing an Information and Communications Technology Authority (ICTA).
- **Develop a digital transformation strategy and roadmap** with a sequencing based on the readiness and capacity of institutions, the level of investment needed, and/or the impact on people's lives.
- **Improve the affordability of internet services** by assessing the impact of direct and indirect taxation and levies on the services and strengthening competition in the telecommunications market.
- **Establish a comprehensive legal and regulatory framework for electronic retail payment services**, along with amendments to fintech sandbox guidelines.
- **Strengthen institutional capacity** and accelerate the implementation of the data privacy and cybersecurity frameworks.

2. Digital public infrastructure and platforms refers to developing the core infrastructure, information systems, and platforms needed to manage government operations efficiently and effectively and building on them to make public services widely accessible online. This will also ensure the interconnectivity and interoperability of data and information systems and the continuity of government operations and services, including DFS, among others. The priority actions for Jamaica in this workstream include:

- **Develop a basic enterprise architecture vision document** that sets the main directions and standards for future ICT initiatives.
- **Promote advanced digital infrastructure to transform key sectors,** including investment in next generation infrastructure (fiber to the premises, 5G, and cloud computing) that can enable the modernization of the logistics sector and accelerate the adoption of smart agriculture in priority regions.
- **Continue the modernization of the DFS ecosystem** to promote DFS adoption and advance financial inclusion. This entails continued enhancements of the payment system infrastructure to improve interoperability and enable fast payment functionalities. Efforts should also be directed toward advancing the digitization of cross-border remittances and government-to-person social transfers.

3. Digital skills and technology adoption entails providing individuals and businesses with the tools needed for an advanced digital economy while fostering innovation and productivity. The supply of basic to intermediate skills requires a continued effort to strengthen school curricula and lifelong training for the private and public sectors. The newer high value-added sectors need more targeted public and private sector programs to create a pool of advanced digital talent for the emerging advanced technologies. This in turn can attract more investment by digital firms. Greater technology adoption also relies on the growth of digitally-enabled business models to drive demand for newly skilled employees. The priority actions for Jamaica in this workstream include:

- **Develop a shared vision for digital skills development.**
- **Improve the coordination,** monitoring, and evaluation of key initiatives.
- **Develop an upskilling and reskilling program for public sector employees** to accompany the development and implementation of digital public platforms.
- **Accelerate the demand for digital businesses and promote the growth of the innovation ecosystem** by expanding targeted digital transformation initiatives that address specific vertical competitiveness and cross-cutting strategic objectives, including business formalization, operational competitiveness, and export market readiness.

The detailed findings of the report presented below are organized into six chapters, each dealing with a pillar of the digital economy. Each pillar presents policy recommendations that can inform relevant efforts by national authorities, the private sector, and development partners. The section below summarizes the main findings on each digital economy pillar.

DIGITAL INFRASTRUCTURE:

Inclusive growth through adequate digital infrastructure

The importance of digital infrastructure

Digital infrastructure plays a crucial role in driving Jamaica's digital transformation and unlocking the potential of key sectors, such as public services, logistics, e-commerce, tourism, and agriculture. It enables the streamlining of government functions and the delivery of citizen-centric services, promoting efficiency and transparency. Expanding digital infrastructure is vital for reducing spatial inequalities by connecting rural areas to markets, services, remittances, and social protection. Cloud computing and data storage, for example, support small and medium-sized enterprises to scale IT resources easily and affordably, fostering private sector growth. Digital infrastructure also supports climate change adaptation and disaster response, facilitates communication and coordination between stakeholders, and acts as a key enabler for emerging technologies, such as IoT and artificial intelligence (AI).

Demand and usage of broadband services

Jamaica faces challenges related to broadband usage and affordability, as well as quality of service. Sixty percent of people in Jamaica have a unique mobile broadband subscription, lower than such countries as Costa Rica and Georgia (both 76 percent). International bandwidth used in Megabits per second (Mbps) in Jamaica are also below relevant peers in the Caribbean region and worldwide. Internet usage varies between rural and urban areas (67 and 82 percent, respectively). Gaps in usage could be linked to a variety of underlying factors, such as the quality and affordability of mobile broadband services on the supply side or digital literacy and the availability of services on the demand side. The high prices for fixed broadband service noted above impact the lower-income population disproportionately, as the lowest quintile of income pays between 10 and 25 percent of their income, depending on the service.

Bottlenecks at the value chain

Jamaica is connected to the global data network through six subsea cables, though options for international connectivity for current and future needs are limited. The main subsea cables are owned and operated by a single operator, C&W Networks. Currently there is no clear mandate for C&W to provide wholesale international data transit on equal and transparent terms to all providers, a mandate that could lower the end-user prices for broadband services and increase the adoption of digital services. According to TeleGeography, international bandwidth used in Jamaica is expected to grow at a compounded annual rate of 33 percent between 2022 and 2029. To meet this volume, additional subsea cables may also be needed in the medium to long term, given that the expansion of capacity on the existing cables is limited. With the growing need for capacity and lower latency worldwide, Jamaica could grow into a regional hub to provide international transit providers with alternative international routes and reduced data latency.

The increasing demand for data processing, storage, and cloud services highlights the need for Jamaica to upgrade the backbone, internet exchange point (IXP), and data storage infrastructure to overcome limitations on capacity and network reach. The backbone footprint in Jamaica is fragmented and needs further expansion and resilience to support the growth of mobile and fixed access networks across the island. There is currently one IXP in Jamaica, operated by the Office of Utilities Regulation (OUR) and located at the eGov data center. IXPs, complemented with cache servers, reduce latency and data costs, increase broadband speed, and improve connectivity quality. There are currently no colocation data centers, cloud regions, or content providers hosting in Jamaica. Due to its small size, attracting investment in this area might not be highly profitable yet. In the meantime, how well data or cloud computing services are transferred to and from the main regional nodes (reliable international and backbone infrastructure) would impact the user experience and the choice between one application versus its competitors.

Mobile networks cover most of the Jamaican population, but fixed fiber connectivity needs to be improved. Although coverage for mobile networks is high, the development of sector or geographic areas will require densifying the mobile network and increasing the footprint of fiber connectivity. Reliable and universal connectivity can promote health care, entertainment, agriculture, and forestry in rural areas. Mobile networks will require new investments in 5G to enable more precise applications for IoT in agriculture, port logistics, and other high-capacity applications.

Sector governance, policy, and regulatory environment

Modernizing legislation and strengthening regulatory tools are important to fostering the development of a reliable and resilient digital infrastructure. The Telecommunications Act was adopted in 2000 and needs to be modernized to address technology changes, including the switch from voice to data-based communications, the convergence of services and infrastructure, and the changing ecosystem of digital infrastructure. Streamlining the licensing regime, strengthening the ex ante anti-competitive regulations, and developing clear guidelines for dispute resolution are important priorities for the market.

Jamaica's current regulations on infrastructure sharing are not yet comprehensive and do not facilitate access to essential infrastructure for new or less-dominant operators, thus delaying investments in and the deployment of fiber networks across the island. To strengthen these rules, the OUR would need to conduct a market assessment, determining significant market power and mandating a reference offer on these operators to provide open access and cost-based wholesale services to smaller and new entrant operators.

Jamaica has a full set of institutions that regulate, promote, and oversee the telecommunications sector, but some institutional mandates overlap, which may decrease regulatory efficiency. Good institutional coordination and the streamlining of functions and services to the private sector are important to decreasing uncertainty and improving the environment for private operators and service providers.

DIGITAL PUBLIC PLATFORMS:

A whole-of-government approach to facilitate service delivery and process improvement

The development of digital platforms is an essential lever for the digital transformation of the whole economy. Digital public platforms can transform how governments interact with citizens and businesses and optimize public value by reducing costs and improving productivity.

Institutional and strategic framework

Although the value of digital government has been widely embraced in Jamaica, the government lacks a comprehensive digital government strategy that can be translated into an action plan. ICT blueprints and policy documents developed over the past decade are not updated or detailed enough to serve as a practical guide to addressing the constantly evolving digital challenges.

The responsibility for digital development is dispersed across government, and no one institution has overarching authority in this area. The resulting policy void hinders data sharing, interoperability, cybersecurity, and the overall reform process. Despite the lack of agreed standards and guidelines, ministries, departments, and agencies (MDAs) continue to invest in digital platforms while also awaiting the launch of ICTA and the appointment of the Chief Information Officer. Given the lengthy delays in operationalizing the ICTA, Jamaica should consider interim solutions to guide its digital agenda and an updated roadmap tailored to its specific needs and constraints. Such a roadmap could enable a gradual, fiscally credible digital transformation pathway that can be integrated into a more comprehensive strategy later.

Digital ID and trust services

Jamaica does not presently have a foundational ID that serves as general-purpose identification usable across all activities. Instead, the country has functional IDs, such as passports, electoral IDs, driver's licenses, and the Tax Registration Number (TRN). Jamaica is currently in the process of introducing a new, unique, and unified ID system that is both digital and physical.

The GOJ could use the momentum of establishing a digital ID to set up single sign-on (SSO) for government-to-citizen (G2C), government-to-business (G2B), and government-to-government (G2G) use. SSO is a system that allows a user to use one set of log-in credentials to access multiple applications or services. The Jamaican government could already implement an SSO module without waiting for the official launch of the digital ID.

Interoperability and shared services

The GOJ aims to implement interoperability and shared services layers within its platforms, but so far progress has been limited. Jamaica should adopt a "building-blocks" approach to bringing services online, focusing on common functions and ensuring interoperability across platforms. The TIU is working on a shared services platform that combines many of the government's core functions, such as human resources, payroll, procurement, and financial management. Concurrently, eGov seeks to develop the Jamaica Data Exchange Platform (JDXP), which would allow for data sharing across government agencies, resembling Estonia's X-Road. The JDXP is currently at the concept stage, with sustainable funding yet to be identified. Despite these initiatives, interoperability between GOJ databases is still rare. Even though several ICT systems are hosted and managed by eGov Jamaica, information is shared only in limited instances. To enable interoperability, efforts to synchronize the technology stack, standards, and protocols are needed.

Service delivery (G2C/G2B)

The Office of the Cabinet oversees the government's service delivery platform and is working on an updated version of the government portal with more end-to-end digitalized services. The existing platform intends to provide a single source of information for residents and businesses regarding MDA responsibilities and service requirements. However, despite the well-established vision for an updated service delivery platform, services are still being developed in a stand-alone mode. Each MDA currently develops its services independently, without using standardized guidelines for data exchange and reuse or relying on an interoperability layer. This can lead to difficulties in reusing or integrating services into other interfaces, a lack of consistency, and increased

costs. By centrally developing standard functionalities connected to customized workflows, however, the country can successfully digitize services and ensure a seamless exchange of information, avoiding delays in service delivery. The Office of the Cabinet has taken steps to evaluate GOJ services and identify priority measures for re-engineering and digital transformation, taking into account the needs of selected MDAs, and intends to integrate a proposal for funding consideration by the Public Investment Management Committee.

Back-office systems (G2G)

Jamaica's fragmented development of core government (G2G) back-office systems hinders effective G2C and G2B service delivery, leading to inconsistencies, inefficiencies, and increased security risks. As the current governance model is heavily decentralized, there is no comprehensive inventory of its back-office systems, leading to a fragmented IT landscape. Jamaica should adopt a centralized management approach and whole-of-government strategy to address these issues, focusing on streamlining ICT service procurement and management while enhancing interoperability and information exchange across agencies. In the interim, the TIU has taken steps to consolidate and interconnect some core systems, building a technological layer where the applications could interconnect using application programming interfaces (APIs). By developing standard functionalities as "modules" connected to customized workflows, Jamaica can maximize resource utilization, strengthen the effectiveness of digital public platforms, and facilitate seamless service delivery.

Data management and hosting

The TIU and eGov are working to consolidate government infrastructure and upgrade the GOJ's data center to near Tier-3-equivalent specifications, improving management and security. Despite such challenges as limited hosting capacity, unclear cloud policy, and offshore vendor hosting of critical systems (budget planning), Jamaica can benefit from more extensive centralization of ICT functions within government. By leveraging economies of scale, the government can achieve efficiency gains, cost savings, and more effective use of (financial and human) resources while addressing concerns about data security and sovereignty.

Platform management and cybersecurity

Centralizing the management of ICT assets is crucial for cost-effective and sustainable digital public platforms. To drive effective digital transformation in Jamaica, it is essential to establish one clear political and institutional authority that unites stakeholders under a shared vision. A starting point would be to assess the current information systems used by different government entities and identify the services they provide. The fragmented approach to managing digital assets and information leads to higher costs and resource demands, which are unsustainable. Moreover, a comprehensive enterprise architecture, robust cybersecurity measures, and alignment with international standards are essential to establishing trust in new service channels and safeguarding core systems from cyberattacks. The guiding government body should develop a security and data protection framework that includes security policies, regular assessments and audits, employee training, and incident response procedures to ensure data security, data privacy, and effective utilization of technology in government operations. By centralizing asset management, Jamaica can streamline processes and optimize resource allocation, while at the same time prioritizing cybersecurity and data protection.

DIGITAL FINANCIAL SERVICES:

Accelerating the adoption of DFS for financial inclusion

DFS are a critical enabler of the digital economy and can help to overcome the cost, accessibility, and product design barriers that have historically driven financial exclusion. The G20 High-Level Principles for Digital Financial Inclusion define DFS as financial products and services, including payments, transfers, savings, credit, insurance, securities, financial planning, and account statements. These are delivered via digital/electronic technology, such as e-money (initiated either online or on a mobile phone), payment cards, and regular bank accounts. Digital payments often serve as the entry point and "rails" for a DFS ecosystem and enable consumers to easily make and receive payments from friends, family, retailers, service providers, and government authorities. Greater uptake and usage of DFS help foster the growth of digital businesses by ensuring convenient, fast, safe, and transparent payments. Universal

access to DFS can also facilitate greater use of digital public platforms, including the rapid and efficient delivery of social transfer payments through digital channels.

Access to a transaction account is relatively high in Jamaica, but DFS adoption is not yet widespread. The access level for transaction accounts with financial institutions in Jamaica is relatively high at 73 percent, which is on par with regional peers and the average for Latin America and the Caribbean (LAC) (also 73 percent), but it lags behind the upper-middle-income country (UMIC) average of 84 percent. When breaking down access levels by different criteria, such as gender, age, income, and labor status, a similar pattern is observed: although Jamaica does well compared to regional peers (with a few exceptions), it lags behind other peers as well as UMIC averages. Within the country itself, the access levels of those population segments that are typically considered vulnerable (e.g., the poor, those out of the labor force, rural dwellers, women) are not far off from the general population average. On ownership of payment instruments such as debit and credit cards, Jamaica lags behind most peers as well as the LAC and UMIC averages. However, the fact that non-bank deposit-taking institutions and other non-bank payment service providers (PSPs) have started issuing debit cards, alone or in partnership with banks, holds promise that debit and credit card ownership will rise in the country.

The number of those who have initiated and received digital payments is much lower than the number who have access to a transaction account. According to World Bank Findex 2021 data, 40 percent of adults reported that they had made at least one digital payment over the course of a year in the country, and 32 percent had received at least one digital payment. The low usage of digital payment instruments relates to several factors that still require attention in the Jamaican market. Cash is still prevalent in the country, fueled by the long-standing cash culture, the low levels of financial literacy among some population segments, the lack of digital payment acceptance among micro and small merchants, a lack of interoperability at the payment instrument and account level, the continued use of cheques by some government agencies, and the high costs on the digital payment side.

Although more work remains to be done, there has been a deliberate effort by the BOJ, the government, and market players to work together and accelerate the adoption and usage of digital payments, facilitated by new financial technologies (fintech) that promote financial inclusion. Some of those efforts include the implementation of a regulatory sandbox for PSPs, the revision of the Payment Systems Law, the digitization of government payments, the introduction of a CBDC (JAM-DEX), and plans to upgrade the Real Time Gross Settlement (RTGS) system and the Automated Clearing House (ACH). Moreover, in 2017 the country implemented a National Financial Inclusion Strategy, which was updated in 2021, with five key objectives: (a) increasing the use of digital payments and banking services, (b) improving financial literacy; (c) enhancing consumer protection; (d) promoting MSME finance; and (e) improving the financial inclusion data infrastructure.

Legal and regulatory framework

The BOJ withdrew its guidelines for electronic retail payment services in 2019 and is now working on a new legal regulatory framework for overseeing and supervising PSPs. It is expedient and necessary that the BOJ bring in an interim guidance and regulatory framework (with a sunset clause) to transition entities that are graduating or that are likely to graduate from the sandbox into authorized and licensed institutions, given that the amendments to the Payment Clearing and Settlement Act (PCSA) could take more time.

The BOJ established a fintech regulatory sandbox in 2020 to achieve a number of public policy objectives by encouraging innovations in financial services and promoting financial inclusion and competition. The regulatory sandbox provides the framework for approval of PSPs and ensures the appropriateness of their processes, procedures, and contractual arrangements. The BOJ should consider amending its sandbox guidelines in order to promote competition and innovation in the payment ecosystem in Jamaica. The current requirement that a fintech firm with an innovative payment solution must partner with a deposit-taking institution (DTI) carries the risk that the fintech will have to share information on that innovative solution, potentially resulting in the firm's losing its competitive advantage.

The BOJ is exploring the option of open banking to encourage efficient access to financial information that would allow existing financial institutions to reduce the cost of onboarding new clients. This would also enable third-party providers to offer services at better terms and conditions than existing banks and financial institutions. It will be important during the process to conduct a gap analysis for a better understanding of the different data-sharing initiatives, API adoption, and legal and regulatory framework, as well as the role that existing infrastructures and services, such as credit bureaus and retail payments, could play in the provision of account information and payment initiation services.

Infrastructure

Jamaica has a well-developed payment and settlement systems infrastructure (RTGS, ACH, card switches, CBDC). On the RTGS side, the BOJ has initiated efforts to migrate to International Organization for Standardization (ISO) 20022 message standards from the existing SWIFT MT standards with respect to JamClear-RTGS. On the retail side, access to the ACH was previously limited only to the commercial banks that had an ownership stake. Other entities, such as the remittance service providers and credit unions, do not have direct access to the ACH services. There is no tiered membership in the ACH, which, to a significant extent, has hampered the ability of remittance service providers and credit unions to provide various electronic retail payment products to their customers. Moreover, the Bank of Jamaica Act (BOJA) was amended in June 2022 to provide legal tender status to JAM-DEX. One of the key objectives of the BOJ in introducing the CBDC was financial inclusion, as JAM-DEX is seen as an easy, safe, efficient, secure, and convenient way to pay for goods and services for all Jamaicans. JAM-DEX is available to members of the public through a digital wallet provided by a wallet provider that could be a bank, building society, merchant bank, or authorized PSP.

Market dynamics

There are several actors that operate in the retail payments market of Jamaica: banks, credit/savings unions, money transfer operators, payment aggregators, and digital wallet providers. Although there is interoperability pertaining to automated teller machine (ATM) and point-of-sale infrastructure on international brand card use in Jamaica, there are also several closed-loop solutions that banks have developed for merchant payment acceptance. The lack of interoperability across different payment instruments and PSPs for merchant acceptance leads to inconvenience and higher up-front and transaction costs, particularly for micro and small merchants. Having national QR code standards that could support multiple payment instruments, beyond just cards, could help overcome cost and convenience issues.

Financial literacy

Financial literacy is an important lever to further advance financial inclusion and usage of digital payments in Jamaica. In 2020, the BOJ launched a financial literacy program to promote greater understanding of financial concepts and the relevant laws, including simplified customer due diligence requirements, through traditional and digital media. However, there is still a need to employ additional such programs to target the main factors that inhibit individuals and merchants from accessing and using transaction accounts and digital payments. These programs could specifically address how accounts can effectively help meet payment and store-of-value needs and also target specific “fear” factors, such as: i) the lack of sound proof of payment if paper is not used; (b) vulnerability to fraud; (c) unresponsive, complicated systems prone to operational error; and (d) loss of privacy. This could also be done by targeting particular population segments such as remittance recipients that might benefit even more from such programs and campaigns.

DIGITAL BUSINESSES:

Promoting digital business growth through an enhanced business environment and capacity building

Digital business can play a strategic role in unleashing opportunities for economic growth, digital transformation across key sectors, higher value job creation, and increased social inclusion. Jamaica has made notable progress in expanding the digital economy over the past decade, from attracting key foreign direct investments in its business process outsourcing (BPO) sector to developing the foundations of a digital entrepreneurship ecosystem and assisting MSMEs to become more competitive in the regional market. Overall, Jamaica has become a relatively high performer in terms of digital business density (i.e., the number of digital businesses relative to GDP and population for 2021) in the LAC region. Despite these early successes, however, most digital economy development efforts related to MSMEs have not yet reaped the benefits to sustain improved productivity, profitability, and market reach. This is especially the case when considering the digital transformation efforts in key sectors, such as agrobusiness, manufacturing, and retail and tourism, that require harmonious approaches, methods, and tools tailored to specific value chains.

Policy, legal, and regulatory reforms have contributed to the development of Jamaica's digital business ecosystem. Under the leadership of the Office of the Prime Minister and the MSETT, the Vision 2030 Jamaica ICT Sector Plan provided a framework in 2012 that emphasized the importance of ICT adoption across all sectors, including the public sector, ensured the consistency and continuity of long-term economic planning, and catalyzed numerous initiatives, including the establishment of the E- Learning Project, the Universal Access Company Limited, and the Jamaica Intellectual Property Office. The framework also led to the definition of the National Cybersecurity Strategy (NCS) in 2015, the Cybercrime Act of 2015, and the Data Protection Act (DPA) of 2020, as well as several foundational policies to adapt to the requisites of the digital economy. However, many of the provisions to stimulate investments in the digital economy, such as to prevent cybercrime, regulate e-transactions and e-commerce, encourage open data initiatives, and protect supplier and consumer data, are not yet in effect.

Growth outside of Jamaica could be an important avenue for accessing regional private investment and regional value chains to help Jamaican firms to scale their productive capacity, develop human capital, and increase revenues by trading across borders. In the context of a small domestic market, Jamaican digital businesses need to specialize with vertical-specific offerings to competitively meet rapidly evolving market demand that would translate into more resilient embeddedness in regional markets and, in some cases, international markets. As highlighted in the 2022 Country Private Sector Diagnostic, this repositioning can begin in outsourcing services and agricultural value chains. As part of this effort, competitive niches could include adjacent market opportunities, such as manufacturing and logistics in the case of agricultural value chains and tourism and entertainment in the case of outsourcing services.

Repositioning Jamaica as a higher-value destination for global services delivery will be essential to sustaining further investments and large-size outsourcing deals. In addition to the 2022 National Strategy for Global Digital Services Sector Development, another important update was the 2022 Investment Climate Policy, which revisited Jamaica's enabling environment to continuously and consistently improve competitiveness and entice both foreign and national investment. The MSETT and the Jamaica Promotions Corporation (JAMPRO) have been working with government ministries and other public and private entities, including the Global Services Association of Jamaica, the Jamaica Technology and Digital Alliance, and the Global Services Skills Council, to ensure scalable capacity from infrastructure to skills. These efforts are crucial to building on the progress made in BPO sector development by preparing the country for a notable increase in the provision of information and knowledge process outsourcing services as early as 2025 while ensuring an improved position in key global benchmarks of foreign direct investment, including those related to global service delivery.

It is crucial that private and public stakeholders develop dynamic data collection methods and tools to inform policy, increase transparency, identify bottlenecks, define adequate support mechanisms, and ensure tailored approaches to digital transformation and sustained growth efforts. Currently there is limited data on start-up companies and overall firm-level technology adoption that are segmented by firm size, sector, and digital maturity. For example, the World Bank's Enterprise Surveys on this topic date back to 2010. Many MSMEs misconstrue what it means to go digital and often do not have the means to do so beyond the initial digitalization of their operations. During the recent COVID-19 pandemic, the Development Bank of Jamaica (DBJ) offered grant programs to businesses looking to go digital. However, according to several public stakeholders, this was underutilized, as most businesses opted mainly to boost their social media presence. Looking ahead, tailored approaches that are supported by market and business intelligence data can improve the design and implementation of sectoral digital development or cross-cutting digital business programs.

Further reforms can build on recent progress in entrepreneurship and foster a more mature stage of development specific to Jamaica's digital innovation ecosystem. With a score of 4.2 on the Global Entrepreneurship Monitor 2020/21, Jamaica fairs well relative to peers and some aspirational countries in both Latin America and Europe. Though the existing entrepreneurship policy framework initiated in 2013 at the Ministry of Industry, Investment and Commerce (MIIC) was updated in 2018 to broadly support MSMEs, it is not specific to digital businesses in a way that would create and capture value in emerging market development opportunities, ranging from the digitization of agriculture to the deployment of AI across industries and the adoption of the Metaverse among youth in creative industries. Moreover, public and private stakeholders should coordinate to prevent institutional bottlenecks that could stifle the distributed nature of collaborative innovation networks.

Nurturing more investment-ready digital firms would help Jamaica to move toward later-stage financing. Jamaica's young digital business landscape, coupled with limited early-stage financing capacity, has resulted

in a small pipeline of potential digital firms ready for investment. In the LAC region in comparison, later-stage financing, such as private equity, debt, and mezzanine financing, has been roughly 15 percent of digital business investments in the past decade. This indicates that Jamaica has some catching up to do in terms of nurturing and maturing young digital businesses to be ready for later-stage investments.

DIGITAL SKILLS:

Building a technology-enabled society through a shared vision for digital skills development

Digital skills are essential to realizing Jamaica's Vision 2030, but interventions need to be coordinated, monitored, and evaluated. The country's long-term development plan aspires to create a technology-enabled society to support the transition to a knowledge economy, and a digitally savvy workforce is essential to achieving this goal. Two major policies to advance Vision 2030 created a regulatory framework for investment in digital skills development: the National Science, Technology, and Innovation (ST&I) Policy and the ICT in Education Policy. Although these policies can enable the development of digital skills, Jamaica has yet to define concrete initiatives and the necessary target indicators. Multiple government agencies are actively involved in fostering digital skills, but initiatives are uncoordinated, as there is no strategy or framework that is commonly recognized, accepted, and used. Moreover, though the government has made important efforts to develop the capacity of teachers to integrate ICT into the classroom and to provide access to broadband and digital equipment to schools and students, these initiatives have not been evaluated in terms of their implementation or impact.

The level of digital skills for most of the existing workforce is likely to be basic or below, though there are multiple digital skills training and education offerings. Only 31 percent of workers (aged 24–64) have obtained the Caribbean Secondary Education Certificate (CSEC). Since formal integration of technology into basic education dates only to 2016, when the National Standards Curriculum (NSC) was introduced, current workers are likely to have learned digital skills informally if at all. Although the Human Employment and Resource Training/National Service Training Agency Trust (HEART/NSTA) initiative, many universities, and multiple other stakeholders offer programs to develop intermediate and advanced digital skills, the limited availability of this talent in Jamaica continues to be a common concern among employers and government officials. Some providers offer formal training that is quality assured and certified; others offer quick skilling programs for which quality assurance and formal certification are unclear. In addition, access to formal advanced education in digital skills in universities seems out of reach for an important share of Jamaicans due to poor learning outcomes among high-school graduates and unaffordable high-stakes examinations and university programs.

The development of digital skills for the future workforce is also hampered by important structural challenges. First, despite widespread access to basic education, many individuals do not gain fundamental numeracy and literacy skills in school, both of which are essential to developing digital skills. Second, the lack of connectivity and access to devices is a persistent challenge. Despite investments to enhance connectivity and access to technology for educational purposes, government officials estimate that 50 percent of students do not have devices and 50–60 percent did not attend online classes during COVID-19 due to a lack of connectivity, particularly in rural areas. Third, support for teachers to develop and use digital skills in the classroom appears to be insufficient. Despite investments in teacher training in ICT, most stakeholders believe that the lack of teacher capacity still poses a significant challenge to advancing digital skills in the country.

Jamaica's labor market currently calls for basic and intermediate digital skills, but emerging high value-added sectors need more advanced or specialized digital skills to grow. Currently, the largest sectors in terms of employment are not technology intensive. In 2022, half of the Jamaican workforce was employed in either wholesale and retail (18 percent), agriculture and fishing (14.5 percent), real estate (10.8 percent), or construction (10 percent), which suggests that the largest share of the demand for digital skills is likely to focus on basic and intermediate skills for firms that have integrated ICT. However, emerging and growing subsectors, such as knowledge processing outsourcing, cybersecurity, manufacturing, and creative industries, are expected to increase the demand for more advanced or specialized digital skills. Overall, the demand for digital skills at all levels is only going to grow as businesses and government agencies continue to integrate ICT into their operations and service delivery.

Improving coordination around a shared vision for digital skills development in Jamaica is a key policy priority. The vibrant engagement in digital skills development among public and private stakeholders suggests a shared understanding of its importance. However, uncoordinated action leads to inefficiencies and slows down progress. The creation of a national digital skills strategy that clarifies agencies' roles, establishes coordination mechanisms, adopts a common digital skills framework, develops a digital skills assessment system, and includes accountability measures could help address the existing fragmentation.

Monitoring and evaluation of key policy actions will also be essential input in the development of a digital skills strategy. To date, there have been no formal evaluations of the impact of such major initiatives as integrating ICT into the NSC and providing access to broadband and digital equipment to schools and students. Despite significant investment in recent years, limited access to connectivity and digital devices as well as lack of monitoring of digital skills development through a student's educational trajectory are key obstacles to digital skills development in Jamaica. Robust evaluations of these and other initiatives are essential in order to revise, recalibrate, and adjust them to achieve the intended effect. Such information would also be instrumental in the development of an overall digital skills strategy.

TRUST ENVIRONMENT:

Toward a national cybersecurity strategy

The regulation of data exchanges is indispensable to enabling the kind of interactions and data flows necessary to sustain a growing digital economy while at the same time ensuring that personal data are collected, processed, and stored fairly and lawfully. The World Bank's *2021 World Development Report* categorizes data policies and regulations as enablers and safeguards. Enablers are policies and regulations that facilitate the use of data as a necessary condition for the digital economy, such as through data-sharing models that underpin e-commerce transactions and public and private intent data. On the other hand, safeguards encompass policies and regulations that protect personal and non-personal data and prevent data abuse, cybercrime, and other misuse.

Privacy and data protection

Jamaica took a significant step in developing a data protection framework by enacting the DPA in 2020. Although the DPA is largely aligned with the European Union General Data Protection Regulation, its substantive provisions, including the rights of data subjects and the obligations of data controllers, will come into effect on November 30, 2023, after a two-year transition period. The DPA applies to both public and private sector organizations in Jamaica, regardless of their physical location, if they collect and process personal data that target individuals in the country. The Act also grants data subjects various rights, such as the right to access, rectify, and erase their data, the right to object to the processing of their data, and the right not to be subject to automated decision making.

The operationalization of the DPA is still in progress, and secondary regulations, directives, and guidelines to support its compliance and enforcement are yet to be developed. The Office of the Information Commissioner (OIC) is the primary supervisory authority responsible for enforcing data protection standards and ensuring compliance with the DPA. The OIC has the authority to monitor and enforce data protection standards, issue warnings and orders, conduct investigations, and provide guidance and recommendations. However, to facilitate compliance with the DPA, the adoption of secondary regulation and OIC directives and guidelines will be key.

Digital identification

Jamaica is working toward modernizing its digital identification systems, with a focus on the NIDS. The NIDS utilizes biometric data, such as fingerprints, facial features, and signatures, to assign a unique national identification number to each individual, aiming to improve government transactions, reduce identity fraud, and enhance service delivery. However, there have been concerns about the potential infringement of privacy rights due to the collection of biometric data. In 2019, the Jamaican Constitutional Court ruled that the mandatory biometric requirement violated the right to privacy, leading to the dissolution of the NIDS. This ruling emphasized the importance of respecting the privacy and liberty rights of all Jamaicans.

To ensure the effectiveness and efficiency of Jamaica's digital identification system, the country can learn from international best practices. Examples, such as New Zealand's RealMe and the United Kingdom's Verify systems, highlight the importance of user control, transparency, accountability, and robust security measures to protect data privacy. By incorporating similar approaches, Jamaica can create a user-friendly and secure system.

Jamaica's legal framework for electronic signatures is governed by the Electronic Transactions Act of 2006. The Act outlines guidelines for electronic signatures in specific situations, such as contracts, wills, and legal proceedings. To be valid and legally binding, electronic signatures in Jamaica must meet certain criteria, such as uniqueness, control by the signatory, detectability of subsequent data changes, and use of reliable electronic signature creation methods.

National cybersecurity capacities

Jamaica's national cybersecurity capacities are still in the formative stage. Although Jamaica has made progress on its legal and regulatory frameworks and incident response capabilities, there is a need for further capacity development and for additional organizational and technical measures. The country faces significant cyber threats, as it currently experiences millions of cyberattack attempts and cyber incidents regularly targeting both public and private sector entities. However, the lack of mandatory incident reporting requirements hinders accurate measurement of the extent of cyber incidents and losses. Collaboration between public and private sector organizations and the Jamaica Computer Incident Response Team (JaCIRT) is also limited, and there is a need particularly to incentivize private sector stakeholders to work collaboratively with the public sector to enhance cyber resilience.

The establishment of a new National Cybersecurity Authority (NCA) and a national cybersecurity academy are underway, but greater efforts are needed to monitor cybersecurity threats. Jamaica has taken steps to integrate cybersecurity into its policy and legal frameworks and has established key cybersecurity bodies. However, there is a need for a new NCS and roadmap to address the evolving digital and cybersecurity environment, especially in light of the COVID-19 pandemic. By seeking greater international cooperation and aligning with international standards and best practices, Jamaica can strengthen its strategic and organizational cybersecurity measures.

Jamaica is neither a signatory party nor an observer to the Council of Europe's Budapest Convention. Jamaica's primary substantive and procedural cybercrime law, the Cybercrimes Act of 2015, has been under scrutiny and public review for further amendments since 2021. Given that the Act is being updated, the country should consider aligning it with the Council of Europe's Budapest Convention to enhance its cybersecurity framework. The establishment of the Command, Control, Communication, Computer, and Cyber (C5) Center and the provision of technological equipment aim to further enhance Jamaica's cybercrime response and investigatory capabilities. These efforts can serve as a national guarantee of reliability and security for prospective investors and businesses.

Jamaica has recognized the importance of protecting critical information infrastructure (CII) assets, although the specific sectors have not been officially identified. The NCS outlined activities to ensure the protection and resiliency of critical infrastructure systems. In 2016, Jamaica adopted the "Plan Secure Jamaica" (2016–2023), which included a focus on critical infrastructure protection and cyber defense. However, it is unclear if these activities have been carried out, leaving critical services highly exposed to cyberattacks. The government should adopt a comprehensive national CII protection plan and enhance cooperation between public and private sector operators of essential services. The cybersecurity strategy recently adopted in the United States provides an example of a comprehensive approach to defending CII that involves both government and private sector actors.

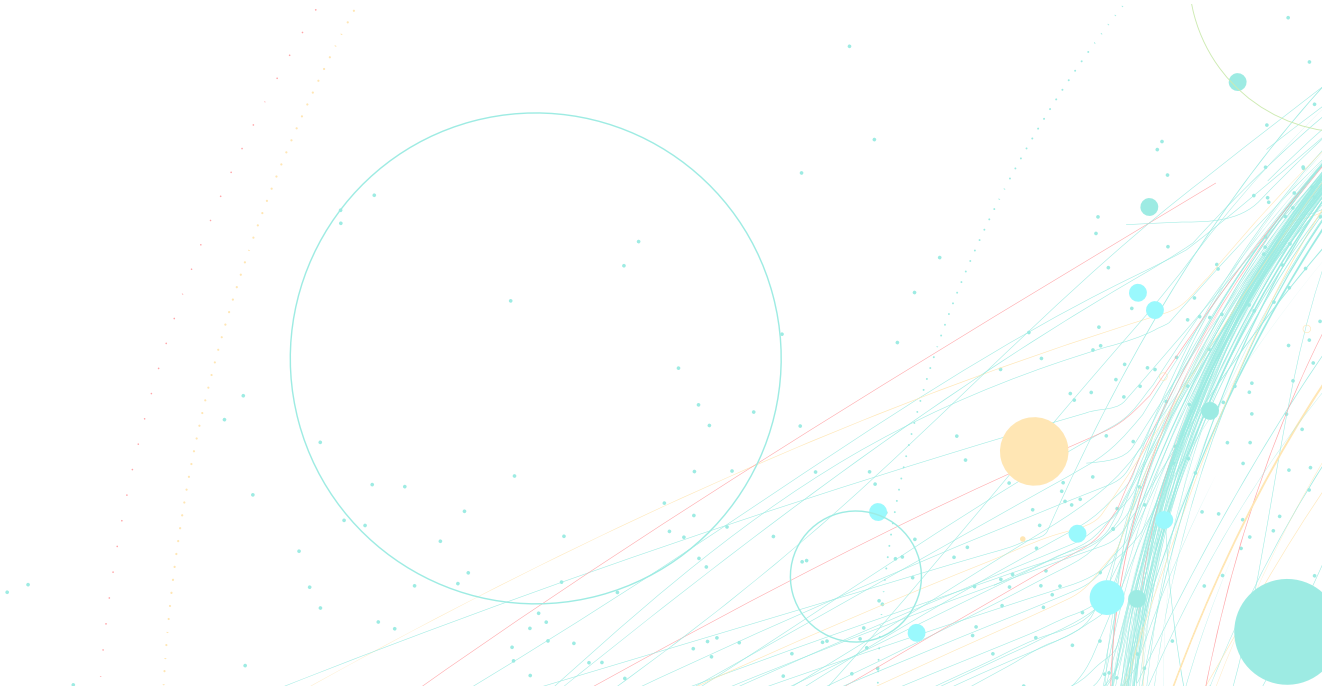


Table O.1. Summary of Key Policy Recommendations by Digital Economy Pillar (1 of 4)

Pillar	Timing	Recommendation	Responsible Entities
Digital Infrastructure	Short term	Strengthen the regulatory rules for digital infrastructure with a market analysis and a requirement for cost-based open access to international connectivity and landing points.	OUR, MSET
		Consider developing a public-private partnership framework to create a resilient and open access backbone network.	MSET, Ministry of Finance and the Public Service (MOFPS)
		Develop a strategic vision for attracting investment in international connectivity and data centers.	MSET, MOFPS, Planning Institute of Jamaica (PIOJ)
		Modernize sector monitoring, and design a set of statistics for sector diagnostics and public policy design.	OUR, Universal Service Fund (USF), MSET, Spectrum Management Authority (SMA), PIOJ
	Medium term	Strengthen IXP governance and capacity and discuss with content providers the installation of cache servers in Jamaica.	OUR, eGov, internet service providers/operators, MSET
		Design regulatory instruments to mandate cost-based open access to the backbone by any internet service provider or operator.	OUR, MSET, SMA
		Diversify international subsea connectivity by attracting new investors.	OUR, Investments Agency
Digital Public Platforms	Short term	**Operationalize the ICTA and the OIC.** The government could focus on addressing implementation challenges for the ICTA, clarifying its mandate, and offering a clear roadmap with political and financial support. The government should ensure that there is a single entity with the authority to convene stakeholders across the public and private sectors, resolve policy conflicts, guide resource allocations, stimulate collaboration, and monitor compliance with program targets over time. Additionally, leveraging the experience of eGov and the TIU might be beneficial while thoughtfully assessing the risks and benefits of potential mergers.	Office of the Prime Minister, MSET, MOFPS
		Develop an interim digital strategy that includes a digital enterprise architecture. The government can work on an interim digital strategy, including a simplified enterprise architecture, to lay the groundwork for interconnection and interoperability. Leveraging eGov and the TIU's experience and institutional knowledge may jumpstart this process while developing a comprehensive strategy.	OPM Office of the Prime Minister, MSET, eGov, MOFPS, TIU

Table O.1. Summary of Key Policy Recommendations by Digital Economy Pillar (2 of 4)

Pillar	Timing	Recommendation	Responsible Entities
Digital Public Platforms	Short term	**Complete the catalog of government services for priority MDAs.** To optimize the digitalization of services that are important to internal (G2G) and external (G2B, G2C) users, the GoJ would benefit from establishing a catalog of government services that includes, among other items: the degree of digitalization, the type of data required to carry out the service, the current ownership of the data, and data privacy considerations. Efforts initiated by the Cabinet Office to survey priority MDAs may need to be scaled up so that compliance with the inventory can be expedited and the results used to support the digital strategy.	Cabinet Office, eGov, TIU
		Develop an inventory for ICT systems. The GoJ does not have an updated list or inventory of the current information systems used by different MDAs. Developing an inventory for ICT systems, led by eGov and supported by the TIU, can help provide an overview and optimize technology usage and resources while identifying potential security risks.	eGov, TIU, MSET, MOFPS
		Ensure that no one is left behind in the digital ID rollout. The government must guarantee that every citizen has access to vital government services, regardless of whether they possess a digital ID. This can be achieved by offering alternative service options for individuals without a digital ID or assistance in acquiring one.	NIDS
	Medium term	**Develop a data governance framework.** Developing a data governance framework with experts from various line ministries can establish a data-driven public sector that improves policy and public service delivery. While waiting for the ICTA, the GoJ could decide on procedures and best practices like data formats, communication protocols, and APIs.	MSET, MOFPS, eGov, TIU
		Increase interoperability between core government systems. Increasing interoperability between core government systems could involve supporting the JDXP with a data integration policy and adopting a data governance framework. Utilizing APIs, web services, and frequent routine backups may ensure seamless information sharing, minimize duplication, and reduce data loss risks.	MSET, MOFPS, eGov, TIU
		Centralize government ICT functions to improve effectiveness and reinforce security. Centralizing government ICT functions, such as application hosting and cybersecurity monitoring, can lead to cost savings, increased security, and more efficient use of resources. A range of approaches can be implemented, such as reorganizing existing resources and adopting a shared services approach similar to that of the TIU.	MSET, MOFPS, eGov, TIU

Table O.1. Summary of Key Policy Recommendations by Digital Economy Pillar (3 of 4)

Pillar	Timing	Recommendation	Responsible Entities
Digital Businesses	Medium term	**Expand and better target digital transformation programs.** Ensure that programs such as Boosting Innovation, Growth and Entrepreneurship Ecosystems (BIGEE) continuously assess lessons and best practices to enhance MSMEs' digitalization and managerial capacity as part of their economic recovery efforts. Structure programs preferably by industry to promote vertical-specific methods and tools that can support the development of competitive clusters of MSMEs. This will require, among other measures, better data collection on sectoral distribution, age, ownership, etc., of digital businesses.	MIIC, with JAMPRO and the Jamaica Business Development Corporation (in partnership with private sector professional associations, such as the Jamaica Manufacturers and Exporters Association)
		Improve financing tailored to digital MSMEs. Adapt existing funding programs (e.g., ASMEF, Vertex, Stratus) and technical assistance programs (e.g., BIGEE, Innovation Grant from Ideas to Entrepreneurship [IGNITE]) to ensure that they become specialized by sector and address vertical-specific challenges and opportunities for Jamaica (e.g., global services delivery, creative industries, and agroindustry). Engage with the diaspora to achieve a virtuous cycle of upstream mergers and acquisitions investments in destination markets.	MOFPS, DBJ
Digital Financial Services	Short term	**Establish a regulatory framework for electronic retail payment services using the existing provisions of the BOJA and PCSA.**	BoJ
		Consider revising the ACH's existing access and participation criteria to enable both direct access and indirect tiering participation arrangements to all entities licensed by the BoJ, such as remittance service providers.	ACH Operator
		Quickly operationalize the interoperability feature of JAM-DEX by wallet providers under the overall direction of the BoJ.	BoJ
		Ensure that customers are provided with instant receipts by TAJ on any of the various systems for the tax amount paid.	TAJ
		Automate reconciliation procedures through coordination by the relevant authorities.	TAJ
		Take measures to automate the current manual procedures used for uploading government payment files, whether into the RTGS or the ACH.	BoJ, Accountant General's Department

Table O.1. Summary of Key Policy Recommendations by Digital Economy Pillar (4 of 4)

Pillar	Timing	Recommendation	Responsible Entities
Digital Financial Services	Medium term	**Take measures to further streamline and enhance the capabilities of the ACH to provide safer and more efficient services.**	ACH Operator
		Develop national QR code standards to foster interoperability across different payment instruments and PSPs, particularly for merchant acceptance.	BoJ, private sector
		Explore synergies between the eGov and TAJ portals to optimize the use of resources and to provide a seamless and efficient experience to the taxpayers.	TAJ
Digital Skills	Short term	**Establish baselines and benchmarks for digital skills development in the country.**	Ministry of Education and Youth (MOEY), Department of Schools' Services, Student Assessment Unit
		Increase monitoring standards and transparency for the implementation of teacher digital skills training, initiatives to improve access to broadband and devices, and the implementation of the NSC. Invest in evaluations to identify the effect or impact of these initiatives on, among other outcomes, digital skills development.	MOEY, USF, e-Learning Jamaica
	Medium term	**Improve coordination around a national digital skills strategy that clarifies agencies' roles, establishes coordination mechanisms,** adopts a common digital skills framework, develops a digital skills assessment system, and assigns monitoring, evaluation, and accountability measures.	TBD
Trust Environment	Short term	**Develop a new NCS to ensure a holistic approach to cybersecurity between government agencies and incentivize cyber hygiene in the private sector.**	TBD
		Develop a step-by step strategy and a roadmap of priorities for the full operationalization of the DPA. In accordance with the DPA, the OIC must develop a wide range of data-compliance norms that outline the data-protection mechanisms.	OIC
	Medium term	**Conduct sectoral consultations to determine the need for a sector-specific data protection regulation.**	OIC

Notes

1. Fan and Ouppara (2022).
2. Jamaican Observer (2023).

1. INTRODUCTION

Adopting digital technologies to increase service delivery efficiency, productivity, and inclusion

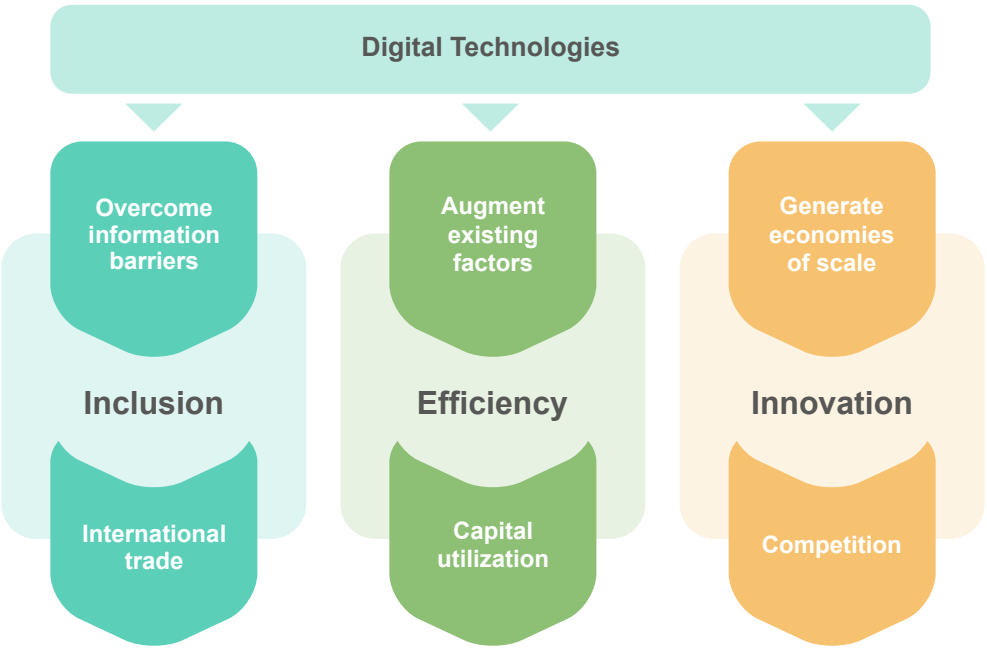
The widespread adoption of digital technologies is transforming how individuals, businesses, and governments interact and at the same time creating new opportunities to address long-standing development challenges. Digital technologies include a wide array of disruptive and transformative technologies, such as electronic systems, devices, and resources that generate, store, or process data, as well as other more advanced technologies, such as artificial intelligence (AI) and the Internet of Things (IoT),[1] that have begun to transform the way most people around the world learn, work, shop, socialize, and access information. Such technologies are also disrupting business models and economic structures and in many cases driving significant productivity gains.[2] For policy makers in emerging markets, digital technologies offer new pathways to address long-standing development challenges and can support better access to public services for citizens. Yet, as the World Bank's *Mobilizing Technology for Development* (2021) highlights, digital technologies require efforts in a number of analog complements, including policies, institutions, and skills, that enable their uptake.[3]

By 2025, the contribution of the digital economy to global GDP is expected to reach roughly 25 percent, up from 15.5 percent in 2016.[4] The concept of the digital economy as discussed in this report refers to all economic activity resulting from the use of information technology to create, adapt, market, or consume goods and services.[5] Data and digital technologies are the cornerstone of the digital economy, as they enable the growing interconnectedness of people, organizations, and machines through billions of daily online transactions.[6]

Jamaica has made significant progress in its efforts toward digital transformation. In 2021, 100 percent of the Jamaican population was covered by at least a 3G mobile network, and approximately 75 percent of households had access to the internet, albeit with varying degrees of quality. This reflects progress in the development of digital infrastructure. Public platforms have also seen progress in digital transformation through the efforts of several government entities, such as eGov Jamaica and the Transformation Implementation Unit (TIU), that have contributed to the implementation of information and communications technology (ICT) projects across government. Jamaica's score on the UN's E-Government Development Index reflects this progress, increasing from 0.4552 in 2012 to 0.5906 a decade later. The Government of Jamaica (GOJ) has also adopted a number of digital technologies that directly benefit Jamaican citizens. For example, according to the Tax Administration Jamaica (TAJ), at least 80 percent of declarations are filed online for each core tax, and 99 percent of large taxpayers file core tax declarations online. Similarly, digital financial services (DFS) have been used to support the country's main social assistance programs, promoting financial inclusion and social development. The Programme of Advancement through Health and Education (PATH), a conditional cash transfer scheme, delivers 40 percent of payments to families digitally and plans to increase this number to 57 percent by 2028. To do so, taking advantage of advances in DFS, such as the adoption of the Jamaica Digital Exchange (JAM-DEX), a central bank digital currency (CBDC) that received legal tender status in June 2022, will be key.

The GOJ has made deliberate efforts to lead initiatives that promote greater digital transformation and innovation through Vision 2030. Vision 2030, Jamaica's National Development Plan, recognizes the fundamental role of science, technology, and innovation (ST&I) in advancing sustainable prosperity through economic development and the creation of wealth and employment, the design and commercialization of new products and services, and improvements in the quality of life for all citizens. Within Vision 2030, the ICT Sector Plan (2009–2030)[7] considers ICT in two ways: i) as a sector in its own right; and ii) as an enabler of all other economic, social, environmental, and governance sectors.

Figure 1.1. Mechanisms of Digital Technologies and Growth



Source: Adapted from World Bank (2016).

In addition, the GOJ has established various initiatives to promote innovation and entrepreneurship. The Midterm Socio Economic Policy Framework 2021–2024 places a priority on creating a technology-enabled society and addresses the challenges Jamaica faces in ST&I, such as low investment in research and development, a weak research and innovation culture, gaps in intellectual property protections, and the absence of a national innovation system. These efforts aim to maximize the contribution of ST&I to the foundation of a knowledge-based society and innovation-based economy. The Ministry of Science, Energy, Telecommunications and Transport (MSETT), responsible for the digital infrastructure sector, has also played an essential role in developing the country's digital strategy framework. For example, the MSETT's 2011 ICT policy established a framework for ICT to support economic and social development. The MSETT also established an ICT Authority (ICTA) and implemented a 100 Day ICT Action Plan to address the immediate and short-term needs of coordinating a COVID-19 ICT-related response in the public sector.

Despite progress, Jamaica faces challenges in access to the internet, as well as internet use and quality. Although 3G coverage is comprehensive, there are significant disparities between rural and urban areas in internet access (67 and 82 percent, respectively). Moreover, there is a gap between access to mobile broadband services and usage, with only 61 percent of people having an active broadband subscription. These challenges can lead to the exclusion of disadvantaged groups, such as the elderly and the poor, from the potential benefits of a widespread digital transformation. Low access and usage of the internet can also result in higher information and search costs, limited access to markets and new technologies, reduced labor productivity, restricted access to financial services, and fewer opportunities for women's empowerment.[8] There is also room for improvement in terms of financial inclusion, as only 40 percent of adults in Jamaica reported having made at least one digital payment over the course of a year, and approximately a third having received at least one digital payment, according to World Bank Findex 2021 data.[9] Furthermore, Jamaica ranks 93rd out of 141 countries in the World Economic Forum's 2019 Global Competitiveness Index, indicating a large digital skills gap between the demand for digital skills and the capacity to respond to the talent deficit. A strategic vision of digital transformation can help unlock the social and economic development benefits of adopting digital technologies, as will be described in the pages below.

Inefficient service delivery, low productivity, economic and educational inequality, and vulnerability to climate change risks pose significant development challenges for Jamaica.

Digital infrastructure serves as a crucial foundation for Jamaica's digital transformation, enabling the enhancement of public services, e-commerce, and key sectors, such as tourism and agriculture, that are vital to the country's productivity and growth. Its applications include streamlining government functions, delivering citizen-centric services, and improving operational efficiency. Cloud infrastructure empowers small and medium-sized enterprises (SMEs) to scale IT resources economically, while expanding digital infrastructure aids in bridging spatial inequalities, supporting rural and peri-urban development, and increasing access to markets, public services, remittances, and social protection. Furthermore, a well-developed digital infrastructure contributes to climate change adaptation, environmental monitoring, disaster response, and coordination among stakeholders. Lastly, it acts as a critical enabler for such emerging technologies as IoT, AI, blockchain, and cloud computing.

Digitalizing core government systems and public services presents an opportunity to enhance service delivery and efficiency, thereby improving the country's capacity to reach rural and marginalized populations. Jamaica scored 0.541 on the World Bank GovTech Maturity Index,[10] slightly below an average of 0.547 in Latin America and the Caribbean (LAC), and was placed in group B (considered countries with high significant focus on GovTech), alongside Bolivia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Panama, and Paraguay. However, Jamaica's performance was weaker in the core government service index, where it received a score of 0.458 compared to LAC's 0.58, suggesting room for improvement in streamlining operations, such as procurement, budgeting, and customs. Such improvements could, for example, strengthen the government's ability to effectively target the beneficiaries of social protection programs. Similarly, a robust digital ID system and public digital platforms could enable the public sector to identify and support vulnerable communities better, ultimately expanding coverage of government services, especially for those living in rural and marginalized areas. Additionally, digital payments could eliminate many of the costs and frictions associated with providing payments or benefits.

The widespread adoption of digital technology in the private sector has the potential to boost productivity growth and increase export sophistication in Jamaica. The country has struggled with low productivity growth due to limited innovation and an unfavorable business environment. The service industry, particularly tourism, remains a dominant economic driver, accounting for 32 percent of GDP. However, the pandemic exposed the risks of overreliance on this sector, with international visitor arrivals plummeting by 69 percent in 2020.[11] To address this, there has been a shift toward faster-growing yet low-productivity sectors, such as hotels, restaurants, and construction, which have created employment opportunities for the poor and those in the bottom 40 percent of the income distribution. Promoting more digital-intensive sectors can potentially bring significant additional benefits to the economy by encouraging the growth of more productive sectors. For instance, a study by the International Telecommunication Union (ITU) finds that an increase of 1 percent in mobile investment can increase GDP by 0.097 percent, while a 1 percent increase in fixed telecom investment can lead to an increase in GDP of 0.023 percent, if all other variables are kept fixed. Additionally, an increase of 1 percent in total telecom investment is associated with a 0.09 percent increase in GDP.[12]

Prioritizing technology adoption in firms, along with investments in digital skills and organizational capacity, is crucial to improving productivity in the private sector. A study on manufacturing firms in 82 developing economies from 2002 to 2019 found that digital adoption, including email and website adoption, learning through exporting, and managerial experience, positively impacted revenue-based total factor productivity and factor demand.[13] However, the Caribbean region exhibits low levels of digital adoption and innovation: one study found that only 26 percent of surveyed firms in the region engaged in any innovative activity.[14] Although there is a lack of data on Jamaica specifically, indicators suggest low technology uptake. According to a 2018 survey by the Planning Institute of Jamaica (PIOJ), around two-thirds of firms in the country did not use the internet. Among those that did, the vast majority (94.5 percent) used it solely for sending or receiving emails, with only a few engaging in more sophisticated activities, such as receiving orders (45.1 percent), training staff (28.5 percent), or delivering products online (14.3 percent).[15] In addition, most firms do not leverage technology to streamline payment processes or take advantage of digital payments: of the firms with internet access, very few used it for online payments (48.7 percent), internet banking (49.1 percent), or accessing financial services (41.5 percent).[16] In Jamaica, adopting digital technologies can help firms access new markets, improve export capabilities, streamline production, and drive innovation. Additionally, DFS can lower financing costs for micro, small, and medium-sized enterprises (MSMEs) and promote more efficient and convenient payments, which are essential for e-commerce and platform-based business models.

Access to technology and improved digital skills can increase the economic and educational inclusion of marginalized communities and individuals, particularly in rural areas. There is a 15-percentage point gap in fixed broadband internet access between rural and urban households in Jamaica, which is problematic, given that half of the country's poor population resides in rural areas. Improving rural connectivity is necessary to developing a hybrid education system that is resilient to external shocks, as was demonstrated by the COVID-19 pandemic. During the pandemic, 50–60 percent of students, many of them in rural areas, did not attend online classes due to a lack of connectivity.[17] Digital competencies are also inadequate, indicating that technical and technological capacity should be developed to strengthen the digital skills of students at all levels. Efforts should also be made to facilitate the lifelong learning of digital skills in order to upskill and reskill the labor force. Currently, most digital skills interventions in Jamaica target individuals aged 34 and younger, excluding a significant portion of the workforce, potential customers for digital businesses, and citizens who could benefit from the digital transformation of public services.

Adoption of technological tools can strengthen Jamaica's resilience to the economic, climate, and security risks associated with climate change. In 2020, the government committed to ambitious targets under the Paris Agreement to transform Jamaica into a low-emissions and climate-resilient economy while fostering low-carbon and sustainable development. Yet, Jamaica continues to be highly susceptible to frequent and intense climate shocks, with approximately 90 percent of its US$14 billion GDP being produced in coastal zones, which exposes infrastructure, tourism, and agricultural assets.[18] Digital solutions, such as geographic information systems (GIS) to map and assess vulnerable areas, visualization tools with remote sensing, satellite imagery, Lidar data, and early warning systems, can all strengthen the country's resilience to climate disasters and improve planning and management capabilities.[19] Other tools, such as the digital mapping of maritime and coastal space and natural assets, can help facilitate cross-sector analysis and planning to promote the sustainable and inclusive growth of the blue economy.[20] Additionally, by establishing a proper measurement, reporting, and verification (MRV) system, which indicates when an activity has successfully avoided or removed greenhouse gas emissions and can be converted into credits with monetary value, the country can increase the traceability of its greenhouse gas emissions.[21] Low-carbon growth can also be supported by improving energy efficiency (e.g., electric demand management) and reducing emissions from other sectors (e.g., electrification of the transport sector).

Strengthening key enablers for the development of a well-functioning digital economy can help Jamaica address its key development challenges.

Strengthening key enablers for the development of a well-functioning digital economy can help Jamaica address its key development challenges. Universal access to the internet and other technologies can support efforts to close Jamaica's digital divide and consequently, address the country's development challenges. Digital transformation can also: (a) create more efficient service delivery and public sector operations; (b) spur productivity and innovation; (c) increase economic and educational inclusion; and (d) strengthen resilience to the economic, climate, and security risks that climate change poses.

This report provides a cross-cutting diagnostic of Jamaica's digital economy and offers policy recommendations to help the country address its digital divide and accelerate the pace of digital transformation. The analyses that follow are based on quantitative and qualitative assessments carried out with government entities, as well as extensive consultations with key public and private sector stakeholders in the country. The report is based on the World Bank's Digital Economy Assessment (DEA) methodology, which, by examining international experiences of digital businesses and public sector institutions, has identified a set of foundational elements that play a critical role in the digital transformation of economies, including: the availability of internet or broadband that brings people online, the capacity to identify and authenticate people digitally, and the ability to pay or transact digitally. Digital economies further energize when there is a sizable tech-savvy workforce and an ecosystem that supports digitally intensive firms in entering the market or scaling up. Once those foundations are in place, a wide array of use cases can emerge that denote all the ways by which a digital economy may take shape, serving people, businesses, and government in a process typically referred to as digital transformation. The private sector is the main driver of use cases, offering major platforms and applications, including e-commerce, gamification, and others. The government may also develop new government platforms, applications, and services to automate its functions, improving its efficiency and effectiveness. In line with the DEA methodology, this diagnostic provides a comprehensive overview of Jamaica's digital economy development across six specific pillars or foundational elements: digital infrastructure, digital public platforms, digital financial services, digital businesses, digital skills, and trust environment.

- **Digital Infrastructure:** This refers to the facilities that are involved in the effort to collect, exchange, store, process, and distribute data across first-mile (international links), middle-mile (backbone), and last-mile (access) networks. Digital infrastructure provides the way for people, businesses, and governments to get online and link with local and global digital services, thus connecting them to the global digital economy. It also encompasses IoT (such as mobile devices, computers, sensors, voice-activated devices, geospatial instruments, and machine-to-machine and vehicle-to-vehicle communications) and data repositories (such as data centers, internet exchange points and clouds). It also includes all the active and passive infrastructure necessary to develop the digital economy downstream.

- **Digital Public Platforms:** Digital Public platforms developed for the public sector or as a public good—either by government agencies, in partnership with private companies, or through a hybrid model—can help deliver more and better services to individuals. The development of digital public platforms underpins the expansion of e-government services and can support the efficiency of core government systems. Digital public platforms can also boost accountability, including through providing new channels for public engagement and feedback and reducing opportunities for corruption. Likewise, they can provide a foundational layer to catalyze private sector innovation and new markets.

- **Digital Financial Services:** DFS provide individuals and households with convenient and affordable channels by which to pay as well as to save and borrow. Firms can leverage DFS to more easily transact with their customers and suppliers and to build digital credit histories and seek financing. Governments can use DFS to increase efficiency and accountability in various payment streams, including for the disbursement of social transfers and receipt of tax payments. Digital payments are often the entry point for DFS and provide the infrastructure, or "rails," through which additional products and use cases can be developed, as has been demonstrated by the evolution of M-PESA in Kenya and Alipay in China. Digital payments and financial services are critical to financial inclusion and key enablers of e-commerce and digitally enabled business models.

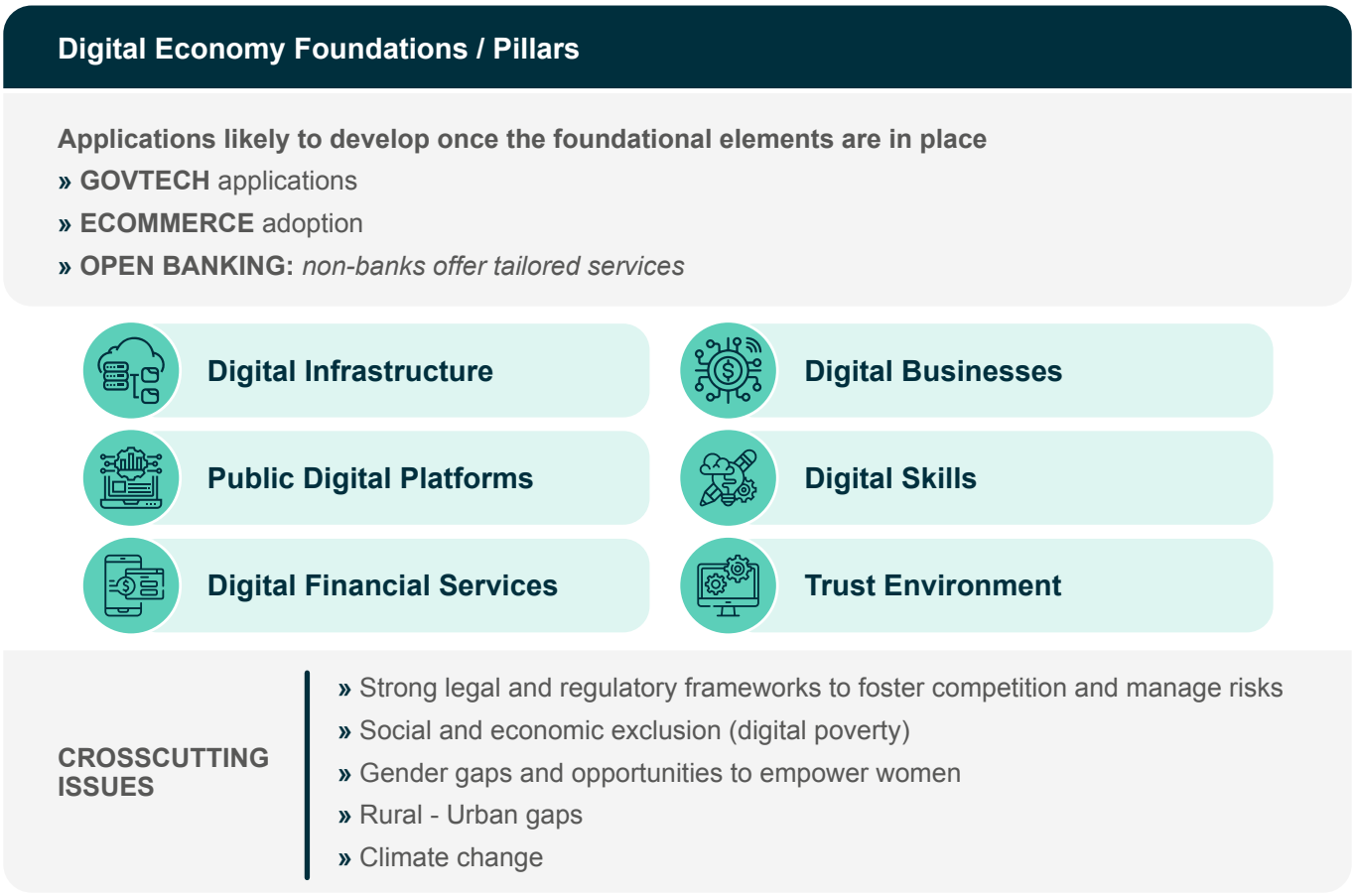
- **Digital Businesses:** Digital businesses can be divided into two categories, each with their distinct characteristics: (a) digital start-ups, which refer to early-stage ventures that create new digital solutions or business models as part of their core products or services, and (b) established digital businesses, which are the digitally intensive businesses that have managed to scale up and consolidate their position in local or international markets and include medium and large platform-based and data-driven firms. Digital businesses, and adoption of digital technologies among less technology-intensive firms, represent a unique opportunity for Jamaica to nurture and scale MSMEs, boost entrepreneurship, increase efficiency, generate more and better jobs, foster economic integration, and promote the integration of lagging populations and regions. Digital businesses thrive when other key enablers, such as digital infrastructure, skills, payments, and a trust environment, are set in place.

- **Digital Skills:** Economies require a digitally savvy workforce in order to build robust digital-intensive sectors and competitive markets. Digital skills encompass foundational, technology, and business skills for building or running a digital start-up or running a digitally intensive business. Greater digital literacy further enhances the adoption and use of digital products and services among governments and the larger population.

- **Trust Environment:** The rapid growth of the digital economy goes hand in hand with a rapid rise in cyber threats and increasing concerns about personal data protection. Therefore, the capacity of both the public and private sectors for cybersecurity and data protection needs to evolve quickly to meet current and future threats. This pillar assesses the presence of a governance framework that balances data enablers and safeguards and supports digital transformation while protecting individuals, businesses, and institutions from cybersecurity risks.

Multiple cross-cutting themes impact these foundational elements, affecting the country's capacity to create an enabling institutional and policy environment. The DEA framework addresses three cross-cutting themes: developing regulatory frameworks to foster competition and contribute to the World Bank's Maximizing Finance for Development (MFD) agenda; managing the risks of the widespread adoption of digital technologies; and generating opportunities to empower vulnerable populations. The diagnostic emphasizes inclusive, equitable, and sustainable access to digital opportunities as a means to improve household welfare, particularly for poor populations.

Figure 1.2. Pillars of the Digital Economy



Source: Authors, based on World Bank (2020).

The diagnostic includes practical and actionable recommendations in the form of a sequenced action plan that can inform relevant government efforts to promote the widespread adoption of digital technologies within government, businesses, and society at large. The report takes stock of existing digital transformation initiatives in Jamaica and identifies key constraints and priority areas, proposing a mix of possible policy reforms, investments, and capacity-building interventions to harness the economic and social benefits of widespread digital technology adoption and to effectively mitigate the associated risks, particularly in the critical areas of a digital economy.

The remainder of the report is organized as follows. Chapter 2 discusses the accessibility, quality, and resilience of digital infrastructure in Jamaica, as well as the availability and affordability of connectivity, which is essential to bringing more people online. Chapter 3 looks at the presence and use of digital public platforms that can support better digital exchanges and transactions, enhance the access to and transparency of public services, and improve public service efficiency. Chapter 4 examines the current state of DFS in the country, while Chapter 5 assesses digital entrepreneurship and established digital businesses. Chapter 6 examines demand for, as well as the attainment and coverage of, digital skills in Jamaica, a key enabler of the uptake of digital services and the application of digitally enabled solutions. Chapter 7 looks at the legal and regulatory framework for cybersecurity and data protection, describing the challenges and opportunities in creating a trust environment conducive to the further adoption of digital technologies.

Notes

1. https://ieg.worldbankgroup.org/evaluations/mobilizing-technology-development
2. See, for instance, OECD (2019).
3. https://ieg.worldbankgroup.org/evaluations/mobilizing-technology-development
4. See Knickrehm, B. Berthon, and P. Daugherty (2016).
5. Adapted from Santander (2022).
6. See WEF and Deloitte (2022).
7. GOJ (2009).
8. World Bank (2016b).
9. Demirgüç-Kunt et al. (2021).
10. Dener et al. (2021).
11. IDB Invest (2021).
12. ITU (2017).
13. Cusolito, Lederman, and Peña (2020).
14. Crespi et al. (2017).
15. PIOJ (2018).
16. Ibid.
17. ECLAC (2022).
18. World Bank (2022a).
19. Saldivar-Sali, Artessa (2021).
20. World Bank (2016a).
21. World Bank (2022c).

2. DIGITAL INFRASTRUCTURE

Inclusive growth through adequate digital infrastructure

KEY MESSAGES

- **Jamaica faces challenges related to broadband affordability that disproportionately impact the lower-income population.** Strengthening competition in the broadband value chain can significantly lower prices. The recent infrastructure-sharing regulation is not clear enough to facilitate investment and competition in digital infrastructure and should be complemented by the definition of significant market power and decrees to mandate specific infrastructure to be shared on the designated operators.

- **Investment in international subsea cables is important for the growth of the digital economy and can be strategic to improving the country's position as a regional hub for data transit.** Jamaica relies heavily on one provider for its international connectivity, which can be constraining to the growth of the market in the medium to long terms. The country could leverage its geographical location to explore opportunities for alternative international connectivity and provide international transit operators with alternative routes and redundancy to improve data latency.

- **Cloud and data infrastructure, internet exchange points (IXPs), and backbone are core enablers of Jamaica's digital transformation and the growth of the data exchange market.** The GOJ can leverage a public-private partnership to develop an island-wide, resilient, and high-capacity backbone network as an essential infrastructure for the development of its digital economy. Complementing this, carrier neutral data centers and the strengthening of IXPs can improve data exchange and lower prices. Incentivizing the use of cloud computing is an opportunity for the government to accelerate the development of home grown digital and small to medium businesses.

- **Reliable and universal connectivity can promote health care, entertainment, agriculture, and forestry in rural areas.** Densifying the mobile network, increasing the footprint of fiber connectivity, and increasing infrastructure sharing can strengthen the network in rural areas and in certain sectors.

- **Mobile networks will require new investments to develop next generation infrastructure, for example, in 5G to modernize logistics or manufacturing.**

- **Development of the digital infrastructure will require modernizing the legal framework, including by streamlining the regulatory functions.**

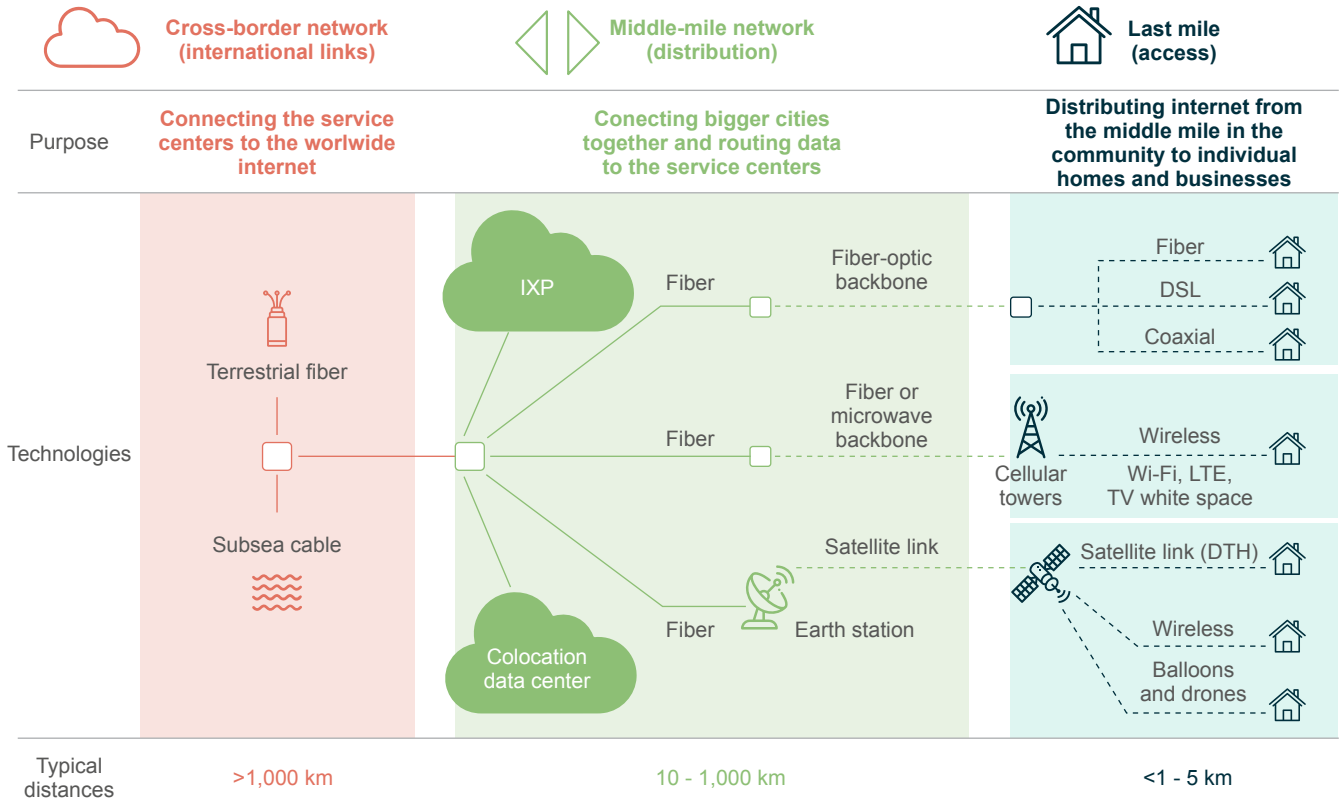
2.1. The importance of digital infrastructure: Enabling inclusive digital transformation in Jamaica

Digital infrastructure consists of the hardware, software, networks, protocols, and standards that enable the collection, exchange, storage, processing, and distribution of data. The network infrastructure is composed of cross-border, middle-mile, and last-mile networks.[1] These segments are interconnected, creating a data supply chain where public and private actors operate (Figure 2.1). Additional layers of the digital infrastructure include data centers, cloud computing, digital ID, and data-sharing systems. For data to be fully and safely leveraged in a trusted environment, the systems and sensitive information should be adequately protected through an appropriate legal and regulatory framework for cybersecurity and data governance.

Digital infrastructure is a foundational enabler for the digital transformation of Jamaica. It can help to improve public services and unlock the potential of e-commerce, tourism, agriculture, and other sectors important to Jamaica's productivity and growth. The use cases for digital infrastructure include:

- It makes it possible to streamline government functions and deliver citizen-centric services (health care, education, social protection), while improving the efficiency and cost effectiveness of government operations.
- Cloud infrastructure allows SMEs to easily and cost-effectively scale IT resources and access a wide range of computing resources on demand, including virtual machines, storage, and databases.
- Expanding digital infrastructure is essential to bridging spatial inequalities and fostering the development of rural and peri-urban areas, increasing access to markets, public services, remittances, and social protection.
- A well-developed digital infrastructure can support climate change adaptation, monitoring, and resilience and help to improve environmental reviews, bolster disaster response efforts, and facilitate communication and coordination among stakeholders.
- It is a key enabler of emerging technologies, such as IoT, AI, blockchain, and cloud computing.

Figure 2.1. Data Infrastructure Supply Chain



Source: World Bank (2021d).

The Jamaican government recognizes the potential of digital infrastructure and should aim toward a more harmonized and ambitious vision to provide the country with a resilient and state-of-the-art infrastructure. Digital infrastructure is prominently featured in Vision 2030 and the Midterm Socio Economic Policy Framework (2021–2024), with emphasis placed on leveraging ICTs to enhance economic growth prospects. The implementation of these aims falls under different ministries, though primarily the MSETT, through such initiatives as the 2011 ICT Policy and the 100 Day ICT Action Plan for the national broadband network. Going forward, and to accelerate the country's digital transformation, the government should consider the immediate need to improve the national infrastructure, target interventions in the more critical sectors and geographic regions, and in the medium to long term, support the next generation infrastructure (fiber to the premises, 5G, and cloud computing) that will enable the country to be an advanced digital economy.

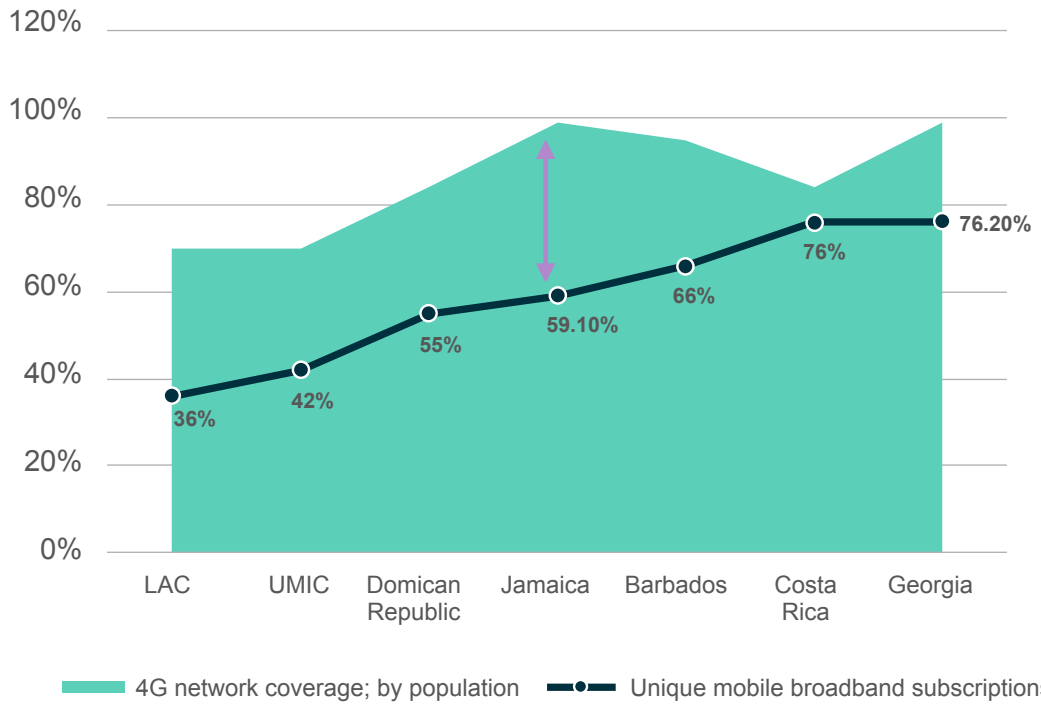
This chapter evaluates the current state of Jamaica's digital infrastructure and outlines a number of general recommendations for the consideration of the GOJ. It examines digital infrastructure from the perspectives of both supply and demand. Additionally, areas of strength and weakness in the digital infrastructure are identified with policy suggestions for an accelerated transition to a digital economy.

2.2. Current state of digital infrastructure: High prices and low quality and usage of broadband services are barriers to inclusive digital transformation

Demand and usage of broadband services

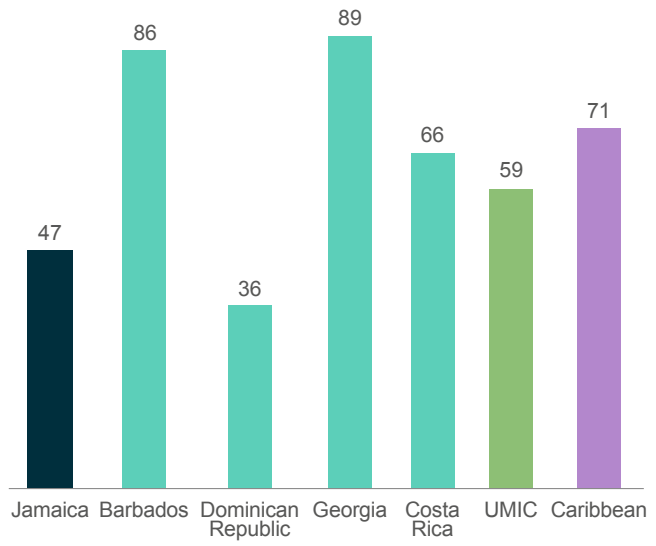
Jamaica has low broadband usage and a digital divide between rural and urban areas, both holding up the transformation of the economy.[2] The population covered by at least a 3G mobile network reached 100 percent of the Jamaican population in 2021, but there is a gap between access to mobile broadband services and usage: only 60 percent of Jamaicans have a unique mobile broadband subscription compared to 76 percent in Costa Rica and Georgia (Figure 2.2). In 2022, 47 percent of households in Jamaica had broadband access at home (Figure 2.3), below the LAC average, and the country relies mostly on cable technology rather than the more advanced fiber to the premises (Figure 2.4). Internet usage also varies between rural and urban areas (67 and 82 percent, respectively).[3] Gaps in usage can be linked to a variety of underlying factors, such as the quality and affordability of mobile broadband services on the supply side or digital literacy and the availability of services on the demand side.

Figure 2.2. 4G Mobile Coverage and Mobile Broadband Penetration 2022[4]



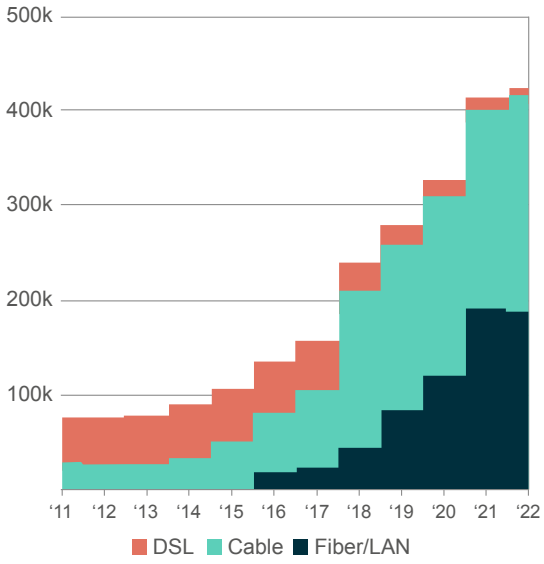
Source: GSMA Intelligence, Mobile by Market.

Figure 2.3. Fixed Household Broadband Penetration in Jamaica versus Peers, %



Source: TeleGeography, 2022.

Figure 2.4. Fixed Coverage by Technology

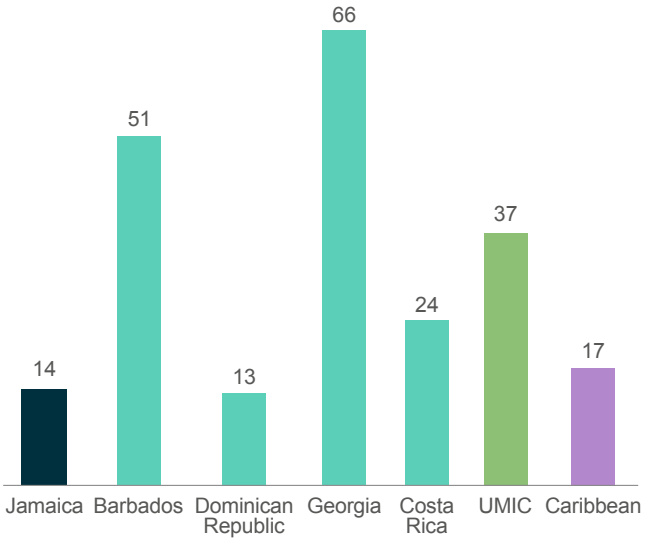


Source: TeleGeography, 2022.

According to the GSM Association (GSMA),[5] Jamaica falls into the cluster of "transitioning countries," performing weaker than others on affordability and content and services. Transitioning countries perform well in at least two categories of enablers (infrastructure, affordability, consumer readiness, and content and services). The score for Jamaica in the maturity of its digital infrastructure is lower than Dominican Republic (63), Costa Rica (72), Barbados (67), and Georgia (69), with the latter three countries considered advanced. The main weaknesses of Jamaica's infrastructure according to this index are affordability and content and services.

The international bandwidth used in Jamaica is below that of relevant peers in the Caribbean region, indicating lower levels of demand for internet connectivity and digital services in the country. The amount of international bandwidth a country consumes is related to the level of demand for digital services, such as online content, e-commerce, social media, and video streaming. Jamaica consumed 394,000 Mbps of international bandwidth in 2021,[6] with an average consumption per user of 0.146 Mbps, a performance below the regional average of 0.206 Mbps.[7] For example, the gap between Jamaica and upper-middle-income countries (UMICs)[8] in the use of international bandwidth was 23 Mbps in 2021. The gap with such peers as Barbados and Costa Rica was 37 Mbps and 10 Mbps, respectively. Comparison with worldwide peers such as Georgia shows a gap of 52 Mbps (Figure 2.5).

Figure 2.5. International Bandwidth Used, Mbps per 100 Inhabitants, 2021

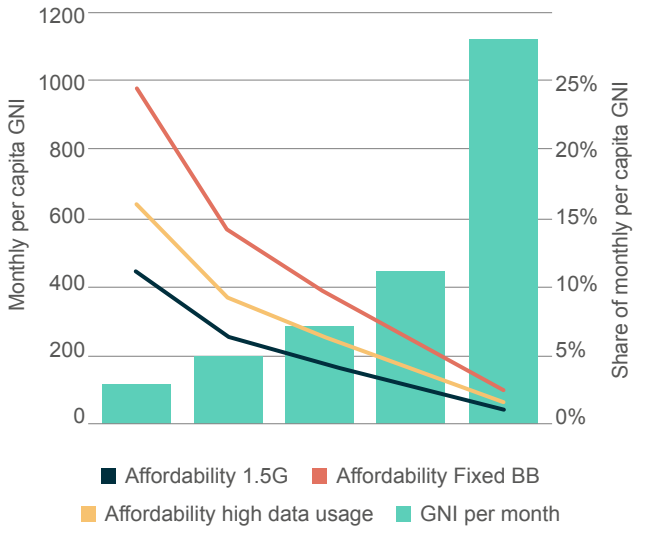


Source: World Bank, 2021; and TeleGeography, 2021.

Data prices in Jamaica are often among the highest when compared to benchmarks. Jamaicans pay 7.9 percent of their average monthly gross national income (GNI) per capita for a fixed broadband basket, while the average for the continent is 5.0 percent. Prices for mobile broadband are also the most expensive when compared to peers, such as Barbados, Dominican Republic, Costa Rica, and Georgia (see Table 2.1). High prices have a stronger impact on low-income segments of the population, making the digital divide more severe and widening inequality. For instance, the lowest quintile of the population per income pays between 10 and 25 percent of their income for mobile broadband depending on the service, while international affordability standards[9] are advocating for data prices to be no more than 2 percent of GNI (Figure 2.6).

Current prices of smartphones and data in Jamaica are limiting accessibility and connectivity, especially for the lower-income population. On average, acquiring the cheapest smartphone in Jamaica requires a substantial percentage of per capita GNI (16.0 percent) in comparison to other Caribbean countries (11.0 percent), relevant regional peers, and worldwide (Figure 2.7). Moreover, the price of the cheapest smartphone in Jamaica is 50 percent of the monthly per capita GNI of the poorest segment of the population, and between 25 and 30 percent of the second poorest segment (Figure 2.8).

Figure 2.6. Data Prices as a Share of Average Monthly Income by Income Quintile, %. Monthly per capita GNI ($, left axis), and share of monthly per capita GNI (right axis)



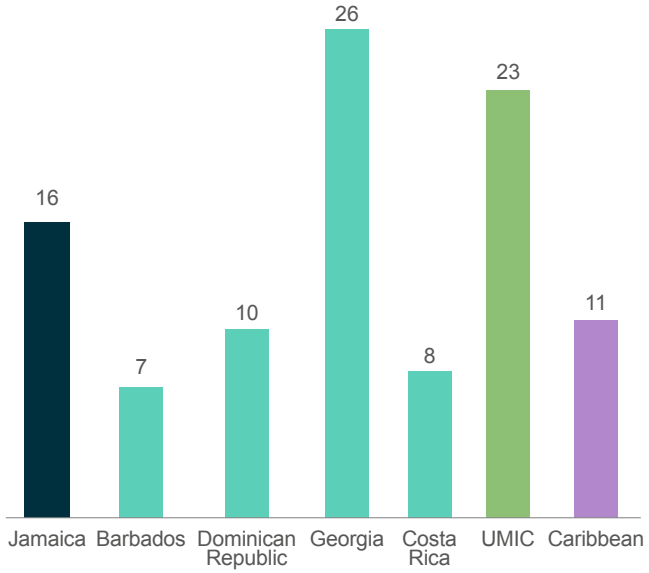
Source: ITU, A4AI, WBG.

Table 2.1. Data Prices as a Share of Average Monthly Income in 2021, %

Data Bundle	Fixed Broadband Basket	Mobile Data and Voice Low-Consumption Basket (70 mins + 20 SMS + 500 MB)	Mobile Data and Voice High-Consumption Basket (140 mins + 70 SMS + 2 GB)
Jamaica	7.9 percent	5.2 percent	5.2 percent
Americas	5.0 percent	3.0 percent	3.0 percent
Barbados	4.1 percent	3.9 percent	3.9 percent
Dominican Republic	4.4 percent	4.0 percent	3.2 percent
Costa Rica	1.8 percent	1.7 percent	1.2 percent
Georgia	2.8 percent	1.9 percent	1.9 percent

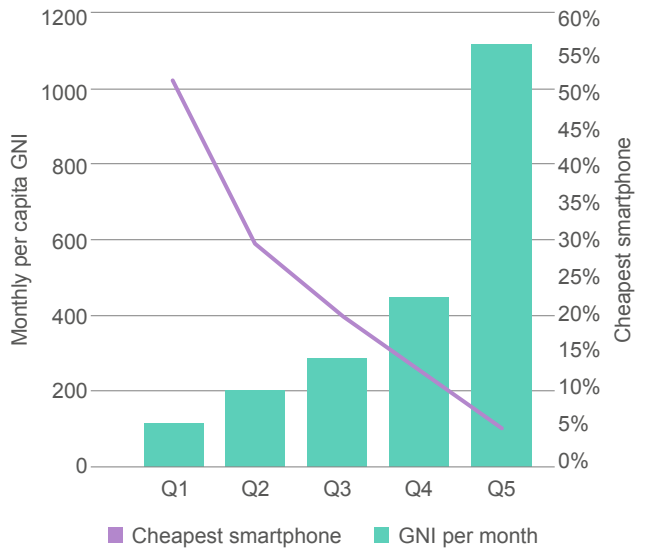
Source: ITU, Digital Development Dashboard.

Figure 2.7. Price of the Cheapest Smartphone, percent of GNI 2022



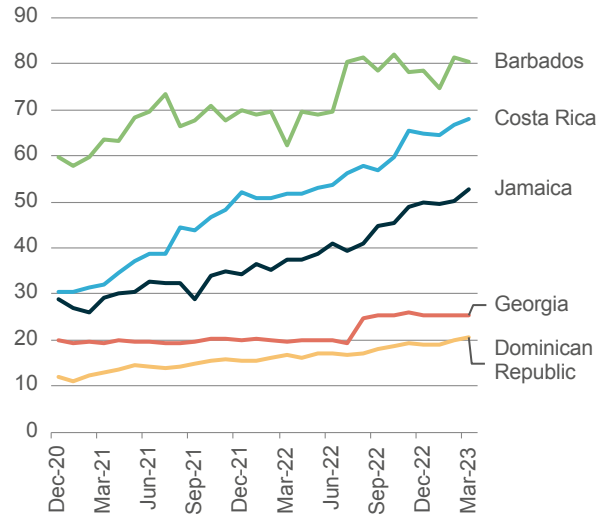
Source: ITU, A4AI, WBG.

Figure 2.8. Price of the Cheapest Smartphone by Income Quintile. 2021



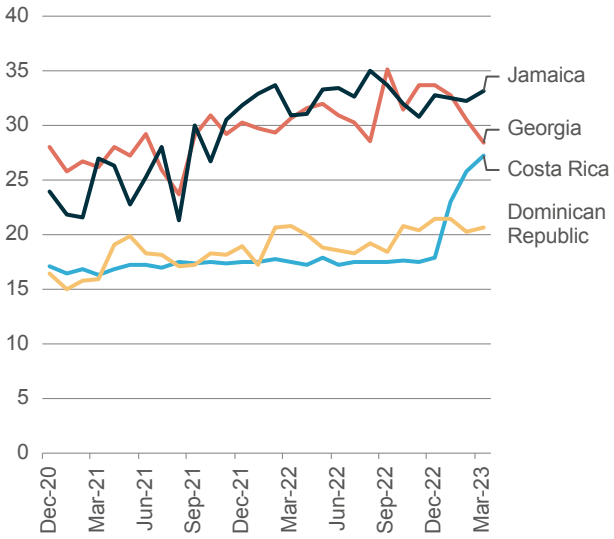
Source: ITU, A4AI, WBG.

Figure 2.9. Median Download Speed for Fixed Services, Jamaica and Peers



Source: Speedtest Global Index by Ookla, https://www.speedtest.net/global-index.

Figure 2.10. Median Download Speed for Mobile Services, Jamaica and Peers



Source: Speedtest Global Index by Ookla, https://www.speedtest.net/global-index.

According to the Speed Test Global Index, Jamaica is a mid-performer in terms of speed quality, performing better in mobile than fixed services.[10] Download speed tests for fixed and mobile services experienced an upward trend, with fixed services averaging download speeds of 43 Mbps compared to 51 Mbps for mobile. According to this index, the average download speed of the mobile networks is better than that of Dominican Republic, Costa Rica and Georgia, but fixed networks are lagging behind higher performers, such as Costa Rica and Barbados (see Figures 2.9 and 2.10).

Jamaicans' low-quality connectivity is influenced by a number of factors, including upload speeds, latency, outages, and energy cuts. In 2021, 66 percent of Jamaicans reported that they faced low-quality connectivity, and 51 percent experienced energy blackouts, compared to an average of 51 and 37 percent in the LAC countries, respectively.[11] Data on latency in the mobile network show a good performance of the mobile network in Jamaica, but there is no information on outages and service consistency. Financial enterprises, content providers, gaming companies, and cloud computing providers all require low latency in long-haul data transmission; thus, reducing delay by even a few milliseconds can impact the performance of big data analytics, machine learning, cloud computing, and gaming.

Bottlenecks at the value chain

First mile (*international terrestrial or submarine cables and landing points*)

Jamaica is connected through six subsea cables to the global data network. Demand for capacity will grow, but expansion may require new investors in the country, as five subsea cables are owned by one operator, C&W Networks. The six subsea cables are: ALBA-1, Cayman-Jamaica Fiber System (CJFS), Colombia-Florida Subsea Fiber, East-West, and Fibralink, which does not have data transit capabilities). The biggest

BOX 2.1. Improving Mobile Handset Affordability

Drivers of affordability include both demand- and supply-side factors. The supply of credit to support the financing of devices for low-income and unbanked individuals is another key barrier. To address these challenges, governments can promote the ownership and adoption of internet-enabled mobile handsets by addressing the supply- and demand-side factors affecting affordability and by promoting innovative financing solutions to lower the risk and increase the supply of credit available for financing schemes that target low-income and unbanked consumers.

Example of these measures are provided in the table below:

	Direct Interventions	Enabling Environment Needed	Virtuous Cycles
Supply Barriers	VAT exemptions for low-end smart devices Customs duty relief for device importation	Regulatory ease of doing business (as a retailer, importer, or manufacturer)	Adequate policies and infrastructure for e-commerce and distribution networks
Demand Barriers	Device subsidization (through Universal Service and Access Funds or otherwise)	Framework for digital inclusion and disadvantaged populations (e.g., women, rural areas)	Local and relevant content generation Digital skills
Financing Barriers	Credit and risk guarantees Debt and equity funding Financial scheme subsidization	Financial and mobile money regulation Financial consumer protection	

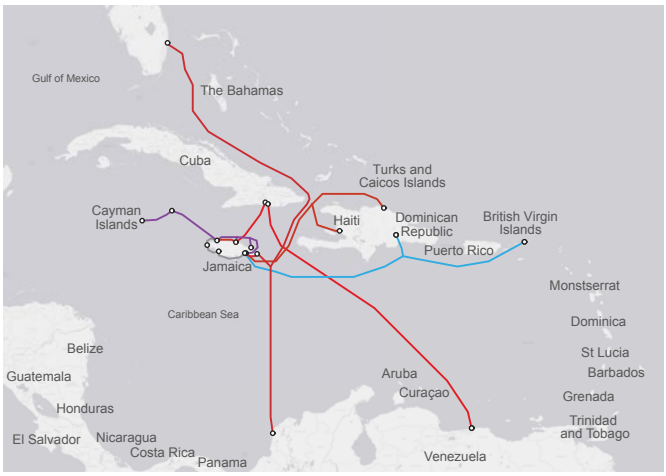
Source: Authors.

capacity is currently the Colombia-Florida cable, which has roughly 80 percent of the lit capacity available to Jamaica, making the country dependent mostly on this cable for future increase in demand.[12] ALBA-1 has 5 percent of the lit capacity, CJFS 9 percent, and East-West and FibraLink 3 percent each. According to TeleGeography forecasts, the international bandwidth used is expected to grow at a compounded annual rate of 33 percent between 2022 and 2029, which implies a doubling roughly every 2.5 years.

Despite the relatively high number of subsea cables, options to buy international connectivity for internet service providers are limited. As noted, five cables are owned and operated by C&W Networks, and the remaining cable is owned by Telecom Venezuela and Transit.[13] Any internet service provider will therefore have to buy wholesale international capacity from C&W Networks or Telecom Venezuela. Currently, Jamaica is heavily reliant on one provider for its international connectivity, which creates risks associated with market concentration. The price of international capacity is an important element of data usage prices, and maintaining efficient competition on this market has the potential to lower end-user prices for broadband services.

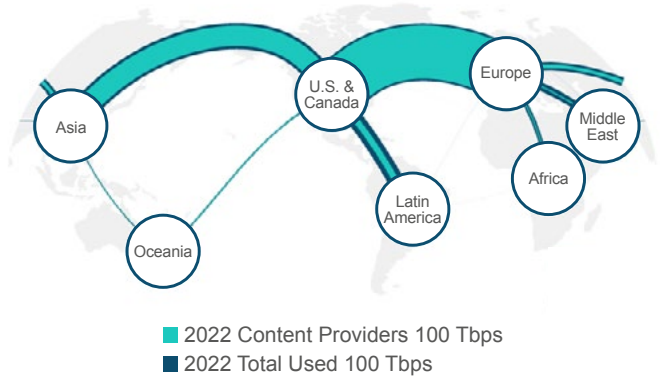
Jamaica can leverage its strategic location to become an important transit hub for applications that require low latency. As most countries in LAC, Jamaica heavily relies on the United States for its international capacity traffic (Figure 2.12). LAC countries have limited direct routes to Europe or other continents, and there are only a few initiatives currently underway to change that. New submarine cable projects have been launched over the past few years with the hope of diversifying interregional connectivity and connecting Brazil to Europe and Africa, betting on an increase in traffic between the two continents. Another example is the BELLA initiative[14] (Building the Europe Link to Latin America and the Caribbean), a European Union (EU)-driven project that aims to enable high-speed connectivity, exchange of knowledge, implementation of advanced technologies, and capacity building between the EU and the LAC region. At the same time, the composition of international traffic itself is changing, as it is increasingly composed of content providers' traffic, which requires low-latency data transmission. Jamaica could tap into both trends to position itself as a hub for international connectivity, first, to offer its shores for diversification of regional connectivity and second, to offer shorter routes to many destinations in LAC for low-latency traffic.

Figure 2.11. International Connectivity in Jamaica



Source: TeleGeography, 2023.

Figure 2.12. Used Interregional International Capacity



Source: TeleGeography, 2023.

Furthermore, Jamaica needs to develop its cloud and data infrastructure market, which is currently nascent but is essential for digital economy development. There are currently no colocation data centers, cloud regions, or content providers in Jamaica. Due to its small size, attracting investment in this area might not be highly profitable yet. In the meantime, how well data or cloud computing services are transferred to and from the main regional nodes would impact the user experience and the choice between one application versus its competitors. Mexico, Costa Rica, and Panama are currently the main hubs for colocation data centers.[15] Improving international connectivity will help strengthen the business case for Jamaica.

Table 2.2. International Internet Bandwidth by Destination

Country	International Internet Bandwidth	
	Gbps	Percent
United States	290	66%
Barbados	80	18%
Trinidad and Tobago	20	5%
Cayman	15	3%
Curacao	15	3%
Bermuda	10	2%
Cuba	3	1%
Haiti	3	1%
Antigua and Barbuda	2	0%

Source: TeleGeography, 2023.

Middle mile (*backbone, data centers, and internet exchange points*)

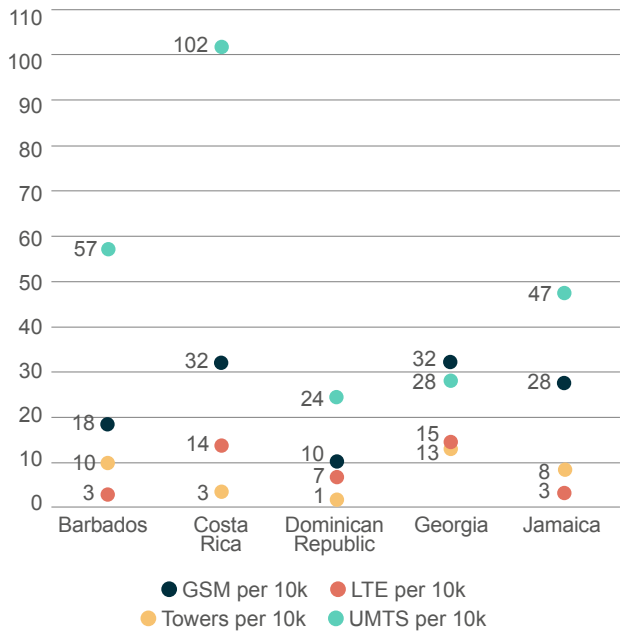
Backbone infrastructure in Jamaica is fragmented and needs to be expanded to support the development of local networks. At present, there are over 1,840 kilometers of optical fiber networks, mainly along the shore of the country, connecting Spanish Town with St. Ann's Bay and Port Maria, owned by telecom operators Flow and Digicel and the National Works Agency. The Agency is currently developing the first phase of the backbone network's expansion through aerial fiber and infrastructure sharing with other operators and utilities. The backbone footprint is therefore fragmented and needs further expansion to support the growth of mobile and fixed access networks and to ensure resiliency. Additional investments are required to bring the infrastructure closer to the remaining 60 percent of the population, resulting in service quality improvements. In many countries, the development of backbone infrastructure has taken the shape of a public-private partnership (PPP), because it allows the efficient utilization of government resources and leverages the know-how and funding of the private sector. Jamaica may want to consider utilizing this model.

Internet exchange points (IXPs) and caches need to be strengthened to support Jamaica's digital transformation. There is currently one IXP in Jamaica, operated by the Office of Utilities Regulation (OUR), the Jamaican regulator for electricity, water, and telecommunications, and located at the eGov data center. IXPs, complemented with cache servers, reduce latency and data costs, increase broadband speed, and improve connectivity quality. A recent study has estimated a 14 percent growth in fixed broadband download speed by doubling the number of IXPs for every 10 million inhabitants.[16] With the increase in local traffic, Jamaica (through the OUR) has the potential to attract content providers to install cache servers, further reducing prices and improving quality of service. To date, not all operators and service providers are linked to the IXP. Low utilization of the IXP may mean that it is necessary to revise the IXP governance model to incentivize operators to connect for local traffic exchange.

Last mile (*mobile or fixed technologies for end-user access*)

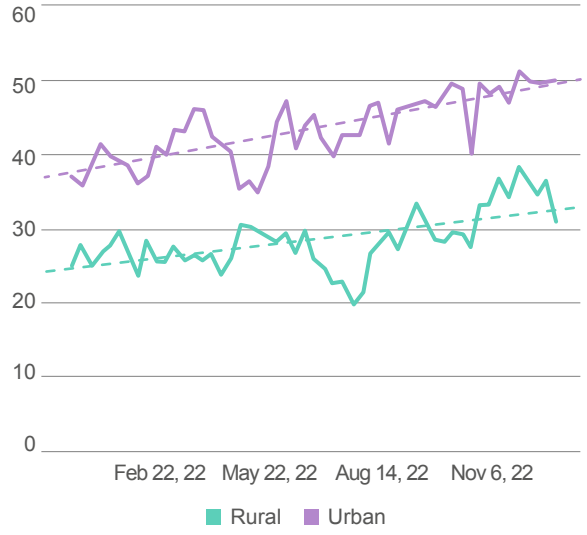
Mobile networks cover most of the Jamaican population, but fixed fiber connectivity needs to be improved. A locally owned network operator, Rock Mobile, is currently finalizing the deployment of its mobile network to compete with Flow (vertical integration with C&W) and Digicel as the third entrant. Fixed network connectivity is mostly based on legacy technologies, such as coaxial and copper cables or fiber, and is provided mainly by Flow and other smaller internet service providers and carriers. The market for satellite-based connectivity is growing but remains a niche market for businesses and remote connectivity. Although 3G and 4G networks reach full population coverage,[17] low cell density (Figure 2.13), quality of service, and affordability remain a challenge. Access to fixed infrastructure is less widespread and is particularly weak in rural and peri-urban areas, which is evident from the lower connectivity speed from both mobile and fixed internet services (Figures 2.14 and 2.15).

Figure 2.13. Mobile Tower and Cell Density per 10,000 Inhabitants (2021)



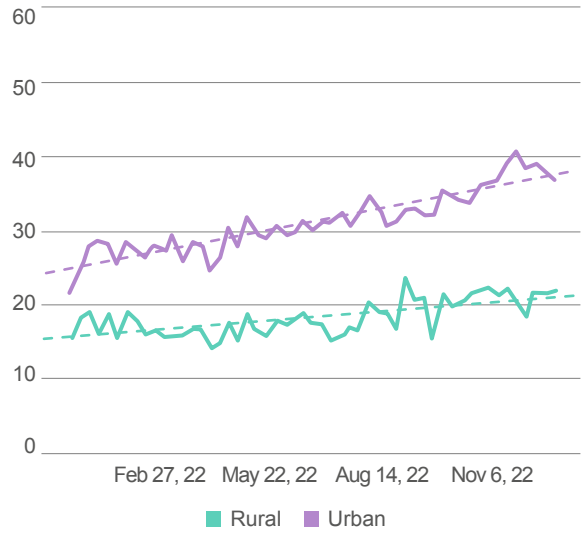
Source: TowerXchange, https://www.towerxchange.com/; World Bank, https://data.worldbank.org/; OpenCelliD, https://opencellid.org/#zoom=16&lat=37.77889&lon=-122.41942.

Figure 2.14. Median Download Speed for Fixed Services, Rural vs. Urban



Source: Speedtest Global Index by Ookla, https://www.speedtest.net/global-index.

Figure 2.15. Median Download Speed for Mobile Services, Rural vs. Urban



Source: Speedtest Global Index by Ookla, https://www.speedtest.net/global-index.

Reliable and universal connectivity can promote health care, agriculture, and forestry in rural areas and reduce societal inequities.[18] Although coverage for mobile networks is high, the development of sector or geographic areas will require densifying the mobile network and increasing the footprint of fiber connectivity. For example, connectivity in rural settlements may be needed beyond the boundaries of the populated areas (in forestry and agricultural locations). In this regard, infrastructure sharing may be a useful tool to strengthen the network in rural areas where it is often not profitable for the private sector to develop or upgrade the infrastructure. Although initiatives to digitalize rural activities in Jamaica were promoted by the Food and Agriculture Organization before the pandemic,[19] an adequate digital environment in the country's rural areas is still pending.[20]

Mobile networks will require new investments in 5G to enable more precise applications for IoT in agriculture, port logistics, and other high-capacity applications. 5G networks can play an important role in the modernization of industry, manufacturing, logistics, and agriculture. These applications require a high number of connected devices within a small radius and low latency to provide the maximum precision for operations, enabling real-time data exchange, remote monitoring of port operations, and the integration of autonomous vehicles and drones for cargo handling. The GOJ may want to consider rolling out pilots for 5G for the modernization and digitization of port logistics, starting with the Port of Kingston.

Sector governance, policy, and regulatory environment

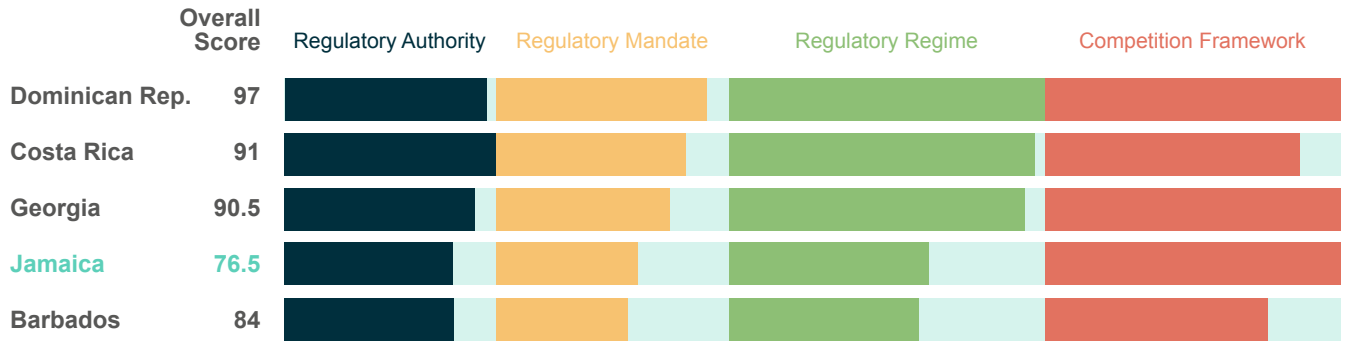
The current Telecommunications Act was adopted in 2000 and has supported several important telecom reforms such as market liberalization, but it needs to be updated to remain relevant for further market needs. The legal and regulatory frameworks need to be modernized to address technology changes, including the switch from voice to data-based communications, the convergence of services and infrastructure, and the changing ecosystem of digital infrastructure. Although the Telecommunications Act allowed the transition to a competitive market,[21] implementation has been challenging. For instance, it was not until recently that a third mobile operator entered the market, not least because the current regulatory framework has a fragmented licensing regime that makes it difficult for smaller and new firms to enter the market. Another shortcoming of the Act was its limited capacity to enforce sanctions, and little progress has been made to address this problem.[22] The ITU's ICT Regulatory Tracker (ICT-RT) has identified the competition framework as a strength for Jamaica, while other areas require more attention (Figure 2.16). For example, Jamaica improved its regulatory regime between 2007 and 2022. However, for the regulatory mandate and regulatory authority categories, Jamaica had the same score in 2022 as it did in 2007. For the regulatory authority branch, opportunity areas may include the capacity of the regulator to impose sanctions and the lack of mechanisms to solve disputes. For the regulatory regime branch, areas for improvement focus on the lack of a specific mandate for an infrastructure-sharing model.

Closing the digital divide and lowering data prices can be promoted through competition in the first- and middle-mile infrastructure value chain. Prices and service quality could be impacted by the degree of competition across segments of the telecom sector. High data prices in Jamaica for final users may be influenced by structural conditions, such as the limited supply of international bandwidth. The analysis so far reveals some level of dominance in the international and backbone infrastructure. Although competition may not be possible in all areas and segments of the digital infrastructure value chain, mandating cost-based open access wholesale infrastructure sharing on operators with significant market power can open the downstream market for more competition, affecting prices and quality.

Jamaica's current regulations on infrastructure sharing are not yet comprehensive and do not facilitate access to essential infrastructure for new or less-dominant operators, delaying investments in and the deployment of fiber networks across the island. The Telecommunications Act allows the OUR to enforce resource sharing between competitors, both tangible and intangible. Although recent rules have been published on infrastructure sharing, they remain contingent upon identifying the dominant operator—a status as yet undetermined within Jamaican markets—and they defer to the operator to determine the assets it wants to share and the conditions for sharing. As stated earlier, to strengthen these rules, the OUR would need to conduct a market assessment, determining significant market power and mandating a reference offer on these operators to provide open access and cost-based wholesale services to smaller and new entrant operators.

Figure 2.16. ITU's ICT Regulatory Tracker Index, 2020

Jamaica belongs to the G3 (enabling investment and access), according to the 2022 ICT Regulatory Tracker



Source: ITU, 2020, https://app.gen5.digital/tracker/about.

Jamaica has a full set of institutions that regulate, promote, and oversee the telecommunications sector, but some institutional mandates overlap, which may decrease regulatory efficiency.[23] The OUR has primary regulatory duties for services and facilities, and it also has an obligation to promote competition between carriers and service providers.[24] Although the Telecommunications Act grants regulatory safeguards to be implemented by the OUR in relation to dominant carriers, the Fair Trading Commission is responsible for ensuring a competitive environment and protecting consumers.[25] The MSETT is also the host ministry for the Spectrum Management Authority (SMA), which provides licenses for the use of scarce frequency spectrum. Finally, the Universal Service Fund (USF) is responsible, along with the National Works Agency, for the planning and implementation of extending connectivity to rural areas. A business environment with several independent regulators requires good institutional coordination, as it increases the risk of regulatory overlaps, regulatory voids, and fragmentation.

Spectrum pricing policy in Jamaica can be upgraded to set the stage for 5G uptake and improvements in 4G network quality. The SMA launched a consultation study in 2020 to review the spectrum pricing policy and to propose new fees for mobile services. With the exemption of two mobile spectrum bands, 700 MHz and AWS (1700/2100), proposals involve fee reductions between 18.7 and 37.4 percent.[26] Jamaica's experience with the allocation of spectrum bands to be used in 4G networks suggests that delays in distribution, as well as the high prices observed, were related to lower market penetration in comparison to the Caribbean average.[27] In particular, Jamaica was identified as an outlier in terms of spectrum prices and was late in beginning the allocation process: 4G spectrum allocation started in 2013 in other Caribbean countries but not until 2016 in Jamaica. In addition, according to the GSMA, spectrum pricing and its impacts on consumers were not aligned with the Jamaican Development Plan or the ICT Sector Plan.

Establishment of an outage/disaster protocol for the telecommunications sector is an important tool that the OUR will be using to reach target indicators on service quality and to reinforce resilience of the infrastructure. On June 2022, the OUR established an outage and disaster protocol for the telecommunications sector in Jamaica, which involves categorizing outages, establishing notification processes, and improving network resiliency during disasters to mitigate risks of recurrence in the future. These protocols will mandate mobile operators to provide national roaming during emergency or disaster situations and to develop business continuity plans, which will greatly enhance network resilience and ensure service availability during emergencies.

The OUR in Jamaica developed Quality of Service Rules for telecom providers, which became effective on February 2024. The rules will enable the OUR to monitor the quality of service delivered by internet service providers and mobile operators through periodic reporting and continuous monitoring, ensuring that delivered speeds are in line with advertised claims and thus providing consumers with objective data on the quality of the voice and internet services they receive. However, the regulations will need to be complemented by an equipment upgrade for the OUR to ensure better measuring and monitoring capacity.

Table 2.3. Key Digital Infrastructure: Challenges and Opportunities

Strengths	Areas for Improvement
» Good 3G/4G network coverage » Well-established regulatory framework that includes a public consultative process for rule making » New rules and regulations on infrastructure sharing, quality of service, spectrum pricing, and outage reporting » Multiple initiatives by the MSET to encourage the supply and demand side of the digital infrastructure » Geographical location between North and South America and Europe	» Affordability of broadband services » Footprint and resilience of the backbone network » Governance and participation of the IXP » Implementation of infrastructure-sharing rules » Fragmented regulatory functions » Legacy legal framework for telecommunications » Statistics for better monitoring of market and planning
Opportunities	**Challenges**
» Developing IXPs, data centers, and cloud computing to foster private sector development » Improving international subsea connectivity » Using access to broadband to promote health care, access to social protection, agriculture, and tourism in rural areas » Deploying 5G to modernize manufacturing, industry, and logistics » Attracting private sector investment for the deployment of the backbone optical fiber network	» Infrastructure is prone to floods and hurricane damage. » The country's small market size makes it difficult to attract big investors in cloud, data centers, and content provider networks.

Source: Authors' elaboration based on digital economy assessment.

2.3. Recommendations: Improving data and device affordability, expanding a resilient backbone network, and strengthening the institutional and legal framework

The GOJ can prioritize infrastructure improvements to accelerate the modernization of key sectors while positioning the country as a leader in digital transformation by investing in next generation infrastructure and applications. The recommendations are organized according to their priority status: short to medium term and medium to long term.

In the short to medium term

Improving the affordability of broadband services and devices:

» **Strengthen the infrastructure regulatory rules with more defined obligations.** Launch a competition assessment for different markets across the data value chain to identify potential bottlenecks and opportunity areas that should be addressed by the government. Although the competitive environment in Jamaica has been referred to as adequate by the Fair Trading Commission,[28] the telecommunications markets still present high concentration levels, and prices for final users remain high. Potential findings from this study could be the source of a regulatory

agenda aiming to promote a more competitive environment (for structural issues). Moreover, such a study would encourage specific market assessments to mandate open access obligations and identify anticompetitive behaviors.

» **Improve the IXP governance model and capabilities.** Currently not all internet service providers are linked to the IXP, which is being managed by the OUR. These are not optimal conditions for leveraging a local data exchange. Incentivizing the private sector to participate and moving management to the private sector can contribute to lower data prices and a higher quality of service.

» **Carry out an assessment of the tax structure.** In the short term, the government can assess the tax structure and the levies that could have an impact if there is a change to the end-use prices. This assessment can also investigate the informal market for devices and the way in which different approaches to formalization can contribute to lower costs for smart instruments.

Expanding the backbone network:

» **Consider developing a PPP framework for the backbone infrastructure.** To strengthen this important transmission infrastructure, the government may wish to consider defining government needs, estimating current and future private sector needs, and developing a PPP to ensure efficient utilization of government resources and to leverage the know-how and resources of the private sector.

» **Provide open access to backbone infrastructure.** This should be accompanied by cost-based open access obligations to allow nonparticipating internet service providers to access the infrastructure on a level playing field.

In the medium to long term

Accelerating the transformation of key sectors in the economy through targeted interventions:

» **Leverage cloud computing and international connectivity to develop key sectors.** Provide cloud computing resources to digital businesses and to key sectors, such as health, education, entertainment, and research and innovation. The plan can include measures to attract data centers with cloud hosting capabilities and/or the international capacity needed to be connected. The BELLA initiative II can be a good starting point to assess the potential of high-speed connectivity for research and innovation in the country.

» **Improve last-mile connectivity for the health, education, agriculture, and tourism sectors and for digital nomads.** Improve the coverage of mobile networks and/or provide high-speed connectivity to regions of strategic importance to the country to boost agriculture and tourism and promote high-speed connectivity in touristic areas for digital nomads.

» **Deploy 5G for manufacturing, industry, and logistics modernization.** Jamaica still has idle resources regarding spectrum, and ideally, potential new entrants in the mobile markets would be desirable to promote competition. Moreover, 5G technologies should be launched in the country, and the government should allocate spectrum for this goal, starting with a pilot for port modernization.

Incentivizing new investments and technologies in the market:

» **Provide a level playing field for domestic network operators.** The OUR can consider updating the competition framework with clearer rules on ex ante and ex post regulations to provide a level playing field for all market participants. Other areas that could facilitate new investments include simplifying the licensing regime, streamlining the SMA, assessing the right-of-way fees and procedures, and assessing the use of the USF to encourage new entrants.

» **Develop a strategic vision for attracting investment in international connectivity and data centers.** The GOJ can start with an assessment of the business case for colocation data centers within the regional and global data center and international connectivity market.

Improving sector governance and planning:

» **Modernize sector monitoring.** The current data and statistics that the OUR and other entities collect are limited and are voice centric. The lack of sector-quality statistics limits the institutional capacity to deploy public policies aimed at improving the sectors' competitiveness and reducing the digital divide. A set of statistics and indicators should be designed that authorities should collect and publish to be more data rather than voice centric in order to launch sector diagnostics and design public policies.

» **Streamline regulatory functions, either by restructuring the functions or by using more collaborative soft tools.** Two main concerns arise from the current governance structure of the regulatory institutions: i) the SMA reports to the MSETT and thus does not have the autonomy to strengthen the independence of spectrum allocation to the public and private sectors, and ii) the USF, OUR, and SMA have overlapping and complementary functions that should not remain in silos and should be streamlined or consolidated.

» **Modernize the legal framework for telecommunications and digital infrastructure.** A new law that is data rather than voice centric is important for the longer-term development of the digital infrastructure. The law could also improve the sanctioning powers of the regulator or reinforce the sanctions regime of other institutions.

Table 2.4. Digital Infrastructure: Policy Recommendations (1 of 2)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Improve the affordability of data and devices	Review the tax policies related to the digital infrastructure value chain and to smart devices.	Ministry of Finance and the Public Service (MOFPS) OUR MSET Jamaica Customs Agency	Short term	Maybe
	Strengthen the infrastructure regulatory rules with market analysis and requirements for cost-based open access to international connectivity and landing points. **PRIORITY**	OUR MSET	Short term	No
	Strengthen IXP governance and capabilities and discuss with content providers the installation of cache servers in Jamaica. **PRIORITY**	OUR eGov internet service providers/ operators MSET	Medium term	No
Expand and strengthen the resilience of the backbone network	Consider developing a PPP framework to create a resilient and open access backbone network. **PRIORITY**	MSET MOFPS	Short term	No
	Design regulatory instruments to mandate cost-based open access to the backbone by any internet service provider or operator. **PRIORITY**	OUR MSET SMA	Medium term	No
Accelerate the digital transformation of key sectors	Leverage cloud computing and international connectivity to develop key sectors, such as health, research and development, and agriculture.	MSET relevant ministries, departments, and agencies (MDAs)	Medium term	No

Table 2.4. Digital Infrastructure: Policy Recommendations (2 of 2)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Accelerate the digital transformation of key sectors	Improve last-mile connectivity for the health, education, agriculture, and tourism sectors and for digital nomads.	MSET OUR SMA relevant MDAs	Medium term	No
	Deploy 5G for manufacturing, industry, and logistics modernization.	MSET OUR SMA relevant MDAs	Medium term	No
Incentivize new investments and technologies in the market	Simplify the licensing framework, review the right-of-way regime, and strengthen the competition framework.	OUR MSET SMA	Medium term	Maybe
	Develop a strategic vision for attracting investment in international connectivity and data centers. **PRIORITY**	MSET MOFPS PIOJ	Short term	No
	Diversify international subsea connectivity by attracting new investors. **PRIORITY**	OUR Investments Agency	Medium term	No
	Auction spectrum for 5G technology.	SMA MSET	Medium term	No
Improve sector planning and the institutional and legal frameworks for digital infrastructure	Modernize sector monitoring. Design a set of statistics for sector diagnostics and public policy design. **PRIORITY**	OUR USF MSET SMA PIOJ	Short term	No
	Modernize the legal framework for telecommunications and digital infrastructure.	MSET relevant MDAs	Long term	Yes
	Streamline regulatory functions, either by restructuring the functions or by using more collaborative soft tools.	MSET relevant MDAs	Long term	Yes

Notes

1. World Bank (2021a).
2. Jamaica ranks as a high developed country in the Human Development Index of the United Nations, but in recent years, it has lost its relative position. Since 2013, Jamaica is below the world average ranking.
3. ITU. Digital Development Dashboard. https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx
4. Peer countries were chosen based on geographic location, income level, and overall development aspiration of Jamaica.
5. GSMA Mobile Connectivity Index, see https://www.mobileconnectivityindex.com/connectivityIndex.html#year=2021&zoneIsocode=JAM
6. TeleGeography (2022), Global Bandwidth Forecast Service Q4. 2022.
7. ITU. Digital Development Dashboard. https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx
8. For more information on UMICs as defined by the World Bank, see https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups
9. like the Alliance for Affordable Internet (A4AI)
10. See https://www.speedtest.net/global-index
11. World Bank and UNDP (2022).
12. TeleGeography.
13. TeleGeography.
14. For more information on BELLA, see https://international-partnerships.ec.europa.eu/policies/programming/projects/bella-building-europe-link-latin-america_en
15. See Thompson and Schweizer (2022), and https://www.datacentermap.com/.
16. ESCAP (2019).
17. GSMA Intelligence, Mobile by Market, https://www.gsmaintelligence.com/data/
18. Gov.uk (2022), Benefits of Mobile Coverage, https://www.gov.uk/government/publications/benefits-of-rural-mobile-coverage/benefits-of-rural-mobile-coverage#findings.
19. FAO. N.d.
20. Clarendon, Manchester, St Elizabeth and St Ann were the parroquias with the highest rural population in Jamaica according to the Census of 2010 (in 2022, a new Census was launched). For more information, see https://statinja.gov.jm/Census/PopCensus/ruralpopulationbyfive-yeargroups.aspx
21. Lodge and Stirton (2002).
22. Idem.
23. Idem.
24. Telecommunications Act 2000, see https://our.org.jm/about-us/our-legislation/telecommunications-acts-legislations/
25. Fair Competition Act (FCA)
26. SMA 2020.
27. GSMA (2018).
28. FTC (2020).

3. DIGITAL PUBLIC PLATFORMS

A whole-of-government approach to facilitate service delivery and process improvement

KEY MESSAGES

- **Jamaica's decision makers understand the dividends of accelerating digital government adoption.** In the past decade, Jamaica has made substantial advances in developing its public platform digital landscape thanks to eGov and the TIU, which engage in the execution and funding of digital initiatives.

- **Jamaican policy makers have been anticipating the establishment of the Information and Communications Technology Authority (ICTA) to address policy and leadership gaps.** A shared vision is crucial to allocating strategic resources, resolving policy conflicts, and eliminating legal or administrative barriers. However, given the prolonged delays in launching the ICTA, Jamaica might consider implementing interim solutions to coordinate the digital agenda, possibly through an updated interim roadmap that could be incorporated into a more comprehensive strategy.

- **The GOJ should develop an extensive enterprise architecture and a whole-of-government approach to managing digital public platforms.** Steps could include evaluating existing ICT systems, developing a service catalog, setting up a data governance framework, developing government software architecture, and expanding the existing shared services layer. Major systems, such as public finance or social assistance, would benefit from a ministry-level enterprise architecture design, which can leverage the data generated for better decision making, promote cost savings, mitigate cybersecurity risks, and help prevent redundant systems.

- **Centralized management of core government systems is vital to achieving cost-effective, sustainable digital public platforms and seamless service delivery.** A whole-of-government and "building-block" strategy could streamline ICT service procurement and management, such as data hosting, and also address unique needs within the ICT governance framework. Focusing on common functions across agencies and centralizing their development would enhance interoperability.

- **As Jamaica implements its National Identification System, the GOJ has an opportunity to rethink interconnectivity and system interoperability using single sign-on systems to strengthen the Jamaica Data Exchange Platform.** However, interconnected systems may increase contagion risks, emphasizing the need for comprehensive enterprise architecture, robust cybersecurity measures, and alignment with international standards to safeguard core systems from cyberattacks. A guiding body must develop a security and data protection framework with clear security policies, regular assessments and audits, employee training, and incident response procedures.

3.1. The importance of digital public platforms: Improving service delivery and core government systems

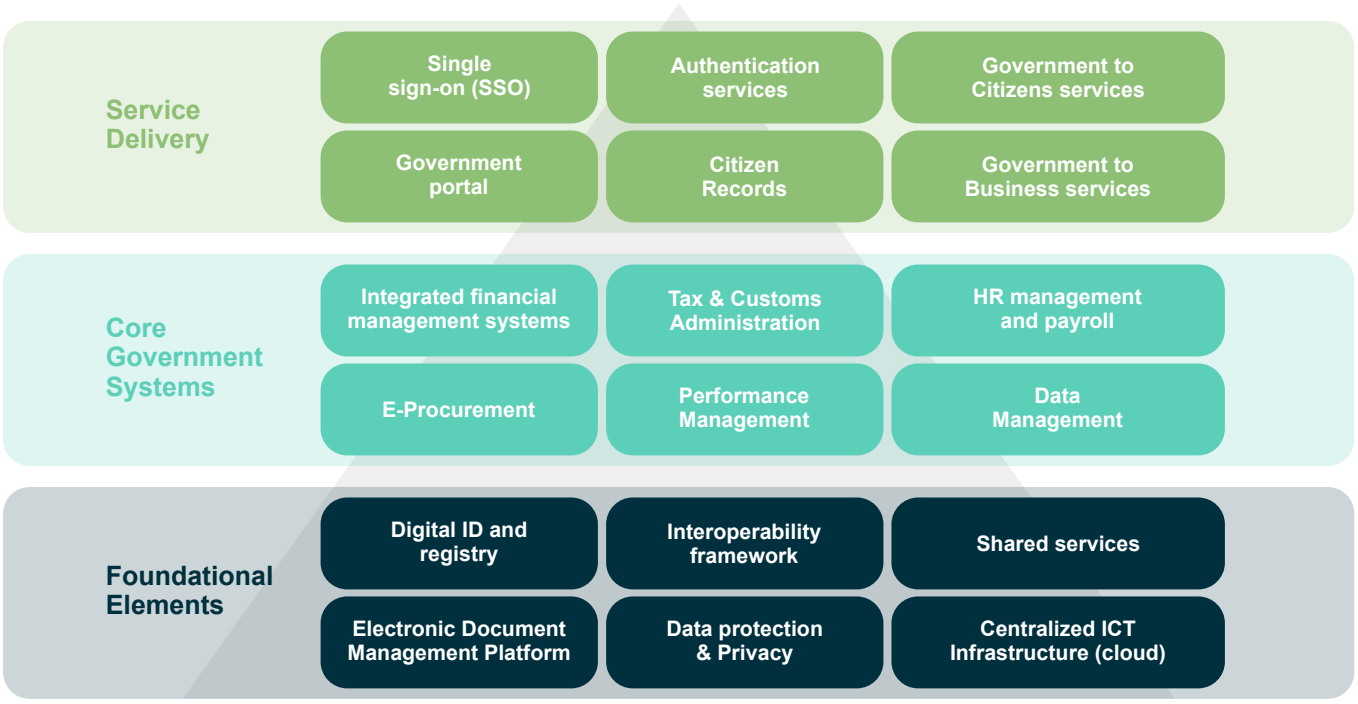
Digital platforms are electronic tools designed to exchange goods, services, or information between producers and users. In a nutshell, they facilitate the flow of information and transactions to enable producers and users to create value by interacting with each other. Digital platforms can be public or private, such as, for example, social networks and online marketplaces. This chapter focuses on digital public platforms and examines their capacity across three complementary levels (see Figure 3.1).

Digital public platforms can increase operational and economic efficiency, improve service delivery, and facilitate innovation and economic development. The development of digital platforms is an essential lever for the digital transformation of the whole economy. They can transform how governments interact with citizens and businesses and optimize public value by reducing costs and improving productivity. They also enable new service delivery models and improve the management of public resources while providing timely information for the design and implementation of public policies. Digital platforms connect people and public institutions virtually and have the power to improve people's lives in multiple ways by enhancing the operational efficiency and service delivery of government institutions. They proved critical during the COVID-19 pandemic, for example, and citizen expectations have increased as a result.

Governments can boost digital public platforms by digitalizing their operations and procedures. Digital public platforms entail operating a set of foundational elements, including shared ICT infrastructure, such as a government cloud, interoperability framework, application programming interface (API), digital ID, and regulatory framework for data protection. A second layer comprises core cross-cutting back-office government management systems, such as public financial management information systems, human resource management e-procurement systems, and so on. These systems produce information that can generate public value and improve strategic decision making within the government through open data. An additional third layer is focused on the delivery of services leveraging the automation and information processes generated by cross-cutting systems and foundational elements. This layer consists of such critical features as the development of single citizen records, a single digital services portal, and the development of ID authentication services for public and private sector institutions.

Using a customized approach, the World Bank team assessed the maturity of Jamaica's digital public platforms. The analysis was focused on key enablers and constraints to the development of digital public

Figure 3.1. The Bank's Approach to Digital Public Platforms Targets Three Levels of Capacity



Source: Authors' elaboration.

platforms on the following dimensions: (a) institutional, strategic, and legal frameworks, (b) interoperability and shared services, (c) service delivery, (d) back-office systems, (e) platform enablers, and (f) platform constraints. An additional section was subsequently added to spotlight the implications of public platforms in the areas of tax policy and tax administration.

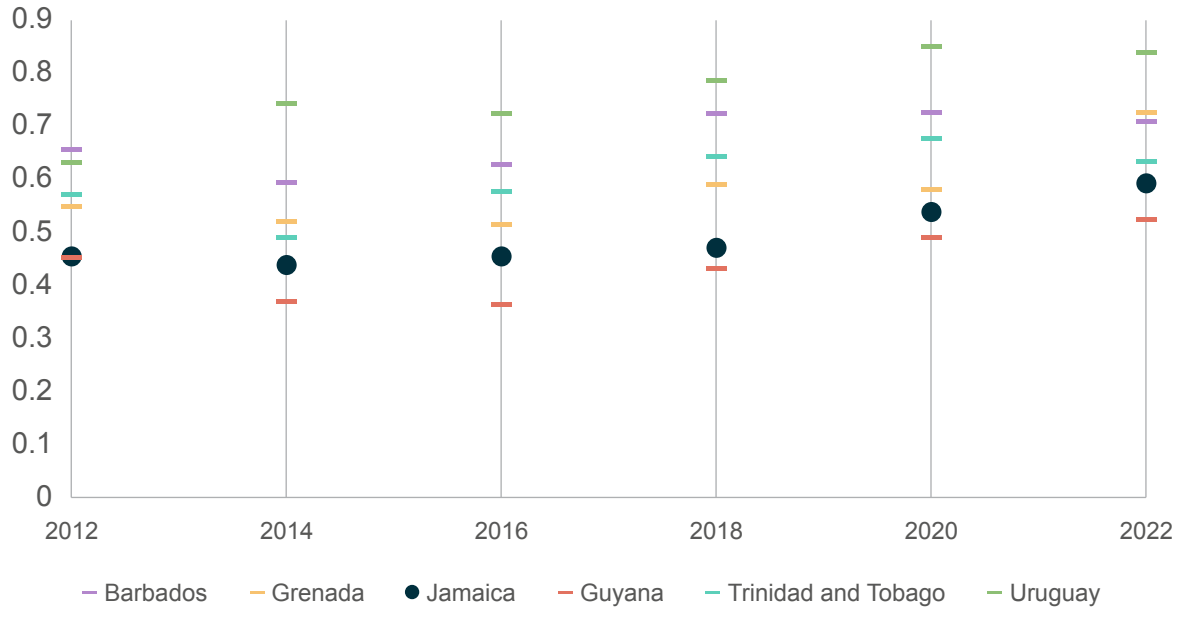
3.2. Current state of digital public platforms: Opportunities to improve service delivery and core government services through digital transformation

Digital transformation is a complex and multidimensional process that often requires legal, institutional, technological, and cultural changes across government and the broader digital ecosystems. Carrying out the necessary reforms and implementing concrete actions to drive digital transformation in a timely and effective manner entails high-level political commitment, a clear transversal mandate, and the development of technical capabilities and human resources to support diverse, multidisciplinary digital teams. The successful implementation of digital transformation policy begins with clear leadership, a vision of the desired outcomes, and the potential policy pathways to achieve them.

Jamaica's relatively good progress in developing digital government is reflected in the UN's international surveys on e-government, though other countries in the region are ranked higher. Jamaica's score on the UN's E-Government Development Index rose from 0.4552 in 2012 to 0.5906 a decade later.[1] Among the six countries from the region displayed in Figure 3.2 below, Jamaica was at the bottom in 2012 but quickly improved its ranking the next time the survey was undertaken. Nevertheless, as of 2022, Jamaica still had work to do to catch up with comparator countries in the Caribbean (Trinidad and Tobago, Barbados, and Grenada).

Other global benchmarks also place Jamaica behind LAC peers, especially in core government service delivery. Jamaica scored 0.541 on the World Bank GovTech Maturity Index,[2] slightly behind the LAC average (0.547). Jamaica belongs to group B of the GovTech Maturity assessment (which considers countries with a highly significant focus on GovTech), along with Bolivia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Panama, and Paraguay. Jamaica is particularly behind in the Core Government Service Index,[3] with a score of 0.458 compared to 0.58 for LAC.

Figure 3.2. Scores on the UN E-Government Development Index from 2012 to 2022 for Select Countries



Source: UN E-Government Development Index.

Institutional, strategic, and legal frameworks

Jamaica's decision makers understand the dividends of digital government. The GOJ has several line ministries investing in digital platforms to increase the efficiency and efficacy of government functioning and service delivery. Every institution seems to see the digital agenda as a top priority, and Parliament has approved legislation to facilitate the use of technology across government. Despite the existing political will and the longstanding awareness of the benefits, however, Jamaica does not seem to have a clear roadmap to reach its vision as a leading digital platform country in the Caribbean.

In the past decade, Jamaica has made substantial advances in developing its digital public platform landscape thanks to the execution and funding of several institutions. The MSETT oversees the country's digital infrastructure and platforms. eGov is the MSETT's powerhouse in managing digital platforms, providing such services as cross support, software development, procurement reviews, hosting, and information system management to other ministries, departments, and agencies (MDAs). The Ministry of Finance and the Public Service (MOFPS) oversees the TIU, which among other responsibilities, leads the transformation programme. This encompasses the build, test, and deployment of shared services and integrated government public financial management systems. Recently, the Office of the Prime Minister, which plays a liaison role for interagency cooperation, initiated the National Identification System (NIDS) project, which aims to establish a comprehensive and secure system to identify and authenticate the country's citizens and legal residents. Finally, the Office of the Cabinet manages the government's portal for service delivery, setting strategic direction and facilitating coordination, technical support, and potential funding.[6]

Although various modernization project initiatives are underway, major digital reforms are being held back until the Information and Communications Technology Authority (ICTA) is launched. The ICTA is supposed to serve as the cornerstone of the digital reform agenda. The current action plans, blueprints, and roadmaps were crafted around the proposed ICTA, which was first planned in 2017. Though the legal basis is in place, it had yet to be officially launched at the time of this writing.[7] The intention is for eGov Jamaica to transition to the ICTA and become the country's primary institution for directing strategic digital government, updating the legal framework, and serving as convenor for other institutions to implement the agenda across government. In the interim, pending the ICTA's launch and the appointment of a Chief Information Officer, a policy void remains, with no institution specifically responsible for setting the policy direction for digital development.

Currently, Jamaica needs a comprehensive digital government strategy that could be translated into an action plan. In the past decade, successive governments in Jamaica have developed roadmaps and policies related to a government digital transformation strategy and cybersecurity, establishing a foundation for these goals. Although these documents were helpful, they have not been sufficiently updated to serve as a practical guide for addressing the constantly evolving digital challenges. The digital agenda is rooted in Jamaica's Vision 2030 document, the long-term development plan published in 2009. Other reference documents include a 2016 Road Map and Action Plan for ICT Transformation (the Blueprint Report), a 2011 ICT Policy (i.e., the sector plan to support Vision 2030),[8] and a 2018 Manual with ICT policies, standards, and guidelines. The redefinition and execution of the digital strategy are intended to be the top priorities of the ICTA.

Jamaica has an extensive legal framework to govern the country's use of ICTs. The framework consists of various laws and regulations that address several aspects of ICT use and governance. These laws and regulations aim to protect the rights of citizens, businesses, and government while promoting the development and use of ICT. When these laws follow international standards, they also help to ensure the security and privacy of personal data and provide a framework for regulating ICT services:

- **The Data Protection Act (2020)** regulates personal information collection, use, and disclosure.
- **The Cybercrimes Act (2015)** criminalizes computer-related offenses and provides for computer crime investigation, prosecution, and punishment.
- **The ICT Act (2019)** establishes the regulatory framework for providing ICT services, including telecommunications, broadcasting, and postal services.
- **The National Identification Systems (NIDS) Bill** was approved in 2021 to establish a reliable database of all Jamaican citizens. A National Identification Agency will be established to manage the NIDS project and its regulations.

Interoperability and shared services

The GOJ aspires to provide an interoperability layer resembling Estonia's X-Road. An interoperability framework is critical to ensuring the flow of information between government systems for decision making and service delivery. The Jamaica Data Exchange Platform (JDXP), currently at the concept stage, would allow for data sharing across government agencies, functioning much like the X-Road system used by the Government of Estonia, which promotes secure and efficient data sharing to help improve the delivery of public services and reduce administrative burdens. Although other interoperability platforms are available on the market, this is the model that eGov Jamaica has chosen to adopt. eGov has developed a roadmap for the rollout of the JDXP, with a first release targeted for the first half of 2023. Functionality at this stage will be limited to data validation and retrieval, and the objective is for MDAs to be able to exchange data through the platform. Still, some may have difficulty reaching this goal because they cannot develop the required APIs. Sustainable funding for the JDXP has yet to be identified, but eGov has been funding its development thus far by drawing from internal resources and collaborating with experts from other GOJ projects.

The TIU is working on a shared services platform that combines many of the government's core functions, such as human Resources, payroll, procurement, and financial management. By using APIs and standards, the TIU aims to improve interoperability between these systems and increase their operational efficiency. This shared service platform is crucial to modernizing the government's IT infrastructure, as it helps to standardize processes, simplify procedures, and lay the foundation for future digital integration and cost savings. One example is the Human Capital Management Enterprise System (MyHR+), a commercial off-the-shelf (COTS) product developed by Quidgest, a software development company out of Portugal. It is customized as needed for the specific requirements of the GOJ. Currently, MyHR+ is used by 40 entities and over 67,000 workers, with a user-friendly interface for employees and a backend for entities to manage human resource matters. Additionally, eGov is exploring the concept of shared services to unify government communication and server hosting through govMail, govTalk, and govCloud.

Despite these initiatives, interoperability between GOJ databases is still limited. Even though several ICT systems are hosted and managed by eGov Jamaica, their databases do not yet communicate, and information is shared only in limited instances. With a few exceptions, most information systems are not configured to access and share data, resulting in silos of information. This siloing can lead to inefficiencies, such as duplication of effort (for both citizens and civil servants), lack of coordination, and missed cost savings. Moreover, the government cannot fully leverage its collected data to improve services and decision making by integrating technologies such as business intelligence. Some information systems are web service capable, but efforts to synchronize the technology stack, standards, and protocols used are needed to enable full interoperability.

Service delivery: government to citizens and businesses

Service delivery platforms provide a standardized technology framework to deploy digital public services. A service delivery platform is a set of components that provide a service delivery architecture (such as service creation, session control, and protocols) for a service delivered to the consumer—whether a customer or another system. These platforms often require the integration of IT capabilities and the creation of services that cross technology and network boundaries. They typically provide environments for service control, design, orchestration, execution, and monitoring.

The Office of the Cabinet oversees the government's service delivery platform, www.gov.jm, and is currently working on issuing an updated version with more end-to-end digitalized services. A steering committee of representatives from different government departments and agencies assists in the decision making on this platform's development. eGov technically maintains the platform and provides links to various online services organized by category, such as passports, licenses, security, justice, and health. However, very few of the services listed are entirely digitalized. Some are hybrid, where services are partially digitalized online but still require a physical visit to the required office to finish. Most others are informational only, listing the document needed for the service and the physical address of the office(s) to visit. The Cabinet Office's objective for phase one of the government portal was very limited: to provide a single source of information to residents and businesses on which MDAs were responsible for which services and the requirements to obtain them.

Among the services that citizens and businesses can access through the government portal, the ability to review and pay taxes is one of the most advanced. Users can sign into the portal to pay their taxes or be directed to the TAJ systems to access more information about their accounts using their tax registration number (TRN). TAJ developed the taxpayer systems for its own purposes, but the payment application in the portal is available for all MDAs to receive fee payments from citizens and businesses.

The Office of the Cabinet has undertaken a comprehensive evaluation of GOJ services to identify priorities for re-engineering and digitalization and to integrate them into the second version of its platform. A consulting firm was hired in 2019 to develop a tool to assess the technical needs and institutional hurdles of the 50–60 MDAs in their efforts to digitalize their services. The process has resulted thus far in information on 281 services offered by about 40 MDAs. The assessment includes key service characteristics, such as volume of transactions, and what would be required to streamline work processes and digitalize the service from end to end. The Cabinet Office aims to integrate the requirements of the selected MDAs into a project proposal that can be submitted to the Public Investment Management Committee for funding consideration. The goal is to provide more end-to-end digital services in the second phase of the portal,[12] with added functionalities such as chatbots to enhance the base software.

The digitalization of services and the review of procedures could be challenging and slow to complete, as the financial and technical capabilities of MDAs vary. The Office of the Cabinet is intervening to assist them in digitalizing services to populate the government portal and mainstream the process. However, once the review is finalized, the GOJ must ensure the sustainability of these services. To overcome this challenge, the GOJ could adopt a governance framework and capacity-building strategy that ensures that new services offered are fully integrated with the existing information system of the respective MDA and not treated as a separate project. Moreover, in some services, the workflow process requires the intervention of several entities, posing a potential problem of ownership that could be addressed in the governance framework.

Back-office systems

Government back-office systems are a vital element of digital public platforms. Back-office systems are used to manage government operations, and although citizens do not directly see them, they ensure the upstream delivery of public services. Such systems comprise processes in key cross-cutting areas, including budget management, accounting, customs, revenue administration, asset management, procurement, and payroll management. The digitalization of government systems has played a crucial role in the initial stages of the digital transformation journey of many countries.

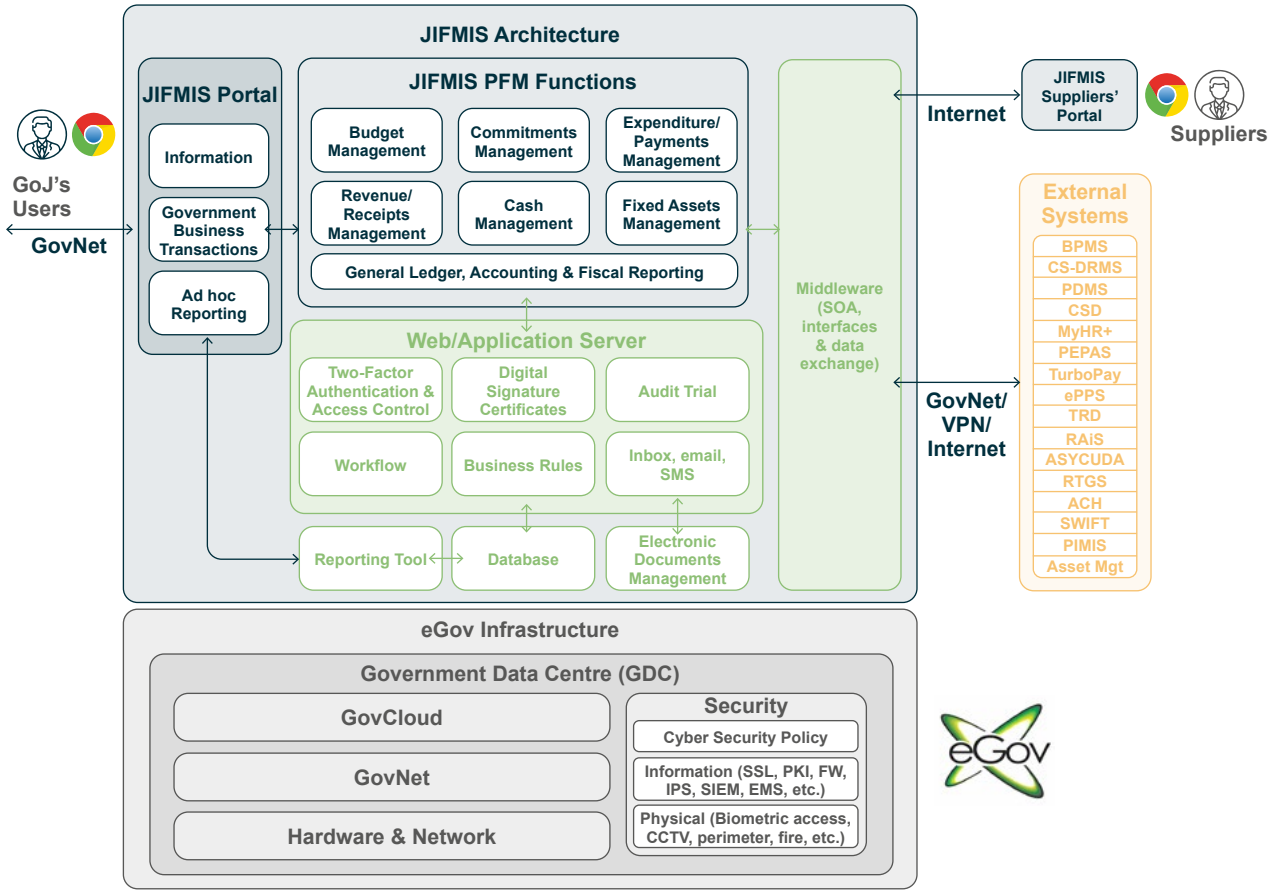
The MOFPS oversees several back-office systems that support the government's core functions. These systems include the Budget Preparation and Management System, Public Debt Management System, Central Treasury Management System (CTMS), Revenue Administration Information System (RAiS), Automated System for Customs Data, MyHR+, TuboPay – Payroll System, and Electronic Public Procurement System (ePPS). The new Public Investment Management Information System (PIMIS) was still being implemented as of January 2023, and its agreed launch date has been delayed by over a year. PIMIS was initiated under a World Bank–financed project (the Strategic Public Sector Transformation Project), financed entirely by the GOJ after the loan closure in December 2022.

The MOFPS has aspired for several years to create a consolidated software architecture, the Jamaica Integrated Financial Management Information System (JIFMIS) (see Figure 3.3.) The system is intended to streamline financial processes, reduce manual data entry and errors, and provide real-time information to policy makers to improve the quality of public financial reporting and decision making across the various platforms MOFPS uses. It would also be expected to improve user functionality and enhance data security and transparency across platforms. Yet despite broad consensus across the MOFPS on the value of JIFMIS, it has not moved from the concept stage to a formal project funding proposal. The MOFPS acknowledges that the momentum that was present before the pandemic has slowed, and focus has been redirected to other areas, even though a JIFMIS committee still exists.

The MOFPS has a decentralized approach to governing its information systems, with individual departments responsible for the day-to-day operations and functional management. eGov Jamaica is a preferred partner for hosting and managing the technical needs of these systems without interfering with the core business or interoperability. However, other systems, such as the budget planning systems, are hosted by the software vendor, which could present limitations when integrating different systems. The governance model is so decentralized that there is no comprehensive inventory of its back-office systems, leading to a fragmented IT landscape. However, the TIU has recently taken steps to consolidate and interconnect some core systems.

The TIU is creating a shared services platform with performance management and a help desk system. The TIU integrates the government human resource system, MyHR+, the government financial management system (GFMS) used to manage public expenditures, ePPS, and other back-office functions, such as payroll and pensions, used by different MDAs. The TIU is building a technological layer where the applications could interconnect using APIs. A dashboard with business intelligence supports the shared services layer and has a dedicated help desk to assist users from different MDAs.

Figure 3.3. JIFMIS Architecture



Source: Government of Jamaica.

MyHR+ could be a blueprint for a back-office system, demonstrating the possibility of centralizing core government operations. The advanced human resource management system offers distinct levels of access based on job function. It enables employees to access their data, schedule leave, submit claims, request salary advances, register for training, and contact the MyHR+ team to address technical issues. The HR/payroll department can access more advanced features, such as recruitment, payroll processing, performance appraisal, and competency management. The system offers enhanced efficiency, standardization, data analytics, and secure data management.

The ePPS program could prove that the decentralized approach to back-office system design, without clear guidelines, could lead to inconsistency in quality and reliability. ePPS is one of the newer applications under the authority of the MOFPS, but reliable data on its functionality and benefits to users are unavailable. There is anecdotal evidence that users in some MDAs have experienced challenges in using all the system's features. MDAs are strongly encouraged to use the ePPS to conduct procurement activities, though this is not enforced from end to end. The MOFPS does not have a process to collect and evaluate system feedback, nor are significant upgrades anticipated. However, performance data and system improvements could be upcoming for ePPS following the decision to integrate it into the TIU's shared services platform.

The TAJ system serves identification purposes and data exchange. The TRN is used to identify accounts but is not used as a login. The TRN is used by entities that collect/withhold taxes and some social services. The tax primary payment system is developed and managed by TAJ but is hosted by eGov. The application uses an off-the-shelf core system called GenTax, which is updated periodically by the vendor. Data exchange is established with other entities, such as the customs agencies. Cybersecurity is managed by eGov, with a risk management unit within TAJ. This tax system is one of the most developed within the MOFPS government-to-government (G2G) landscape.

Platform enablers

The whole-of-government approach and best practices

Jamaican decision makers are generally counting on the creation of the ICTA to drive the development of a comprehensive strategy to guide the nation's digital transformation. Building a solid institution capable of exercising convening power to rally key Jamaican stakeholders is a crucial step toward a successful digital agenda. A common challenge encountered by the GOJ in previous attempts to modernize the public sector was the leadership required to enforce mandates. The ICTA would play a key role in promoting interoperability and ensuring standardization across MDAs. The GOJ hopes the ICTA becomes an evolved version of eGov with more institutional strength and financial and human resources.

A whole-of-government approach can only be achieved if GOJ information systems are designed and developed following a well-defined enterprise architecture. The approach requires seamless collaboration and communication between government agencies with clear leadership and vision. Proper software architecture provides a clear and consistent framework for designing, building, and integrating software systems. It also ensures that the various systems are compatible and can communicate with each other effectively, following standards and protocols while providing privacy and security. Authorities believe the ICTA will be given the mandate and resources to develop the government's enterprise architecture; however, to succeed, the ICTA must acquire the appropriate expertise and have the cooperation of GOJ stakeholders that are currently accustomed to the siloed approach.

Before embarking on a comprehensive enterprise architecture, Jamaica could take foundational steps to a broader strategy. The goal would be to jump-start the process of setting up the enterprise architecture in order to ensure interoperability and data exchange in upcoming information system procurement. One of these steps could be understanding the current ICT landscape by comprehensively assessing the existing systems, including applications, databases, hardware, software, data flows, and network infrastructure. Another step could be to develop a data governance framework to agree on data standards, classifications, security, and quality. Finally, the government could define an architecture vision and develop a roadmap. Achieving these goals might require establishing a high-level committee to ensure commitment from all stakeholders, including political leaders, department heads, IT leaders, and other key decision makers.

More extensive centralization of ICT functions within government would provide efficiency gains and help mitigate skills shortages. Utilizing economies of scale can lead to cost savings and more efficient use of resources. A centralized ICT team can also respond effectively to crises, such as natural disaster risks or significant cyberattacks, by coordinating a swift and well-informed response. Additionally, a centralized ICT function could help attract highly skilled ICT specialists because it is often seen as a desirable work environment, with opportunities for professional development and exposure to a broader range of technologies and practices. The shortage of skilled IT specialists was identified as a challenge for the GOJ during this assessment (see Chapter 6).

Digital ID and trust services

Jamaica does not currently have a foundational ID that serves as general purpose identification usable across all activities.[13] Instead, the country has functional IDs, such as passports, electoral IDs, driver's licenses, and also the TRN, which is Jamaica's most commonly used form of ID. The TRN is a unique, 10-digit number assigned to every Jamaican taxpayer and used for various government transactions, including filing taxes and accessing social services. It is also required for other activities, such as opening bank accounts and obtaining a driver's license. The proportion of the adult population with a TRN is unknown, but it is essential for registering a business with the Companies Office.

Jamaica is currently in the process of introducing a new, distinctive, and unified ID system that is both digital and physical. The new ID card will be equipped with a chip and a QR code, allowing for secure and efficient verification and access to government services. This unique ID system should be Jamaica's foundational ID to help increase security and reduce fraud. Additionally, the GOJ plans to integrate digital ID into government digital platforms to further streamline procedures. A dedicated Identification Agency would manage the ID, while the physical infrastructure would be hosted and managed by the ICTA.[14] It is planned for the TRN to remain separate from the NIDS, but for those who have it, the TRN will be their national ID number. As part of the plan to develop the digital ID, the GOJ awarded US$4 million to Fujitsu Limited to digitize vital records at the Registrar General's Department, the repository for all records of births, marriages, deaths, and deed polls.[15]

The GOJ could use the momentum of the digital ID to set up single sign-on (SSO) for government-to-citizen (G2C), government-to-business (G2B), and G2G use. SSO is a system that allows a user to use one set of login credentials to access multiple applications or services. The Jamaican government could already implement an SSO module without waiting for the official launch of the digital ID. In the meantime, the system could use the TRN or any other unified form of ID. The Jamaican government could pilot SSO for G2G before launching a G2C/G2B version. The eventual integration of biometrics through the NIDS could also be used to strengthen SSO systems.

Data management and hosting

Data should be treated as a key strategic asset to generate public value. When governments approach data as a strategic asset, it can open the door to creating value by leveraging new technologies. Thus, the GOJ should purposefully shift away from managing siloed datasets and allow data to become a driver of innovation and growth by improving strategic decision-making capabilities and enabling data sharing between different digital government services. How fast the government can reap the benefits depends on key supporting elements, such as a solid technical foundation, a strengthened data governance framework, the prioritization of data sharing associated with the user journey in each event, and privacy and data protection settings.

The TIU and eGov are consolidating government infrastructure and upgrading the GOJ's data center. eGov has a data center with near Tier-2 capabilities (not certified) and is upgrading it to Tier-3-equivalent specifications to consolidate government servers for better management and security. The TIU is collaborating with eGov to provide technical expertise and funding for the data center's upgrade. It is also investing in extending GovNet, a wide area network that links various MDAs through fiber-optic connections. However, there is no concrete timeline for how quickly the upgrades can be implemented.

The Jamaican government faces several challenges in its data management practices due to limited hosting capacity, the absence of a cloud policy, and offshore vendor hosting. Most of the systems are hosted by eGov, but there is limited use of cloud technology, and the policy surrounding it remains unclear. As a result, the government's ability to leverage the benefits of the cloud, such as increased flexibility and scalability, is hindered. Additionally, some critical systems, such as the budget system, are still hosted offshore by vendors, which creates concerns about data security and sovereignty. The Jamaican government must address these issues and develop a clear and comprehensive data management strategy, including cloud hosting, to ensure the effective and secure use of its data.

The open data portal in Jamaica has the potential to be a valuable resource for transparency, accountability, and informed decision making. However, the portal's data are outdated because of the lack of regular updating, reducing the data's effectiveness,[16] usefulness, and credibility. To be practical and beneficial, open data should be made available automatically without requiring additional effort for extraction and publication. Thus, although Jamaica's open data policy is encouraging,[17] it must be accompanied by practical measures to ensure that data are reliably updated and publicly available. To this end, the government must prioritize the implementation of a robust data management system that supports the timely and regular release of information.

Online payments and digital currency

The GOJ is promoting greater financial inclusion through online payments for government services and the rollout of a digital currency. The TAJ e-Services portal accepts online payments for government services, including the payment of taxes, utilities, licensing fees, and various other government-related services using a credit or debit card or a direct bank transfer. Additionally, some individual government agencies, such as the Jamaica Public Service Company and the Island Traffic Authority, offer online payment options. An account must be created on the TAJ website to use the e-Services portal. In addition to payments for government services, the GOJ hopes to promote financial inclusion through JAM-DEX[18] and its digital wallet LYNK®, as they allow payments for different services without needing a bank account (for more information, see Chapter 4).

Platform constraints

Institutional challenges

The absence of a leading structure to set up the necessary policies, frameworks, and standards impedes data sharing, interoperability, and cybersecurity goals. The ICTA is meant to be the institution that would enable Jamaican government information systems to interconnect and share data without posing challenges to data availability, integrity, and security. While waiting for that transition, eGov plays a limited role in ensuring basic standards in procuring government information systems. However, eGov is not enforcing guidelines for data standards, classification, cybersecurity, interoperability, and virtualization, as such guidelines either do not

exist or are outdated. Currently, eGov lacks the necessary institutional support and staff to manage the existing architecture effectively. The TIU is also working on consolidating the government's core functions with more substantial support from the MOFPS.

Jamaica needs interim solutions for the development of its digital agenda while it awaits the ICTA and a formal digital strategy. An interim updated roadmap is needed to ensure that a realistic digital transformation, adapted to the country's specific needs, can take place. Once developed, this interim roadmap could be integrated into a larger strategy. While the government is awaiting major reforms, however, MDAs are likely to continue their modernizing efforts without following any specific guidelines, which might later jeopardize interconnectivity and security. By taking proactive steps, such as issuing standards for all MDAs in data classification, for example, the government can ensure that the solutions being implemented are in accordance with standards that ensure security and interoperability, among other objectives.

Despite the TIU's intervention, the governance of back-office systems is currently a challenge that is impeding a whole-of-government approach. The TIU's consolidation project is a step in the right direction. Nevertheless, like the modernization efforts, Jamaica's back-office systems, which support the operational and administrative functions of government, are often developed independently, without a clear overarching strategy. There is also a lack of adherence to standards across these systems, meaning that the GOJ is missing an opportunity to introduce better efficiency, data consistency, and mitigation strategies for security vulnerabilities. These current governance problems are impeding the government's ability to manage and utilize its back-office systems effectively. Even the TIU's consolidation project is problematic because its systems were developed following different software architectures and data standards.

The fragmented development of back-office systems (G2G) can hinder the delivery of effective G2C and G2B services. This siloed approach leads to inconsistencies, inefficiencies, and higher costs due to disparate, non-integrated systems. Instead of adopting an API-based architecture, MDAs are developing their applications as stand-alone entities, making it difficult for them to provide a seamless experience for businesses and individuals. The lack of integration also increases risks to privacy and security. When systems are scattered, they are likely to be protected by different defense systems that may vary in their level of protection, making it more difficult to implement consistent security protocols and leaving some systems more vulnerable to security threats. The result is likely to be increased costs and inefficiencies in the digital transformation process.

It may benefit eGov to prioritize its interventions to allocate its limited human and financial resources more effectively. While eGov is involved in several initiatives, some of its projects, such as the JDXP, govMail, govChat, and govCloud, appear to be facing

BOX 3.1 Development of a Sector-Wide Social Protection Information System

Under a US$20 million IBRD operation, the Social Protection for Increased Resilience and Opportunity Project (SPIRO), the Ministry of Labor and Social Security (MLSS) will be developing an integrated Social Protection Information System (SPIS), which the sector currently lacks, as a single registry, modular system for social assistance programs. It would be unified with a central intake system as a single-entry point to all its services, with an advanced case management function. The current TRN would be used as a unique identifier until the launch of the national identification number (NIN). The SPIS is aimed to become a multi-sector, multi-agency system but would be launched initially to incorporate a few key programs and services at the MLSS.

Although the ministry will coordinate closely with the various ICT authorities in Jamaica and a technical working group for the project's IT activities will be established, there are several risks involved, given capacity limitations within the MLSS and eGov and the absence of an overarching ICT governance framework. The working group, which will include MLSS, eGov, and MSETT representatives, will attempt to mitigate these risks through technical oversight of all the IT activities (procurement and development) in the project to ensure that the SPIS complies with all forthcoming legislation and national ICT standards.

Source: Author's elaboration.

development challenges. To ensure the efficient use of resources, it is crucial that eGov carefully consider the trade-off between investing in in-house development and procuring off-the-shelf solutions. For example, other government agencies have adopted commercially available solutions for productivity tools at the same time that eGov is developing similar tools internally. Although eGov has a vital role in shaping the Jamaican digital landscape, its decision making should be based on economic considerations and the need for customization.

Platform management and cybersecurity

Utilization of technology in government operations cannot be effective without clear IT architecture, a system inventory, and virtualization directives. The lack of a well-defined IT architecture hinders efforts to align technology with the government's digital goals. The absence of a government IT system inventory exacerbates this problem by making it difficult to determine the scope of technology assets and infrastructure available for use or to update them if needed, leading to potentially duplicated efforts and misaligned investments. Furthermore, utilizing cloud technology, an increasingly crucial component of modern IT infrastructure, without virtualization and a clear-cut cloud policy, would create challenges. A comprehensive IT architecture, inventory management system, and virtualization/cloud policy directives should therefore be developed and implemented promptly to address these concerns.

The GOJ has a set of policies and initiatives to address cybersecurity challenges, but they are not integrated into an updated and defined cybersecurity strategy. The GOJ has a cybersecurity document from 2015 that is being updated as well as a Cyber Emergency Response Team (CERT), but the latter's role is more informative than strategic or operational. Meanwhile, as noted above, MDAs currently are individually responsible for their cybersecurity and do not have a reference policy framework to follow. After it is developed, the cybersecurity strategy must be revisited and assessed periodically to guarantee business continuity and to ensure that it has the capacity to recover from manmade and natural disasters. The absence of a defined cybersecurity strategy is particularly critical as the country moves toward implementing a digital ID (see Chapter 7 on the Trust Environment).

Uptake and accessibility

The GOJ has a partnership with telecommunications operators to guarantee citizens free access[19] to government platforms, but this might not be enough to increase adoption. According to the ITU, Jamaica's internet penetration rate of 70 percent[20] is high compared to other countries in the region, but the cost of connectivity remains high (more details can be found in Chapter 2). The government has made efforts to improve access to the internet, particularly in rural areas and schools, through such initiatives as the Universal Service Fund (USF) and the Connect Jamaica Project. Despite the agreements with operators to ensure free access to government services, the high cost of internet access could remain a barrier, and many individuals may not be accustomed to using the technologies and devices involved.

Digital literacy among both government employees and citizens is critical to implementing digital government services. Digital literacy refers to the ability to use digital technology and devices to access, understand, and create information, a crucial skill if citizens are to benefit fully from digital government services and without which uptake and use of those services is likely to be low. Government staff also need a certain level of digital literacy to effectively support these services. In fact, the shortage of skilled government personnel to perform advanced IT functions presents a significant challenge. The lack of expertise in data analysis, cybersecurity, and software development, and the failure to attract and retain skilled IT personnel, can negatively impact the government's ability to deliver major digital platform reforms, keep pace with technological advancements, and implement the latest digital tools and solutions to enhance service delivery, increase efficiency, and improve decision making. To address this issue, the government must focus on developing strategies to attract, train, and retain talented IT professionals to ensure that it is equipped to meet the demands of the rapidly evolving digital landscape. As mentioned above, the centralization of IT functions could help mitigate this problem, though other measures may also be needed (more information on digital skills can be found in Chapter 6).

The government must ensure that all citizens, including those without a digital ID, are able to access essential government services. Jamaica's development of a digital ID for service delivery is a positive step toward modernizing and streamlining government services. To ensure that no one is left behind in the transition, alternative ways of accessing services must be provided to those without a digital ID and/or extra assistance in obtaining the digital ID offered to those who do not have it.

Developing a multichannel digital government service that uses the same information system in the delivery process is critical to accessibility and efficiency. Citizens should be able to access government services through various methods, such as a website, mobile app, text, phone call, and/or in-person interaction. The information system should be the same as any commercially available customer relationship

management tool, regardless of the channel used. For example, if a citizen calls an operator to perform a service over the phone, the operator should use a dedicated or similar interface to the web version that would interact with the same information system used by another citizen on their mobile phone. This principle allows citizens to choose the best method for them and is inclusive to those who may not have access to specific devices or to the internet.

Tax policy and administration

Global tax policy reforms arising from digitalization

Digitalization of the economy has created challenges and opportunities for tax policy and tax administration for countries across the globe. The past decade has seen an intensive effort to bring much-needed reforms to the international tax framework under the pressure of digitalization and globalization. Much of this reform was driven by the G20 and OECD countries. In recent years, non-OECD countries, including developing and emerging economies, have taken a far more proactive role in shaping the tax reform agenda through the OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting (BEPS) (the Inclusive Framework), which now has representation from 142 countries. Notably, the GOJ has been prominent in representing non-OECD members and developing countries as the co-Chair of the Inclusive Framework.[22]

The GOJ has been proactive in implementing the BEPS minimum standards and voluntarily adopting the guideline on automatic exchange of information of financial account information, with the first exchanges taking place in 2022. Implementing these global standards is critical to addressing profit shifting and tax evasion. It will be important to ensure that the full benefits arise from these reforms, including optimizing the use of information that Jamaica receives from other countries, in part through systems developed by TAJ.

The GOJ should consider implementing new international standards on the automatic exchange of information relating to income earned on internet platforms currently being applied globally.[23] This information can help monitor the growth of the platform economy in Jamaica, keeping in mind that the key platform businesses are established outside the country. The new standards can also assist Jamaica in ensuring that digital platform operators comply with their tax obligations, even as the benefits of the platform economy for small business and individual entrepreneurs are recognized.

In October 2021, the GOJ was a signatory to the historic global agreement on a two-pillar solution to address the tax challenges of digitalization.[24] [25] Pillar One of the agreement foresees re-allocating tax revenues to market jurisdictions, meaning where the goods were consumed, and simplifying transfer pricing for routine activities. Pillar Two will see a global minimum tax of 15 percent (effective rate) and measures to address low taxation on intra-group payments, including royalties and service payments. The World Bank has produced guidance for countries applying the minimum tax, including policy options and administrative steps for implementation.[26]

Timely implementation of the global minimum tax, including structured consultation with key stakeholders, can provide certainty to businesses and protect the tax base. The GOJ may need to protect its tax base by implementing a qualified domestic minimum top-up tax to prevent another country from applying a top-up tax on profits generated in Jamaica. In addition, it should examine its fiscal incentive regime to ensure that it complies with the new rules and continues to attract investment that delivers sustainable employment.

The GOJ should also implement international general consumption tax (value added tax [VAT]) standards to ensure that digital supplies and online trade are subject to tax and that there is a level playing field for business. The BEPS process included recommendations on the leakage of VAT revenues, which have arisen as goods and services that would have been subject to VAT are now being delivered through electronic means, such as online streaming, gaming, software applications, and so on, in addition to goods sold through online marketplaces for importation. This is a challenge that many countries have faced and are addressing through the modernization of VAT legislation according to international standards. Failure to address these challenges not only impacts revenue collection but also leads to an unlevel playing field for operators (online and traditional) in Jamaica.

The GOJ should continue the ongoing process of modernizing tax legislation. In particular, the government's intention to update excise tax legislation is welcome, as this can facilitate the use of digital systems for effective and efficient controls while reducing compliance burdens on taxpayers.

Additional benefits of the digitalization of tax administration

Digitalization of tax administration can benefit both businesses and individuals, as it can boost tax morale, increase tax certainty, and deliver operational efficiencies. Continued investment in digital solutions is

essential and has been recognized by the OECD's Forum on Tax Administration through the Tax Administration 3.0[27] initiative, which sets out a vision for the digital transformation of tax administration under which taxation becomes a more seamless and frictionless process over time.

Given the importance of the tax system for Jamaica's economy and society, it is essential that there be continued investment in the development, maintenance, and improvement of the IT systems necessary for the efficient collection of taxes and compliance activities. Digital transformation of tax administration will take many years and requires multiple efforts to realize the full benefits. This includes the co-development of many of the building blocks of future tax administration with other parts of government, private sector actors, and the international community.

The GOJ has made significant progress[28] in modernizing tax administration for taxpayer-facing systems and information on self-assessment tax filing and in supporting voluntary compliance. Jamaican taxpayers use electronic filing extensively, which is mandatory and available for all core taxes. TAJ reports that at least 80 percent of declarations are filed online for each core tax, and 99 percent of large taxpayers file core tax declarations electronically. TAJ invests in a public education program, including traditional media, social media, town halls, seminars, and workshops; it also provides "how-to" documents on its website, and personalized client service is available in person, by telephone, and by email.

Modern tax administration also requires investment in internal programs that support tax compliance through risk analysis systems. As acknowledged in the recent Tax Administration and Diagnostic Assessment Tool (TADAT), TAJ has shown remarkable improvement since 2015, particularly in implementing the RAiS. The RAiS has provided TAJ with greatly enhanced compliance capabilities for taxpayer registration as well as better data cross-matching, interoperability, report generation, risk scoring, and compliance identification and tracking. However, further improvements can and should be made to continue the digital transformation process. In excise taxes and the general consumption tax, there may be scope to implement real-time information systems to support compliance, including for movements of excisable goods, that can assist in protecting tax revenues.

Digital transformation in TAJ can be supported by developing a medium-term strategy/roadmap. In this context, it is critical that the ongoing digital transformation is integrated into all areas of tax administration and supported by robust governance and project management structures led by top management.

Table 3.1. Digital Public Platforms: Key Challenges and Opportunities

Strengths	Areas for Improvement
» There is a long-term vision among stakeholders to digitalize public platforms. » Expertise is being developed through government institutions, such as eGov and the TIU. » The government has an existing portal that the Office of the Cabinet is updating following a list of prioritized services for digitalization. » There are several ongoing digitalization projects, including NIDS, PIMIS, shared services platforms, etc. » eGov is central to most of the digitalization initiatives, either hands-on or consultative. » The TIU is working on a shared services platform that combines many of the government's core functions, such as human resources, payroll, procurement, and financial management. » A comprehensive legal framework governs Jamaica's utilization of ICTs. » The GoJ has a partnership with telecommunications operators to guarantee citizens free access to government platforms.	» Despite the TIU's shared services platform, interoperability between GoJ databases is still rare. » No system inventory exists government-wide or within the MOFPS. » The current decentralized approach can result in duplication of effort and stretched human resources. A centralized approach to systems management may be more efficient. » There is no updated digital strategy or interim action plan. » Policies and initiatives addressing cybersecurity challenges are not integrated into an updated, defined cybersecurity strategy. » Many data management challenges are due to limited hosting capacity, the absence of cloud policy, and offshore vendor hosting. » The open data portal is not updated regularly, reducing its effectiveness.
Opportunities	**Challenges**
» The launch of the ICTA could guide the nation's digital transformation. » The ongoing development of NIDS, a new, unique, and unified ID system, could be used to set up an SSO for G2C/G2B and G2G use. » The TIU and eGov are consolidating government infrastructure and upgrading the GoJ's data center. » Using building blocks for the digitalization of service delivery could reduce costs and help articulate a digital enterprise architecture. » eGov is developing a data exchange platform (JDXP), but it is still in its early stages of development and requires institutional support and funding. » With regard to data management, more extensive centralization of ICT functions within government would provide efficiency gains and help mitigate skill shortages. » eGov should allocate its limited human and financial resources more strategically, as some of its projects, such as govMail, govChat, and govCloud, are available commercially off-the-shelf. » The open data portal in Jamaica has the potential to be a valuable resource for transparency, accountability, and informed decision making.	» Policies and standards for data sharing, interoperability, and cybersecurity are pending the launch of the ICTA or an equivalent leading structure. This lack of leadership impedes the whole-of-government approach. » There is a lack of coordination in developing the service delivery platform, with each MDA developing its own services without guidelines to ensure data exchange and reuse or reliance on an interoperability layer. » Despite the eGov and TIU structures, there is a lack of clear IT architecture, system inventory, and virtualization directives. » There is a shortage of skilled personnel to perform advanced IT functions, including data analysis, cybersecurity, and software development.

Source: Authors' elaboration based on digital economy assessment.

3.3. Recommendations: Clarifying the political and institutional authority, centralizing management of ICT assets, and adopting a "building-blocks" approach to services online

The GOJ must thoroughly assess its financial and policy options when developing its digital strategy to ensure that it can be realistically achieved and sustained. The current Vision 2030 and ICT Sector Plan do not provide enough guidance and should be updated to consider recent technological advancements, changes in citizen and business expectations, and new cyber threats. The digital strategy should also consider the government's financial parameters and prioritize goals based on explicit assumptions about financing, including base and high-case scenarios. Failing to include an indicative resource envelope in sector strategies and plans can lead to difficult trade-offs and incentivize unachievable goals.

The GOJ should develop an enterprise architecture for a whole-of-government approach, starting with an Enterprise Architecture Vision document outlining the main direction of and standards for future ICT initiatives. Developing a comprehensive architecture could seem an intimidating process, as it requires major resources, substantial political will, and a societal consensus. However, some of the steps highlighted below could be operationalized by existing structures, such as eGov, the TIU, and other ICT leaders from line ministries. Ultimately, these steps could facilitate—and be reused for—a more comprehensive architecture down the road:

- **Elaborate a data governance framework**
- **Proceed to an inventory of the ICT systems and digital services**
- **Rationalize and centralize selected ICT functions**
- **Establish interoperability standards**
- **Build on the existing shared services layer**

The political and institutional authority for driving the digital transformation must be clarified so that potential conflicts or overlaps across MDAs can be identified and addressed promptly. A clear political directive is needed to bring stakeholders together under a shared vision. MDAs will play different roles in implementing the digital strategy, but their relative responsibilities should be clearly defined. The expectations for the ICTA in implementing the digital agenda should be set realistically, taking into account Jamaica's political economy context and its experience with other digital reform efforts, for example, the TIU and eGov. Regardless of how implementation duties are allocated, a high-level governing body (at the political level) is needed to optimize resource allocation across objectives, to resolve policy conflicts, to establish targets, and to remove stubborn legal or administrative obstacles that arise. No single best model exists for organizing the institutional leadership for digital transformation, as countries have used multiple approaches. However, it is critical that the institutional leadership reflects the perspective of not only ICT leads, but also business process owners.

Centralizing the management of ICT assets is crucial if Jamaica is to achieve cost-effective and sustainable digital public platforms. The fragmented approach to managing digital assets and information leads to higher costs and excessive human resource demands, making it unsustainable. This fragmented system also weakens the government's ability to maintain and improve the systems, increasing the vulnerability of both front- and back-end systems. A whole-of-government approach would better utilize financial and human resources by focusing on efficiently procured and managed ICT services, such as data hosting. Although some government agencies may have unique needs, these can be handled within the overall ICT governance framework. Consolidating the management of ICT assets will allow Jamaica to achieve its digital transformation goals more effectively.

Human resource policies should incorporate sufficient flexibility and innovation to ensure that the GOJ can access the talent required to sustain digital government. In many countries, experienced ICT professionals are difficult to attract and retain within the public sector due to rigidity in public sector pay scales and competition from the private sector. Jamaica is no exception and faces added pressure from outward migration to neighboring countries. The government needs to develop strategic approaches on attracting and retaining individuals with the right mix of skills. Some agencies have already begun to target new university graduates with the prospect of intensive on-the-job learning opportunities but with no expectation that they will commit to public service. Some countries use market-based wage premiums to compensate for specialized, high-demand positions (not just for ICT). Jamaica has also succeeded in creating special units authorized to operate outside the traditional public sector pay and employment regime, facilitating the attraction of seasoned talent. Taking a more whole-of-government approach to managing ICT assets, as mentioned above, may also help to rationalize the use of human resources.

Jamaica could consider a "building-blocks" approach to bringing services online, focusing on common functions across government and developing them centrally. Individual MDAs or service owners have tried to take responsibility for digitalizing services, but this approach has often proven to be slow and inefficient. Interoperability is crucial to ensure a smooth exchange of information across platforms, avoiding delays in delivering services. The country can succeed in digitalizing services by centrally developing standard functionalities as "modules" connected to customized workflows.

An ICT sector plan should guide the selection of public investment projects financed across the government. Technical experts at eGov provide input on MDAs' project proposals, but the lack of an overarching digital strategy or action plan limits their ability to determine priorities. A strategic framework document could help prioritize projects across sectors/MDAs, put them in a medium- to long-term fiscal perspective, and identify critical interdependencies across the whole government. The short-term benefits of a project for a single MDA should be evaluated against the broader goals reflected in the whole-of-government strategy.

Cybersecurity and data protection should be more robust priorities for the GOJ, guided by centrally established standards. The increasing cyberattack threat requires the government to develop the means for securing core systems, and MDAs should not be left to determine their own security measures. Interconnected systems increase the risk of contagion, making standards necessary at the whole-of-government level. Data protection and privacy provisions should align with international standards and user expectations. A centrally guided data security and protection approach is required to build trust in new service channels.

The GOJ should continue its efforts to implement new international tax standards to increase transparency, modernize tax legislation, and invest in the digital transformation of tax administration as a key element of Jamaica's digital architecture. Implementing international tax standards requires investment in human capital, including legal capacity and IT support with robust data security, incorporating e-filing of taxes and non-tax payments, risk analysis systems, and exchange of information at a domestic and international level. This investment can provide tangible dividends by enhancing tax certainty, improving tax morale, reducing compliance costs, and increasing tax revenues through higher voluntary compliance and targeted risk-driven audit interventions.

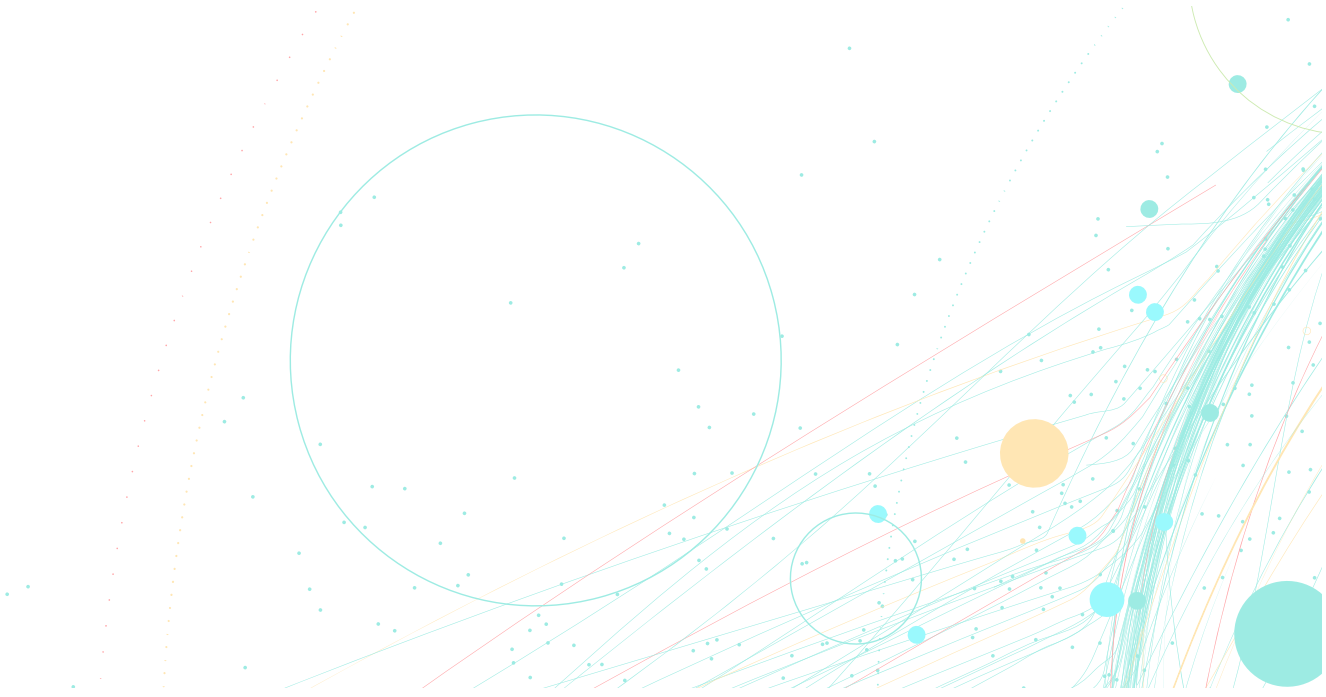


Table 3.2. Digital Public Platforms: Policy Recommendations (1 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Institutional, strategic, and legal frameworks	**Operationalize the ICTA and the Office of the Chief Information Officer.** The government could focus on addressing implementation challenges for the ICTA, clarifying its mandate and offering a clear roadmap with political and financial support. The government should ensure that there is a single entity with the authority to convene stakeholders across the public and private sectors, resolve policy conflicts, guide resource allocations, stimulate collaboration, and monitor compliance with program targets over time. Additionally, leveraging the experience of eGov and the TIU might be beneficial while thoughtfully assessing the risks and benefits of potential mergers. **PRIORITY**	Office of the Prime Minister MSET MOFPS	Short term	Yes
	Develop an interim digital strategy that includes a digital enterprise architecture. The government can work on an interim digital strategy, including a simplified enterprise architecture, to lay the groundwork for interconnection and interoperability. Leveraging eGov and the TIU's experience and institutional knowledge may jumpstart this process while developing a comprehensive strategy. **PRIORITY**	Office of the Prime Minister MSET / eGov MOFPS / TIU	Short term	No
	Develop a digital strategy that considers Jamaica's recent achievements, the expectations of users, and fiscal trade-offs. This strategy could help guide the prioritization and selection of public investment projects within the ICT sector, considering interdependencies and positive externalities across various initiatives.	Office of the Prime Minister MSET MOFPS eGov	Medium term	No
	Develop government platforms following an iterative and incremental process. Government platforms can benefit from an iterative and incremental development process, allowing for ongoing adjustments and improvements, ensuring that they remain relevant and practical. Government platforms could follow a life cycle with clear metrics to determine their upgrade or phase-out.	MSET MOFPS eGov TIU	Long term	No

Table 3.2. Digital Public Platforms: Policy Recommendations (2 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Service delivery	**Use building blocks to ensure the sustainability of services and facilitate faster rollout.** Utilizing building blocks for digitalizing services can improve sustainability and reduce development time. A coordinated strategy ensures compatibility and compliance with relevant laws and regulations.	MSET eGov TIU	Long term	No
	Design the platforms following a user-centered design and follow the uptake with clear indicators. Adopting user-centered design principles and tracking platform uptake with clear indicators can enhance usability and accessibility, resulting in greater user engagement and satisfaction.	Cabinet Office eGov TIU	Short term	No
	Complete the catalog of government services for priority MDAs. To optimize the digitalization of services that are important to internal (G2G) and external (G2B, G2C) users, the GoJ would benefit from establishing a catalog of government services that includes, among other items: the degree of digitalization, the type of data required to carry out the service, the current ownership of the data, data privacy considerations, etc. Efforts initiated by the Cabinet Office to survey priority MDAs may need to be scaled up so that compliance with the inventory can be expedited and the results used to support the digital strategy. **PRIORITY**	Cabinet Office eGov TIU	Short term	No
Back-office systems (G2G)	**Develop an inventory for ICT systems.** The GoJ does not have an updated list or inventory of the current information systems used by different MDAs. Developing an inventory for ICT systems, led by eGov and supported by the TIU, can help provide an overview and optimize technology usage and resources while identifying potential security risks. **PRIORITY**	eGov TIU MSET MOFPS	Short term	No
	Weigh whether MOFPS systems should continue maintaining several separated solutions or invest in an off-the-shelf solution. The MOFPS could weigh the pros and cons of maintaining separate solutions versus investing in an	MOFPS TIU	Long term	No

Table 3.2. Digital Public Platforms: Policy Recommendations (3 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Back-office systems (G2G)	off-the-shelf solution, considering factors like flexibility, customization, costs, and specific needs. Maintaining different systems may offer more flexibility and customization but can also lead to higher costs and complexities regarding integration and interconnectivity.	MOFPS TIU	Long term	No
Inter-operability and shared services	**Consolidate more services on the shared platform.** The TIU started consolidating a shared services platform with a ticketing technical support system and a business intelligence layer. Consolidating more services on a shared platform, including public financial management systems and license-based software, may help reduce costs, enhance security and availability, and increase usability.	TIU eGov	Medium term	No
	Develop a data governance framework. Developing a data governance framework with experts from various line ministries can establish a data-driven public sector that improves policy and public service delivery. While waiting for the ICTA, the GoJ could decide on procedures and best practices like data formats, communication protocols, and APIs. **PRIORITY**	MSET MOFPS eGov TIU	Medium term	Yes (policy)
	Increase interoperability between core government systems. Increasing interoperability between core government systems could involve supporting the JDXP with a data integration policy and adopting a data governance framework. Utilizing APIs, web services, and frequent routine backups may ensure seamless information sharing, minimize duplicates, and reduce data loss risks. **PRIORITY**	MSET MOFPS eGov TIU	Medium term	No
	Centralize government ICT functions to improve effectiveness and reinforce security. Centralizing government ICT functions, such as application hosting and cybersecurity monitoring, can lead to cost savings, increased security, and more efficient use of resources.	MSET MOFPS eGov TIU	Medium term	Yes (policy)

Table 3.2. Digital Public Platforms: Policy Recommendations (4 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Inter-operability and shared services	A range of approaches can be implemented, such as reorganizing existing resources and adopting a shared services approach similar to that of the TIU. **PRIORITY**	MSET MOFPS eGov TIU	Medium term	Yes (policy)
Digital ID	**Use the momentum from the digital ID and TIU shared services platform to develop SSO systems for G2G and G2C.** Leveraging the momentum of digital ID and TIU shared services, two SSO systems could be designed: one for citizens and another for public servants. This approach can provide a unified identity for all public service delivery platforms and enhance security through controlled access management.	NIDS eGov TIU	Short term	No
	Ensure that no one is left behind in the digital ID rollout. The government must guarantee that every citizen has access to vital government services, regardless of whether they possess a digital ID. This can be achieved by offering alternative service options for individuals without a digital ID or assistance in acquiring one. **PRIORITY**	NIDS	Short term	No
Data management and hosting	**Boost and expand Jamaica's open data policy.** Datasets should be made available automatically without requiring additional effort to extract and publish them, thus making Jamaica's open data policy more operational. A robust data management system could automate open data availability, minimizing extra effort for extraction and publication.	MSET Office of the Cabinet	Medium term	Yes
Tax policy and tax administration	**Introduce legislation in early 2024 to apply the general consumption tax to cross-border supplies of digital services and low-value goods.**	M0FPS TAJ	Short term	Yes
	Finalize TAJ's Digital Transformation Roadmap by early 2024, and take the necessary steps to implement the actions in the roadmap.	TAJ MOFPS	Medium term	No
	Continue implementing international tax standards, including the two-pillar solution that was agreed upon in October 2021 by over 130 countries, including Jamaica, to address the tax challenges arising from digitalization.	MOFPS TAJ	Medium term	Yes

Notes

1. The E-Government Development Index is calculated for each by averaging the normalized scores of its three components: Online Service Index (OSI), Telecommunications Infrastructure Index (TII), Telecommunications Infrastructure Index (TII). The overall index ranges from 0 to 1, with higher values indicating better e-government development. Based on the EGDI methodology, an individual country can improve its normative score but still drop in its ranking if other countries have improved more.
2. The GovTech Maturity Index (GTMI) was introduced in 2019 as a part of the World Bank's GovTech Global Partnerships Initiative. It measures countries' maturity in digital government transformation in four GovTech focus areas, based on information reported by governments.
3. The Core Government Systems Index (comprised of 17 key indicators) is one of the GTMI's four focus areas and is intended to capture the key aspects of a whole-of-government approach, including government cloud, interoperability framework, and public platforms.
4. Linton (2019).
5. For more information, see https://opm.gov.jm/portfolios/agencies-of-opm/. Within the OPM a Minister without Portfolio has been assigned responsibility for the NIDS.
6. In addition to the formal structures, there are informal mechanisms through which Jamaican authorities are conceptualizing strategies for digital transformation. For example, an advisory group or think tank was established to advise the Prime Minister directly.
7. Launch of the authority has been pending final decisions by the government on the appropriate classification and grading of the new positions.
8. OPM (2011).
9. The digital economy assessment does not review the quality or comprehensiveness of the laws.
10. The X-Road is an interoperability layer that facilitates the exchange of information between government agencies, businesses, and organizations.
11. This work was undertaken by PWC on behalf of the Cabinet Office's Public Sector Modernisation Division (PSMD-CO) and conducted through an online Services eReadiness Assessment Tool (SEAT).
12. PSMD-CO's assessment identified 180 services as partially or fully automated, based on the information received from MDAs. Approximately 67 of the 180 are believed to be "fully automated." In this context full automation meant that users could start the process online, make payments online if necessary, with back-end processes digitalized and final product being delivered either online or physically (depending on legal requirements).
13. According to research from the Caribbean Policy Research Institute https://www.capricaribbean.org
14. See https://www.nidsfacts.com/nids-timeline/
15. NIDS (n.d.).
16. See https://data.gov.jm/
17. MSETT (2021).
18. SEE Jamaica's Central Bank Digital Currency (CBDC): https://boj.org.jm/core-functions/currency/cbdc/
19. Users accessing the government's platforms from mobile devices are not subject to data charges.
20. ITU data 2020.
21. See https://www.oecd.org/tax/beps/inclusive-framework-on-beps-composition.pdf
22. See https://www.oecd.org/tax/jamaica-s-marlene-nembhard-parker-appointed-co-chair-of-oecd-g20-inclusive-framework-on-beps.htm/#:~:-text=01%2F03%2F2022%20–%20The,lead%20the%20group%20with%20Ms
23. See https://www.oecd.org/tax/exchange-of-tax-information/28-jurisdictions-sign-international-tax-agreements-to-exchange-information-with-respect-to-income-earned-on-digital-platforms-and-offshore-financial-assets.htm
24. See OECD (2021).
25. The Agreement does not just apply to digital business and will have broader application. The reforms respond to challenges arising from digitalization of the economy where multinational enterprises can have substantial activity in countries without physical presence, which has resulted in the erosion of the tax base in market jurisdictions as well as profit shifting to no-tax and low-tax countries.
26. Osullivan and Cebreiro Gomez (2023).
27. OECD (2020).
28. Paz et al. (2021).

4. DIGITAL FINANCIAL SERVICES

Accelerating the adoption of DFS for financial inclusion

KEY MESSAGES

- **The Bank of Jamaica (BOJ), the government, and market players have made considerable efforts to work together to accelerate the adoption and usage of digital payments.** This has been facilitated by new financial technologies (fintech) that advance the objective of financial inclusion.

- **There is a discrepancy between access and usage in Jamaica, as the levels of initiating and receiving digital payments are much lower than the level of access to transaction accounts.** Although the access level to transaction accounts with financial institutions in Jamaica is relatively high (73 percent), only 40 percent of adults reported having made at least one digital payment in the previous year.

- **The updated Payment Systems Law is being finalized and operationalized to increase certainty in the market, level the playing field, and enable the entrance of innovative payment fintech players.**

- **The BOJ is exploring the option of developing open banking.** This would encourage efficient access to financial information, allowing existing financial institutions to reduce the cost of onboarding new clients and third-party providers and enabling services with better terms and conditions than those of existing banks.

- **The country has prioritized full interoperability for JAM-DEX accounts with other types of accounts, payment instruments, and merchant acceptance devices.** JAM-DEX can promote financial inclusion, as it is an easy, safe, efficient, secure, and convenient way to pay for goods and services for all Jamaicans.

- **Although there is interoperability pertaining to ATM and points-of-sale infrastructure on international brand card use, the lack of interoperability across different payment instruments and payment service providers for merchant acceptance leads to inconvenience and higher costs.** Having national QR code standards that could support multiple payment instruments beyond just cards could help overcome these issues.

- **Financial literacy is an important lever to further advance financial inclusion and usage of digital payments in Jamaica.** Intensifying financial literacy efforts related to digital payment usage could target specific "fear" factors, such as vulnerability to fraud, possibility of operational errors, and perceptions of a loss of privacy.

4.1. The importance of digital financial services: Key enabler for financial inclusion

DFS are important enablers of the digital economy and can support the public policy objective of financial inclusion, both from an access and usage perspective. They cover financial products and services, including payments, transfers, savings, credit, insurance, securities, financial planning, and account statements. DFS are delivered via digital/electronic technology, including through a payment card, online, or through a mobile phone, and various instruments may be linked to electronic money (e-money) or traditional bank accounts (collectively referred to as transaction accounts). DFS can provide individuals and households with convenient and affordable channels through which to pay and be paid, as well as to save and borrow. Moreover, they can be more accessible for lower-income and rural households as well as for women and youth—the segments of the population that are often underserved by traditional financial services. Governments can use DFS to increase efficiency and accountability in various accounting and payment streams, including for the disbursement of social transfers and receipt of tax payments.

Digital payments are often the entry point for DFS and provide the infrastructure or "rails" through which additional products and use cases can be developed. A DFS ecosystem needs to be supported by risk-based and forward-looking legal and regulatory frameworks (for example, to allow a level playing field for market entry and innovation), robust financial infrastructure (for example, interoperable payment and credit reporting systems), and deployment of delivery channels uniformly across the jurisdiction (for example, agent networks, automated teller machines (ATMs), point-of-sale terminals, and mobile phones).

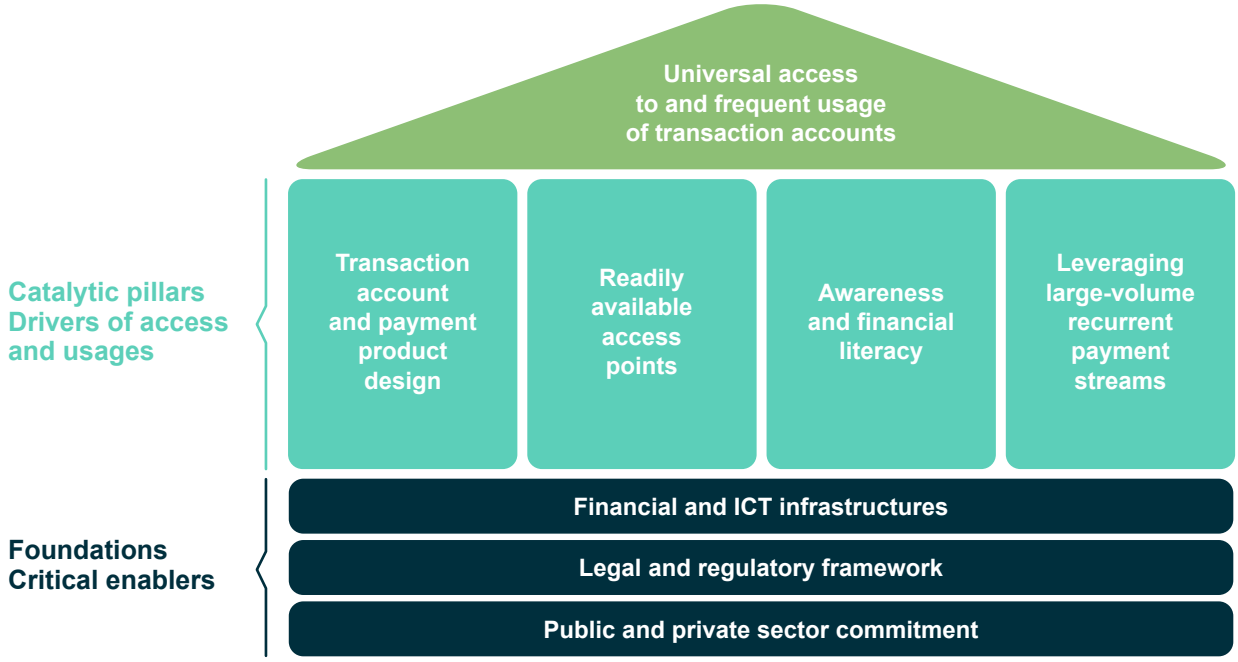
The COVID-19 pandemic further underlined the importance of DFS and provided a boost to digitization, particularly in the context of payments. The COVID-19 crisis heightened the focus on the role of DFS in relation to domestic and cross-border remittances and the distribution of financial aid to citizens, including to the unbanked population, and in the reduction of the use of cash and its replacement with digital payments.

Jamaica is considered one of the champion countries in the Caribbean region in terms of digitizing financial services and payments. Although more work remains to be done, there has been a deliberate effort by the Bank of Jamaica (BOJ), the government, and market players to work together to accelerate the adoption and usage of digital payments, facilitated by new financial technologies (fintech) that promote financial inclusion. Some of those efforts include the implementation of a regulatory sandbox for payment service providers (PSPs), the revision of the Payment Systems Law, the digitization of government payments, the introduction of a central bank digital currency (CBDC) JAM-DEX, and plans to upgrade the Real-Time Gross Settlement (RTGS) system and the Automated Clearing House (ACH). Moreover, in 2017 the country implemented a National Financial Inclusion Strategy, which was updated in 2021, with five key objectives: (a) increasing the use of digital payments and banking services, (b) improving financial literacy; (c) enhancing consumer protection; (d) promoting MSME finance; and (e) improving the financial inclusion data infrastructure.

Increased access to and usage of digital payments and (more broadly) financial services are also one of the fundamental pillars of the Payment Aspects of Financial Inclusion (PAFI) framework, which was designed by the Committee on Payments and Market Infrastructures and the World Bank.[1] This framework sets out several recommendations centered around the general premise that access to and use of transaction accounts in which to store value and conduct payments can build the foundation for the use of other financial services. The framework can be used as a targeted tool for enabling and increasing financial literacy and financial inclusion and facilitating the wider use of DFS for the benefit of the digital economy. The PAFI framework has been further expanded in the context of fintech, focusing on the impacts and implications of new technologies and the new types of payments facilitated by technology.

The World Bank Digital Economy Assessment and PAFI frameworks are utilized in this chapter to assess and analyze the current state of DFS in Jamaica and to provide recommendations on how they can be expanded and improved. More specifically, the chapter looks into the catalysts for access and usage, particularly pertaining to digital payments in terms of (a) policy, legal/regulatory framework, and oversight, (b) financial infrastructure, (c) market dynamics, and (d) financial inclusion.

Figure 4.1. The Payment Aspects of Financial Inclusion (PAFI framework)



Source: WB-BIS (2016).

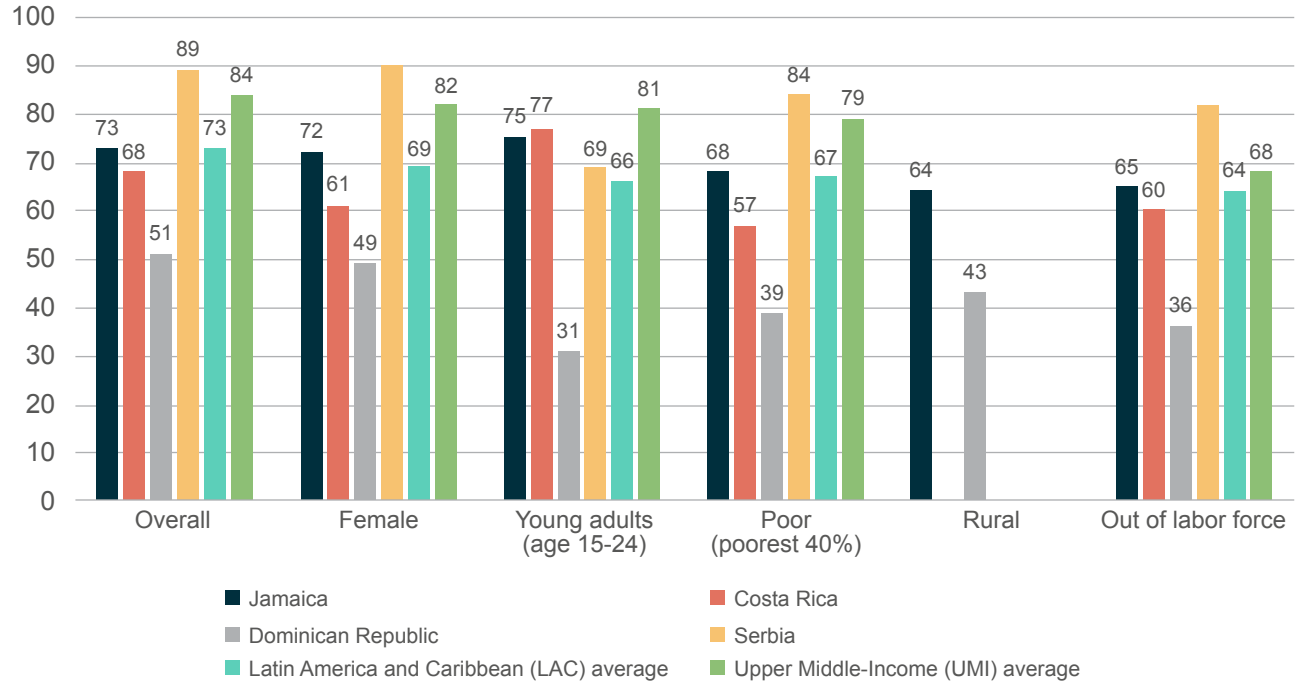
4.2. Current state of digital financial services: Toward financial inclusion through the interoperability of JAM-DEX accounts, payment instruments, and payment services

The access level for transaction accounts with financial institutions (banks and non-banks) in Jamaica is relatively high (73 percent) when compared to regional peers, such as Costa Rica (68 percent) and Dominican Republic (51 percent), as well as the LAC average (73 percent). However, Jamaica still lags when compared to UMIC peers outside the region such as Serbia (89 percent) as well as the UMIC average (84 percent). When breaking down the access levels by different criteria, such as gender, age, income, and labor status, a similar pattern is observed, with Jamaica doing well compared to regional peers (with a few exceptions) but lagging behind others as well as UMIC averages. However, within the country itself, the access levels of those population segments that are typically considered vulnerable (e.g., the poor, those out of the labor force, those living in rural areas, women) are not far off from the general population average. This is an indication that though progress has been made in Jamaica to fill the gap for the vulnerable and underserved/unserved communities, the growth rate has been fairly flat.

On ownership of payment instruments, such as debit and credit cards, Jamaica lags behind most peers as well as LAC and UMIC averages (Figure 4.3). This presents a paradox, given the good levels of transaction account provision. However, the fact that non-bank deposit-taking institutions and other non-bank PSPs have started issuing debit cards, alone or in partnership with banks, indicates that debit and credit card ownership could potentially rise. Additionally, card ownership is being given a boost by the issuance of e-money products such as prepaid cards by several PSPs, linking them to salary distributions for companies as well as utilization for cash withdrawals and physical point-of-sale/e-commerce purchases.

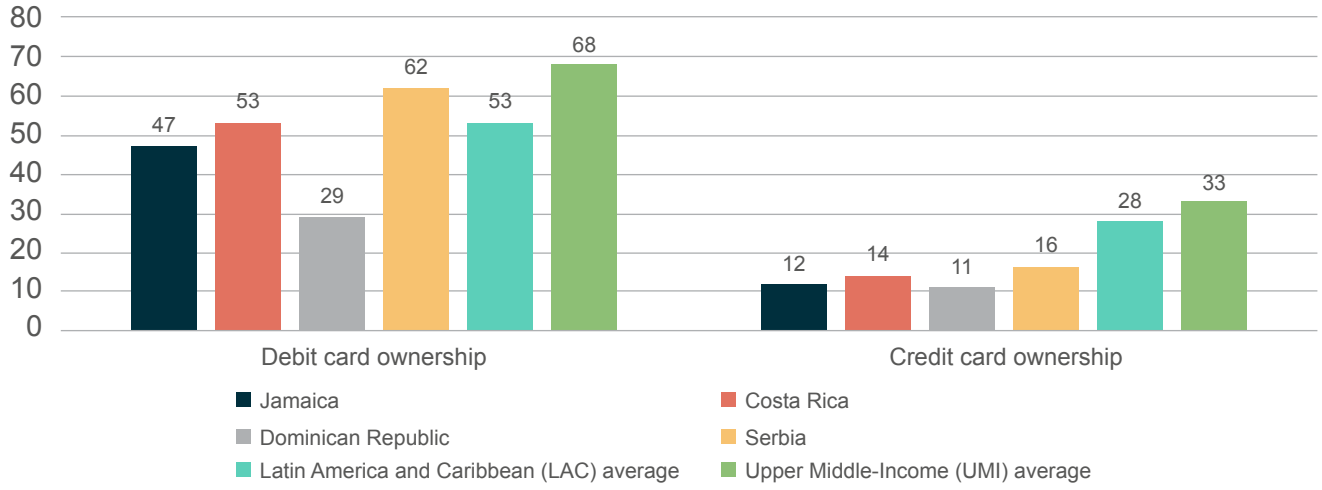
There is an evident discrepancy between access and usage in Jamaica, as the number of those who have initiated and received digital payments is much lower than the number who have access to a transaction account. According to World Bank Findex 2021 data, 40 percent of adults reported that they had made at least one digital payment over the course of a year in the country, and 32 percent had received at least one digital payment. Only 23 percent of adults had made a digital payment in store, and only 16 percent and 12 percent of adults had made digital payments online for goods/services or paid bills digitally, respectively. On the receiving side, 59 percent indicated having received wages

Figure 4.2. Account Access (%, age 15+), 2021



Source: World Bank Findex (2021), https://www.worldbank.org/en/publication/globalfindex.

Figure 4.3. Card Ownership, 2021 (%, age 15+)



Source: World Bank Findex (2021), https://www.worldbank.org/en/publication/globalfindex.

directly into accounts, and 49 percent domestic remittances. In comparative terms, except for Dominican Republic, Jamaica lags behind other peers examined here as well as LAC and UMIC averages across all usage indicators.

For the quarter of adults in the country who still do not have access to a transaction account, there are several reasons cited in the Bank Findex data: lack of sufficient funds/need for an account, high opening and maintenance costs, lack of necessary documentation, and long distance to the PSP branches. The BOJ has taken steps to further improve account levels by introducing laws that provide for low-cost accounts and simplified due diligence for certain population segments (i.e., underserved and unserved communities) and certain merchant categories (i.e., "basic" accounts with limited functionalities). However, the provision is not equally applied by all financial institutions, creating barriers to transaction account access. In this regard, offerings new types of accounts through innovative fintech PSPs in the BOJ's current regulatory sandbox is

expected to lead to more competition and lower prices for end users and to help close the gap among the currently unbanked. More market-based efforts are needed to expand the presence of physical branches or agents across the country, reducing the distance for those who live in remote areas.

The low usage of digital payment instruments relates to several factors that still require attention in the Jamaican market. Cash is still prevalent in the country, fueled by the long-standing cash culture, low levels of financial literacy among some population segments, the lack of digital payment acceptance among micro and small merchants, a lack of interoperability at the payment instrument and account level, the use of cheques by some government agencies, and the high costs on the digital payment side.

The BOJ has, among other initiatives, engaged the industry to work on a national retail payments strategy that would also address bottlenecks to the use of digital payments. Four thematic areas have been identified: (a) integration – leveraging the existing ecosystem; (b) innovation – supporting the growth of digital payments; (c) competition – promoting knowledge and information sharing; and (d) standardization – implementing legal frameworks and standards.

BOX 4.1. Criteria for the Adoption of Digital Payment Instruments

The adoption of any given retail payment instrument by consumers, businesses, and governments is influenced by how well-suited it is to specific payment needs and by how the instrument is perceived in terms of risk, liquidity, cost, acceptance, and convenience. The choice of payment instruments is typically shaped by the following factors:

- **Cost:** Usage of payment instruments entails both explicit as well as implicit costs. Explicit costs include the direct charges paid by the user, such as transaction fees. Implicit costs include, for example, the waiting time for processing the payment request or the cost of time spent commuting to a designated place to obtain cash to make payments or to use the non-cash payment instrument.
- **Safety and reliability:** There should be a high level of trust that a payment instrument will work as expected and discharge the payer's payment obligation as required. This includes such factors as system uptime, fraud and/or misuse of funds, processing errors, and so forth.
- **Convenience:** The payment instrument needs to be convenient to use, including with regard to what the payer needs to remember or physically carry or use when making the payment, how much time the transaction takes to complete, and other related considerations.
- **Acceptance:** The payment instrument should be widely accepted. For example, a card would not be useful if it is not accepted at grocery shops or restaurants, or for utility payments or other routine payment needs.
- **Payment confirmation and reconciliation:** Payments should be processed and confirmed as per a defined timeline in a way that serves as both a reconciliation record and proof that payment has been made. This would help payers to manage and monitor their payment accounts.

Source: Developing a Comprehensive National Retail Payments Strategy, World Bank (2012).

Policy, legal/regulatory framework, and oversight

There are several statutes governing payment systems in Jamaica. These include the: (a) Bank of Jamaica Act (BOJA), 1960; (b) Banking Services Act, 2014; and (c) Payment Clearing and Settlement Act (PCSA), 2010, as well as other relevant laws governing the government securities and capital market segments.[2] The Proceeds of Crime Act 2007 as amended to date, along with the relevant Guidance Notes, govern requirements related to anti-money laundering and combating the financing of terrorism (AML/CFT). The Data Protection Act (DPA), passed in June 2020, seeks to protect Jamaicans from unlawful and/or reckless disclosure of their personal information. The Act sets standards for data processing (sections 21 through 31) to ensure that personal data are processed fairly and lawfully and only where necessary.

The BOJA authorizes the BOJ to clear and settle payment transfers between financial institutions and reinforces the BOJ's oversight powers over the payment and settlement systems in Jamaica. The BOJA was amended in June 2022, designating the BOJ as the sole authority to issue the CBDC, JAM-DEX, designated as legal tender in addition to notes and coins. The PCSA provides the legal basis for the netting, finality, and irrevocability of payments and provides the BOJ with statutory powers of oversight over the country's payment and settlement systems. The PCSA is being amended to equip the BOJ with additional authority to regulate and oversee PSPs. The amendments to the Proceeds of Crime Act have provided banks with flexibility in the application of certain elements of the AML/CFT framework for the opening of tiered, no frills accounts, adopting a risk-based approach. The associated Guidance Notes delineate different criteria (including know-your-customer [KYC] requirements) needed to open accounts based on the level of risk involved.

The BOJ withdrew its guidelines for electronic retail payment services in 2019 and is now working on a new legal regulatory framework for overseeing and supervising PSPs. As part of the process, a consultation paper, "Policy Proposal for the Legal Framework for the Regulation of Retail Payment Service Providers – A Consultation Paper, 2020," was prepared and published by the BOJ in December 2020. The policy proposals recommended legislative amendments to the PCSA to further strengthen the BOJ's powers of oversight, supervision, and enforcement.

The position with regard to credit unions is rather nebulous. Under the BOJA, credit unions are designated as specified financial institutions but are licensed by the Department of Cooperatives and not the BOJ. Credit unions, however, submit monthly reports to the BOJ, which, in turn, issues instructions to and audits credit unions.

Remittance companies (money transfer operators) and their sub-agents are licensed by the BOJ under Section 22 of the BOJA. As part of the licensing requirements, remittance companies and their sub-agents must fulfill the requirements of fit and proper criteria to undertake remittance-related business in Jamaica. The licensing requirements for sub-agents are onerous, as it takes roughly three–six months on average to obtain a license from the BOJ. All licenses are renewed on an annual basis. Remittance companies have to follow and adhere to the BOJ's Operating Directions for Remittance Companies and AML/CFT requirements. The BOJ undertakes on-site inspections and in-house monitoring of remittance companies' activities.

The objectives of the BOJ's oversight function as spelled out in the Payment System Oversight Policy document[3] are to ensure the safety and efficiency of the national payment system in Jamaica. The oversight function is geared toward: (a) preventing or controlling systemic risk; (b) fostering fair access to the payment systems for market participants; (c) promoting competition in the payment services market; (d) protecting consumer interest; and (e) fostering cooperation with other regulators. These objectives are to be achieved through an explicit commitment to comply with and adhere to international standards, such as the Principles for Financial Market Infrastructures and the General Principles for international remittance services.

The scope of oversight covers all existing payment, clearing, and settlement systems operating in Jamaica and the payment channels and instruments that are offered through these systems. These include systems owned and operated by the BOJ and other entities. A body known as Retail Payments Jamaica Limited (RPJ) has since been established to oversee the operations of the ACH. RPJ is chaired by the BOJ. Its objectives include promoting fair, open, and transparent access criteria for the ACH.

The BOJ established a fintech regulatory sandbox in 2020 to achieve a number of public policy objectives by encouraging innovations in financial services and promoting financial inclusion and competition. The regulatory sandbox provides a framework for the approval of new products by PSPs and ensures the appropriateness of their processes, procedures, and contractual arrangements.

The Guidelines for the regulatory sandbox were issued by the BOJ under Section 28 of the PCSA.

Entities eligible to apply to the sandbox include: (a) regulated entities, for example, banks and deposit taking institutions (DTIs), such as building societies, Cambios, and remittance service providers; (b) securities dealers that have been authorized by the Financial Services Commission to participate in the sandbox; (c) credit unions; (d) fintech companies incorporated in Jamaica that are in partnership with a DTI or that offer solutions not directly related to payment services that may not require partnership with a DTI; and (e) entities invited by the BOJ to provide technology solutions. The types of products currently being tested include mobile wallets, e-commerce solutions, branded debit cards, and prepaid cards. The types of entities currently participating are DTIs, credit unions, fintech in partnership with a DTI, and remittance service providers. In preparation of JAM-DEX's distribution, wallet providers are being assessed in the BOJ's fintech regulatory sandbox. The vendor of the JAM-DEX solution has been invited by the BOJ to participate in the sandbox.

The BOJ is exploring the option of open banking to encourage efficient access to financial information that would allow existing financial institutions to reduce the cost of onboarding new clients. This would also enable third-party providers to offer services at better terms and conditions than existing banks and financial institutions. Data portability is being pursued by the GOJ to provide greater control of and access to its data and the subjects of that data, and the BOJ aims to implement this same concept in the financial sector.

Financial infrastructure

Jamaica has a well-developed payment and settlement systems infrastructure.[4] It consists of: (a) the BOJ-owned and operated JamClear-RTGS; (b) the ACH for retail payments, owned and operated by a consortium of seven commercial banks clearing and settling JMD-denominated cheques and credit and debit transfers; (c) two payment card switches, MultiLink (owned by four commercial banks, the Credit Union League, and two building societies) and QNet (owned by the Credit Union League); and (d) the JAM-DEX (CBDC system). The net settlement files from the retail ACH and the payment card switch MultiLink are settled in the JamClear-RTGS system.

Implemented in February 2009, the JamClear-RTGS system is a large-value (amounts ≥ J$1 million) gross real-time funds transfer system. It enables real-time funds transfer on own accounts and third-party transfers and time-critical payments by financial market participants on accounts held at the BOJ. Participants include DTIs (commercial banks, merchant banks, building societies), the Jamaica Central Securities Depository, primary dealers, the Accountant General's Department (AGD), and the BOJ. JamClear-RTGS is owned and operated by the BOJ. Payments settled in the JamClear-RTGS are final and irrevocable.

There are three participant categories in the JamClear RTGS. Full members include the commercial and merchant banks, primary dealers, the Jamaica Central Securities Depository, and the BOJ. Full members are provided with an intraday liquidity facility by the BOJ. A second category is that of restricted members,[5] including the GOJ and building societies, which have direct access to JamClear-RTGS but no access to the intraday liquidity facility. The last category is indirect members, such as the ACH and MultiLink, which can submit their net clearing files for settlement in JamClear-RTGS without any intraday liquidity support by the BOJ.

The BOJ has initiated efforts to migrate to the International Organization for Standardization (ISO) 20022 message standards from the existing SWIFT MT message standards with respect to JamClear-RTGS. Cutoff dates for cross-border and domestic messages are March 2023 and November 2025, respectively.

The retail payment infrastructure in Jamaica comprises an ACH and two card switches: MultiLink and Q Net. The ACH handles the clearing and settlement of JMD-denominated cheques and credit and debit transfers. The ACH does not have bulk payment processing capability, such as debiting a single account and crediting multiple beneficiary accounts and/or vice versa. The consortium of seven commercial banks that own the ACH has formed a company, APL Limited, with equal shareholding. The operation of the ACH has been outsourced by APL Limited to another company, JETS.

There are three clearing cycles in a day, with settlement of the ACH's net clearing position files happening in central bank money in the JamClear-RTGS system twice a day. The net settlement file is settled on an "all or none" basis. The ACH does not have any guarantee measures to ensure that a settlement takes place even in the event of insufficient funds in a member's settlement account in JamClear-RTGS. Although the ACH operator indicates that the BOJ would extend liquidity to a bank with a debit position, the JamClear-RTGS rules do not have any stipulation regarding provision of intraday liquidity support to the ACH.

Access to the ACH was previously limited only to commercial banks that had an ownership stake. After a change in ACH rules, a building society has now been granted access to the ACH as a licensee even though it is not an ACH owner shareholder. On the other hand,

other entities, such as remittance service providers and credit unions, do not have direct access to ACH services. This lack of tiered membership in the ACH has significantly hampered the ability of remittance service providers and credit unions to provide various electronic retail payment products to their customers.

In the case of electronic transfers, credit to customer accounts is awarded either on the same day or on a T+3 basis, depending on the participant ACH member. In the case of cheques, customer accounts are credited on a T+3 basis. There do not appear to be any standard operating rules mandating that the ACH participant members should provide credit to customers in a timely manner.

The ACH currently uses a modified version of the NACHA message standard with modifications to the amount field in the message body. As with the BOJ, it is understood that the ACH has also initiated measures to migrate to ISO 20022 message standards, but details of the migration schedule are not available.

MultiLink is a payment card switch that clears and settles both ATM and point-of-sale transactions. The MultiLink switch adopted EMV standards in 2021. It is estimated that 60 percent of the cards issued in Jamaica are smart cards. MultiLink caters only to card-present transactions and is not enabled for e-commerce transactions. It is owned and operated by JETS, which is owned by a consortium of four commercial banks, two building societies, and the Jamaica Credit Union League. There are three additional entities (two commercial banks and one merchant bank) participating as licensed issuers in the MultiLink system.

In order to mitigate settlement risk failure, JETS collects collateral in the form of pledged government securities equivalent to four days gross issuer positions for the peak weekend period in the previous year for each participant. The net settlement position file from MultiLink is settled in the JamClear-RTGS system once a day at 11 am. Planned initiatives include enhancing the capabilities of the switch to process mobile payments and enabling it to process e-commerce transactions. However, there are no defined timelines in place for these initiatives.

The Jamaica Credit Union League owns a payment card switch operated by QNet, an independent technology company. QNet is connected to the MultiLink system, thus ensuring the interoperability of the cards issued by credit unions and used at ATMs and point-of-sale terminals across the country. The settlement of QNet card “off us” transactions is done in the MultiLink system once a day at 11 am. “On us” transactions of the QNet cards are settled on a multilateral net basis in the books of the Credit Union League, which holds the accounts of all credit unions.

The BOJA was amended in June 2022 to provide legal tender status to JAM-DEX. Thereafter, the BOJ initiated a phased national rollout of JAM-DEX in mid-2022, after completing a pilot phase of the project in 2021. One of the key objectives of the BOJ in introducing CBDC was financial inclusion, with JAM-DEX seen as an easy, safe, efficient, secure, and convenient way to pay for goods and services for all Jamaicans. JAM-DEX is available to members of the public through a digital wallet. Potential wallet providers include banks, building societies, merchant banks, or an authorized PSP. The BOJ issues CBDC to the wallet provider, which then distributes CBDC to the end user. Wallet providers incur infrastructure costs in acquiring the solution from the vendor and in paying the vendor annual fees.

The National Commercial Bank (NCB) was the first bank to offer JAM-DEX through LYNK®, its digital wallet. Currently LYNK provides only wallet-to-wallet transfer payment functionality, whether these are person-to-person or person-to-merchant transfers. The NCB has 170,000 retail customers using its LYNK wallet, including several thousand merchants. Recently, another bank, JN Bank, has been onboarded by the BOJ as a wallet provider for distributing JAM-DEX, with other providers expected to come on board later in 2023.

JAM-DEX has been designed as an interoperable payment solution for local use cases and does not facilitate cross-border transactions at this stage. Use cases for JAM-DEX include person-to-person, person-to-business, and government-to-person transactions and loading cross-border inward remittances onto the JAM-DEX wallets. Data on volumes and values of transactions for the above use cases were not available.

Market dynamics

The retail payments market in Jamaica is dominated by eight commercial banks (domestic and international) that operate in the country (both issuers and acquirers). Other actors include credit unions and building societies, payment aggregators, money transfer operators, and traditional PSPs and payment fintechs that operate inside the regulatory sandbox implemented by the BOJ to test new products/services not covered under the current licensing legal/regulatory framework.[6]

Banks serve customers through their branches, ATMs, agents (though only one bank currently has deployed agents),[7] and digital channels, such as internet banking and mobile banking. They charge a fee for opening and maintaining an account, and in the due diligence process, they usually require two identification documents. The "basic" account provision, implemented by the BOJ, simplifies the process and allows for remote account opening. The due diligence process is typically longer for merchants and requires more documents. The "basic" account provision is not implemented consistently across the commercial banks in the country. Banks issue a variety of payment instruments, such as cheques, debit cards (domestic and international), credit cards (international), prepaid cards (international), direct debits (intrabank and interbank), and credit transfers (intrabank and interbank). In some cases, banks also have partnerships with credit unions and non-bank fintechs in order to issue co-branded debit and prepaid cards. Banks apply charges for interbank credit transfers and direct debits. Several banks facilitate cross-border payments in the country using a network of correspondent banks through SWIFT.

Banks in Jamaica collect payments on behalf of utility companies and government agencies in their branches as well as through internet banking. Typically, the transaction fee for such payments is borne by the company/agency on behalf of which the banks collect payments. Banks are also engaged in the disbursement of government payments, such as public sector salaries, pensions, and social assistance transfers, directly to the beneficiary accounts.

Several banks in the country are also acquirers, providing payment acceptance infrastructure for merchants (physical and virtual). However, the lack of interoperability across different payment instruments and PSPs for merchant acceptance leads to inconvenience and higher up-front and transaction costs, particularly for micro and small merchants. Although there is interoperability pertaining to ATM and point-of-sale infrastructure on international brand card use in Jamaica, there are also several closed-loop solutions that banks have developed for merchant payment acceptance. In some cases, alongside a card point-of-sale terminal, a merchant displays a closed-loop QR code or might have a mobile app from a particular PSP to accept payments. Having national QR code standards that could support multiple payment instruments, beyond just cards, could help overcome cost and convenience issues.

Credit unions and building societies play an important role in the financial inclusion realm, given that they tend to work with clients of a different socio-demographic profile than banks. There is typically a one-time membership fee but no other fees related to account opening and/or maintenance are applied. These institutions would like to be more involved in providing payment services and products and thus to play a more proactive role in contributing to financial inclusion. Unlike banks, credit unions and building societies have a more widespread physical presence in villages and rural areas.

There are several payment aggregators in Jamaica that collect payments on behalf of private utility companies and government agencies, utilizing their own stores as well as agent networks to collect payments physically. Most payments are collected in cash, though payments can also be made by means of a payment card or bank account transfer in the virtual point-of-sale of the aggregator. There is typically a fee borne by the client, particularly when paying for multiple types of bills through the same aggregator. Some of the payment aggregators also act as merchant aggregators and work with banks to provide acquiring services to micro and small merchants, particularly when such merchants cannot directly open accounts themselves with a bank.

E-commerce has potential in Jamaica but is still underdeveloped. Some of the factors pertain to the low usage of payment cards for purchases as well as the lack of international players such as PayPal that are not registered in the country. Amendments to the Payments Law would expand the list of PSPs that could be licensed in Jamaica and can be expected to bring more players into the market to facilitate e-commerce payments (one such player is already being tested in the regulatory sandbox).

Cross-border remittances (i.e., person-to-person transfers) are another important use case for the country. Jamaica is primarily a remittance-receiving country. According to the World Bank, in 2021, remittances accounted for approximately 25 percent of the country's GDP.[8] Remittances from the United States account for 70.2 percent of total remittance inflows into Jamaica. Other important originating countries are the United Kingdom at 10.2 percent, Canada at 9.7 percent, and the Cayman Islands at 6.2 percent.

The cost of receiving cross-border remittances is still higher in Jamaica than the LAC average. In the latest World Bank data, the average cost of sending US$200 to Jamaica was 6.20 percent of the value, while the LAC average was recorded at 5.64 percent.[9] Overall, there is lack of consolidated data in Jamaica's remittance market. Commercial banks in the country are not particularly engaged in cross-border remittance services, even though they could play a more active role.

Currently, most remittances are facilitated in cash (cash-in/cash-out at agent locations of money remitters) through local and international money transfer operators. As described above, remittance companies and their sub-agents have to conduct their activities in compliance with the Operating Directions for Remittance Companies, along with AML and CFT legislative requirements, and fulfill the fit and proper criteria as part of the licensing conditions. The licensing requirements for sub-agents are burdensome, and there are no explicit regulations banning exclusivity arrangements for agents and their sub-agents. The BOJ annually reviews all licenses.

The bulk of the remittances are cashed out by the beneficiaries. Though credit to a bank account is possible, the process is slow (taking a day or more), and hence beneficiaries prefer to cash out the funds, which is real time. Moreover, remittance proceeds cannot be credited to tiered, no-frill beneficiary accounts as per existing BOJ regulations. Remittance proceeds can be credited to a card, provided the remittance has been made through international card scheme products, such as Visa Direct and MasterCard Send, as these also are real time in nature.

Financial inclusion

The BOJ is focusing its financial inclusion efforts in six areas, while also rallying other relevant stakeholders:

1. **Enhancing the legal and regulatory environment for banking and payment services.** In 2021, amendments were made to the Banking Services Act recognizing electronic retail payments as financial services.

2. **Improving the financial inclusion data infrastructure.** The BOJ has had a detailed monitoring and evaluation framework for financial inclusion impact and intermediate indicators since the launch of the National Financial Inclusion Strategy in 2017.

3. **Promoting financial literacy.** In 2018, the BOJ, in collaboration with its financial inclusion partners, completed the development of a National Financial Literacy Action Plan. In 2020, it launched its financial literacy initiative through traditional and social media, targeting the youth. A demand-side survey on financial literacy among the youth (in school and at risk) is ongoing.

4. **Boosting financial consumer protection.** In 2018, the BOJ formulated policy proposals for the development of legislation on financial protection for consumers of financial services from the BOJ's regulated entities. The legislative process commenced in 2020 and is ongoing.

5. **Improving MSME finance.** Since 2017, the BOJ has supported the work of the Ministry of Industry, Investment and Commerce and the Development Bank of Jamaica in initiatives designed to improve access to finance.

6. **Supporting fintech.** The BOJ launched its fintech regulatory sandbox in March 2020, which seeks to encourage fintech providers and regulated financial institutions to explore innovative payment solutions to promote financial inclusion.

Financial literacy is an important lever to further advance financial inclusion and the use of digital payments in Jamaica. In 2020, the BOJ launched a financial literacy program to promote greater understanding of financial concepts and the relevant laws, including simplified customer due diligence (CDD) requirements through traditional and digital media. Key financial literacy programs include BOJ Real Talk and BOJ Empowering You. The BOJ also distributes financial literacy content through radio stations, nationally circulated newspapers, and a television station. The goal of these programs is to build an inclusive economy by equipping persons with information on financial services and explaining key financial concepts, including savings, budgeting, credit, CDD, and the roles of the financial service regulators.

At the core, though, there is still a need for financial literacy programs to target the main factors that inhibit individuals and merchants from accessing and using transaction accounts and digital payments. The programs could specifically address how accounts can effectively help meet payment and store-of-value needs, and could also target specific "fear" factors, such as: i) the lack of sound proof of payment if paper is not used; (b) vulnerability to fraud; (c) unresponsive, complicated systems prone to operational error; and (d) the loss

Box 4.2. Examples of Financial Literacy Programs around the World

The Central Bank of Brazil has used social media campaigns and cooperated with digital influencers to increase awareness among Brazilians of a new digital payment scheme (Pix). The central bank produced over 30 videos posted on YouTube and disseminated over 100 social media posts to explain the technical features of Pix and generate trust in the population at large. This approach and cooperation with digital influencers allowed the quick and widespread take-up of this innovation (see Box 4.3).

In **Argentina**, the Central Bank, in cooperation with the Ministry of Education, has undertaken a financial education campaign that includes tutorials to promote the use of debit cards, management of security codes for ATMs and non-bank cash withdrawal points, the use of online banking and digital wallets for the payment of services, cybersecurity, and the protection of financial consumers. The campaign was distributed digitally and on public television to reach those without internet access and is also used in schools.

In **Germany**, BaFin collaborates with a local non-governmental organization to organize webinars for elderly people that can be watched individually online or in small group meetings in person with a mediator (through so called "regulars' tables"). The webinars cover various digital topics, including new developments in digitalization in the banking sector or the risks of fraudulent activities that consumers need to be aware of. Elderly people have an opportunity to ask questions to BaFin experts, and mediators can further facilitate the exchange.

In **Malaysia**, the Securities Commission, as part of the Financial Education Network, has launched an initiative to improve the digital literacy of seniors (55 and over) with the aim of increasing their digital financial inclusion. The program includes monthly webinars for seniors who have access to the internet and the ability to join online, and a face-to-face "digital clinic" involving tutors and a small group of seniors with little knowledge on digital applications. The face-to-face sessions provide step-by-step guidance on digital knowledge, covering basic financial literacy, banking, and investing.

In response to the challenges of the COVID-19 pandemic, the Bank of Italy implemented (virtual and face-to-face) training courses for low-income and/or low education women. Topics relevant to the crisis were covered in the modules, including digital payments and the risk of fraud and scams.

The Financial Education Foundation in **Morocco** hosts a section on entrepreneurship on its financial education website. Owners of micro and small firms can test their knowledge of accounting and other important aspects of business creation and development, find calculators to better manage business finances, and navigate tax issues. During the COVID-19 crisis, the Foundation stepped up its digital initiatives to support MSMEs on topics linked to DFS and management of a company in times of crisis.

of privacy. This could also be done by targeting specific population segments such as remittance recipients that might benefit even more from such programs and campaigns. One example is the Greenback program of the World Bank, which works with remittance recipients and PSPs to increase awareness, efficiency, and transparency in the remittance market.[10] Moreover, the International Gateway for Financial Education, led by the OECD, provides principles and frameworks for integrating financial education programs into the formal school curricula and provides examples of how a number of countries have done this.[11] The World Bank has also developed a set of tools on financial literacy under the consumer protection framework.[12]

Government payment digitization (both receiving and disbursing) also presents an opportunity to advance financial inclusion. TAJ is the agency responsible for tax collection in Jamaica, such as stamp duties, income, general consumption, and property taxes, traffic ticket fines, and driver's license fees. Some of these taxes are classified as core taxes and others as non-core. TAJ has accounts with the Scotia Bank and NCB. Twice a day, the balances in these accounts are swept by the BOJ to the Treasury Single Account held with the BOJ. Customs duties are dealt with exclusively by customs offices and are not part of the TAJ mandate.

Digital payment methods are available for the payment of taxes. First, Scotia Bank customers can pay their taxes online through the electronic funds transfer facility implemented in 2015. Second, a direct funds transfer can be made through the TAJ portal for customers of other banks. This process includes the generation of a direct funds transfer number to be inputted by the customer to initiate a bank transfer from his account to the TAJ account. The customer receives an acknowledgement of payment made but actual receipt is provided only the next day, a system implemented in 2021. Third, payment of taxes by credit card is possible through the government's eGov portal, which is interlinked to TAJ; at the end of the day, eGov sends a confirmation of the payment made and TAJ carries out a reconciliation. And fourth, TAJ is a payee on the bill payment facility of the Scotia Bank and NCB. This has been recently introduced, and the experience so far is that it is reflecting significant user acceptance. Finally, payment of taxes through cash and cheques can continue to be made to TAJ.

On the disbursement side, the AGD processes the payments for most government MDAs. The MDAs and the AGD electronically upload the payments into the CTMS through the BOJ. The MDAs and the AGD use a web-based application GFMS to process the payments. The BOJ then channels the payments (salaries, pensions, social benefits transfers, supplier payments, etc.) to the bank accounts of the beneficiaries/companies through RTGS or ACH, as applicable. Where the beneficiaries do not have bank accounts, for instance, in the case of social benefit transfers, remittance companies are used for cash payouts. Pensions are also paid through a legacy system in which (2) cheques are drawn with the pensioners' details and sent to commercial banks.

Further digitization is also needed on the social assistance disbursement front. Jamaica's main social assistance program, the poverty-targeted conditional cash transfer Programme of Advancement through Health and Education (PATH) has been successful in reducing poverty and is among the top-performing programs in the region. Although the COVID-19 pandemic facilitated an increase in PATH digital payments, they are still made mostly by check, and access to payments for people with disabilities and the elderly is a challenge. Moreover, the lack of full coverage of digital payment mechanisms led to processing delays during the pandemic. The Ministry of Labour and Social Security (MLSS), which manages PATH and other social assistance programs, is prioritizing the further digitization of payments. According to their 2022–2026 Strategic Plan, currently 40 percent of PATH families receive their payments digitally. As part of the upcoming IBRD-financed Social Protection for Increased Resilience and Opportunity (SPIRO) project, the MLSS aims to increase this number to 57 percent by the end of 2028. To achieve this goal, it is currently conducting a digital wallet pilot with the World Food Program for emergency benefit payments. The SPIRO project will build on this pilot to expand digital payments to regular PATH benefits and create a digital payment module in the Social Protection Information System funded by the project. To achieve this goal, however, further understanding of the level of mobile penetration among poor and vulnerable groups, their level of digital literacy, and other barriers they may face in accessing digital payments (particularly the ease of opening a JAM-DEX account) is needed to design an accessible platform that will include the most vulnerable and hard-to-reach beneficiaries.

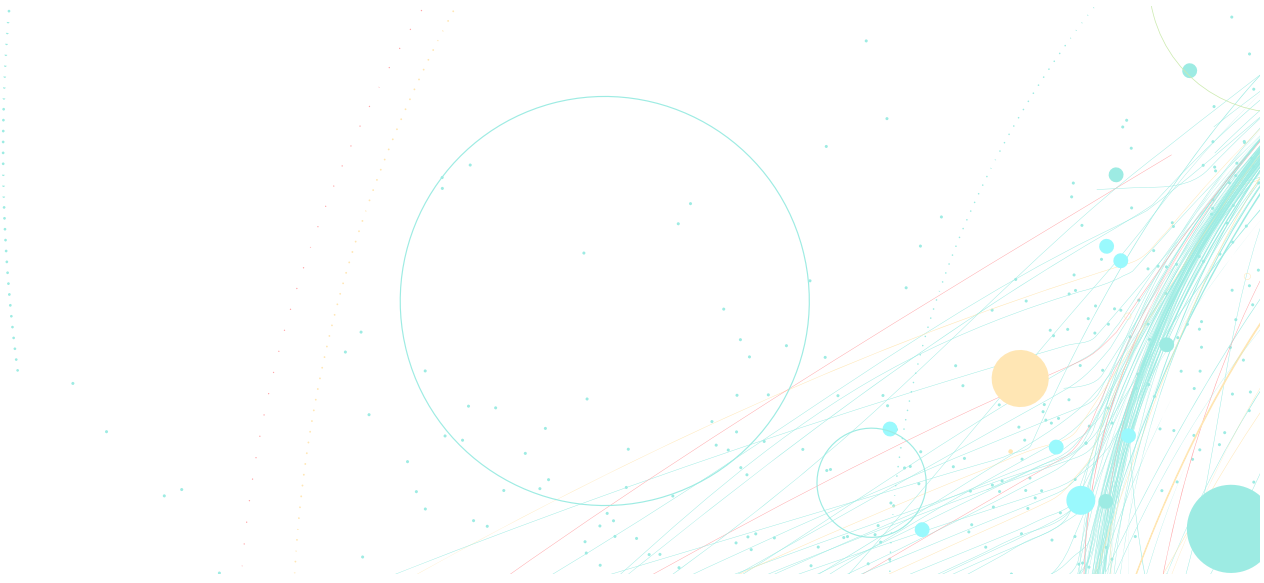


Table 4.1. Digital Financial Services: Key Challenges and Opportunities

Strengths	Areas for Improvement
» Relatively high level of access to transaction accounts for the general population and vulnerable communities (e.g., those living in rural areas, the poor, those out of the labor force) » Well-rounded underlying payments infrastructure » Central Bank and financial authorities proactive and open to innovation » Existence of a fintech regulatory sandbox	» Usage of digital payments still low compared to access levels » Lack of wide digital payment acceptance infrastructure by micro and small merchants » Lack of interoperability at the account and instrument level » Lack of digitization in cross-border remittances » Lack of interoperability framework for sub-agents » Agent exclusivity agreements not yet banned
Opportunities	**Challenges**
» Further digitization of government payments » Operationalization of additional features of JAM-DEX » New players entering the DFS market of Jamaica » Modernization of the RTGS and ACH	» Lack of access to ACH for non-bank PSPs » Low levels of financial literacy » Use of cheques by some government agencies » Tax payment system still not fully automated » Lack of national QR code standards

Source: Authors' elaboration based on digital economy assessment.

4.3. Recommendations: Enhancing payment system infrastructure, expanding access for non-bank payment service providers to the ACH, and updating the legal/regulatory framework for fintech and open banking

Policy, legal/regulatory framework, and oversight

The BOJ should consider putting in place a regulatory framework for electronic retail payment services using the existing provisions of the BOJA and PCSA, pending the amendments to the latter. The BOJ must bring in an interim guidance and regulatory framework (with a sunset clause) to transition entities graduating or likely to graduate from the sandbox into authorized and licensed entities, given that the amendments to the PCSA could take more time. The withdrawal of the guidelines for electronic retail payment services has left a regulatory vacuum since 2019. The 2020 consultation paper proposing a legal framework for the regulation of retail payment service providers continues to be a consultation paper with no legal backing, as the requisite amendments to the PCSA are yet to be carried out. ***(Short Term – High Priority)***

The BOJ should consider amending its sandbox guidelines to promote competition and innovation in the payment ecosystem in Jamaica. DTIs that require support from a fintech firm for an innovative payment solution pose a risk for the fintech, as sharing this information could potentially result in the firm's losing its competitive advantage. In addition, the BOJ should publicly disclose the criteria under which it extends an invitation to entities to enter the sandbox, as this would promote a level playing field and foster transparency. ***(Short Term – Medium Priority)***

The BOJ could undertake a gap analysis on the reform toward open banking focused on areas of opportunity and existing challenges. In particular, a better understanding of the different data-sharing initiatives, API adoption, and legal and regulatory framework, as well as the role that existing infrastructures and services, such as credit bureaus and retail payments, could play in

the provision of account information and payment initiation services, could form part of this gap analysis. ***(Short Term – Medium Priority)***

The BOJ is encouraged to engage in the development of an e-KYC platform that includes information related to CDD in coordination with all relevant stakeholders. The onboarding costs for banks and other financial institutions that follow the BOJ Guidance Notes on AML/CFT (related to regulatory expectations and high and low risk scenarios) could be mitigated by such a platform. Its implementation should include a review of the existing rules for all types of institutions and close coordination with other current efforts on digital ID at the national level if necessary. ***(Medium Term – Medium Priority)***

The BOJ should clearly spell out the legal basis for RPJ's functioning as an overseer of the ACH. Under the existing legal framework (BOJA and PCSA), the BOJ is the overseer of the ACH and not the RPJ. Given this, the BOJ should reexamine the current role of RPJ as an overseer to transition it into a stakeholder consultation body of licensed entities. RPJ's role should be to provide stakeholder inputs to the National Planning Council and BOJ on various issues, such as widening and streamlining risk-based, fair, and open access criteria to the ACH; introducing ISO 20022 message standards; instituting rule changes mandating a timeline (for instance, two hours to credit a beneficiary customer's account); modernizing the ACH infrastructure aimed at implementing fast payments; and adopting a nationwide QR code standard. The BOJ could continue to participate in such a body as part of its oversight function. ***(Medium Term – Medium Priority)***

Financial infrastructure

In line with Principles 18 and 19 of the Principles for Financial Market Infrastructures, the ACH should consider revising its existing access and participation criteria to enable both direct access and indirect tiering arrangements to all entities licensed by the BOJ, such as remittance service providers. The ACH should also streamline its processes and procedures with a defined timeline to enable eligible financial institutions to become licensee participants. These measures will lend a spur to the greater digitization of the retail payments sector in Jamaica, promote interoperability, and facilitate non-bank PSPs' ability to develop products and services that banks may not offer to their clients. ***(Short Term – High Priority)***

The interoperability feature of JAM-DEX should be operationalized at the earliest by the wallet providers under the overall direction of the BOJ. End users holding wallets should be enabled to transact seamlessly from CBDC to commercial bank money and vice versa across providers. Currently, the LYNK wallet provides only wallet-to-wallet transfer capability within the NCB. ***(Short Term – High Priority)***

The ACH should consider establishing settlement risk mitigation measures, such as collateral or a guarantee fund mechanism, to mitigate any unwinding risk of the net clearing file in the event of a participant default. An unwind can cause liquidity risks to the remaining participants and in extreme scenarios contribute to and exacerbate systemic risks. Such risk mitigation measures are already in place for the MultiLink switch. (Short Term – Medium Priority)

The ACH, in consultation with all relevant stakeholders, should take measures to further streamline and enhance the capabilities of the ACH to provide safer and more efficient services. Illustratively, these include: (a) prescribing standard operating rules in its rule book mandating that ACH members should afford credit to customers in a definitive time period (of, say, two hours to begin with); (b) developing a bulk clearing facility catering to the needs of governments and businesses; (c) taking measures to migrate to ISO 20022 message standards over a fixed timeline; and (d) actively considering and introducing fast payment capability. ***(Medium Term – High Priority)***

MultiLink should engage with stakeholders and draw up a blueprint and action plan to enhance its capacity to process mobile payments, QR code–based payments, and e-commerce transactions. This will further spur electronic retail payments adoption in Jamaica. ***(Medium Term – Medium Priority)***

JAM-DEX should be made fit for use, such as allowing QR code–based payments and e-commerce transactions. JAM-DEX should also be enabled to receive cross-border inward remittances. The additional functionalities will provide greater customer stickiness and increase the usage of JAM-DEX. ***(Medium Term – Medium Priority)***

Box 4.3. Fast Payments in Brazil: the Case of Pix

Brazil's fast payment scheme "Pix" was launched by the Central Bank of Brazil in 2020. It allows fund transfers between all types of transaction accounts in the Brazilian market—current, savings, and prepaid payment accounts—creating a payment service ecosystem with low acceptance costs and high levels of usability. Pix aliases, which inform the account data to start a transaction, are as simple as an e-mail address or a mobile phone number. The platform also actively uses QR codes as the access channel. Since its launch in November 2020, Pix has grown rapidly and by December 2021 there were approximately 109 million consumers and 7.6 million businesses, mostly MSMEs, as active users of the platform. That includes around 45 million citizens who previously did not have access to DFS.

The strong adoption trend of the platform demonstrates that the effects go beyond a simple switch to a new digital means of payment and to positive digital financial inclusion outcomes. Some of the main drivers behind the adoption rates have been single name and brand building recognition and trust in the system; the mandatory participation of big banks, creating network externalities and scale; low transaction costs compared to other retail payment instruments (transaction is free for end users) and improved customer experience due to the standardized way Pix is provided in participating institutions' app; and the multiplicity of use cases, including person-to-person transfers, tax and bill payments, and online and card-present purchases.

Market dynamics

The process of licensing the sub-agents of remittance service providers should be a time-bound process and not open ended as it is now. Further, the BOJ should consider automating the license approval procedure, including submission of relevant documentation to the extent feasible for administrative efficiency in HR utilization. The BOJ should also explore whether the tiered KYC and CDD requirements could be suitably tailored and adopted for licensing sub-agents. ***(Short Term – Medium Priority)***

The BOJ should explicitly ban exclusivity arrangements, as they stifle market competitiveness and lead to de facto monopolies. Exclusivity conditions can pose difficulties, especially where an exclusivity clause would mean that an agent retail outlet would be able to cater to a sole remittance service provider, resulting in higher remittance costs. ***(Short Term – Medium Priority)***

The BOJ, together with private sector stakeholders, should consider developing national QR code standards to foster interoperability across different payment instruments and payment service providers, particularly for merchant acceptance. The BOJ could spearhead the process, while also getting the industry on board. The EMVCo specifications could be used as a reference template for further customization to the country's needs and circumstances. ***(Medium Term – High Priority)***

The BOJ should consider assessing the remittance market in the country. Given the lack of data in the remittance market on direct credit to a beneficiary's account relative to cash payouts and the potential digitization benefits that direct credit offers, the BOJ could conduct a thorough assessment using the Committee on Payments and Market Infrastructures – World Bank General Principles for International Remittance Services.[13] This could help document the current business models, data gaps, and bottlenecks and demonstrate how the BOJ can work along with the private sector to unlock the potential of the market and accelerate the digitization pace.[14] In the process, the current G20 cross-border payments roadmap work could also be utilized.[15] ***(Medium Term – Medium Priority)***

The BOJ should consider establishing a sub-agent interoperability framework, as current guidelines neglect this aspect. The sub-agent, while serving customers with a different PSP, would continue to be responsible to a sole principal. The principal continues to be responsible for agent float management, training, and other needs. The settlement of transactions would be carried out at the back end. Such a harmonized policy framework addressing the principal-agent relationship, liquidity management, and consumer grievance redress mechanisms in the context of interoperability will provide direction and stimulus to the market. ***(Medium Term – Medium Priority)***

Financial inclusion

Customers should be provided with instant receipts by TAJ on any of the various systems for the tax amount paid. Customers are provided an acknowledgement on the day of payment followed by the issuance of the actual receipt by TAJ on the next day. In the event of a dispute, the legal validity of this acknowledgement as the customer's proof of payment is not clear. ***(Short Term – High Priority)***

Reconciliation procedures should be automated as soon as possible by the relevant authorities. The current manual reconciliation procedures between TAJ and the two commercial banks where it holds accounts could lead to delays and operational errors. ***(Short Term – High Priority)***

The BOJ and AGD should consider taking measures to automate the current manual procedures used for uploading government payment files, whether into the RTGS or the ACH. This would minimize any operational risk and would also facilitate the reconciliation of balances in the CTMS and the GFMS systems. ***(Short Term – High Priority)***

The need for TAJ to have a single tax payment system should be examined to avoid duplication of resources, given that currently there is more than one system. The synergies between the eGov and the TAJ portals should be exploited to their fullest capability to optimize the use of resources and to provide a seamless and efficient experience to taxpayers in Jamaica. ***(Medium Term – Medium Priority)***

The BOJ and the GOJ should explore the possible expansion of existing financial literacy programs. The BOJ is encouraged to consider adding e-merchants (selling products/services online) and remittance recipients as target groups of their financial literacy programs, utilizing frameworks such as the World Bank's Greenback program. Moreover, the scope should be expanded to include the digital aspects of financial services, the different digital payment instruments, access channels, and cost efficiencies and to address specific "fear" factors that individuals and merchants have in using DFS. ***(Medium Term – Medium Priority)***

Table 4.2. Digital Financial Services: Policy Recommendations (1 of 3)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Policy, Legal/Regulatory Framework, and Oversight	**Establish a regulatory framework for electronic retail payment services using the existing provisions of the BOJA and PCSA.** PRIORITY	BoJ	Short term	Yes
	Amend sandbox guidelines to promote competition and innovation in the payment ecosystem.	BoJ	Short term	Potentially
	Undertake a gap analysis to identify the areas of opportunity and existing challenges to move forward on the reform toward open banking.	BoJ	Short term	No
	Engage in the development of an e-KYC platform, including information related to CDD, in coordination with all relevant stakeholders.	BoJ	Medium Term	Potentially
	Spell out the legal basis for the functioning of RPJ as an overseer of the ACH.	BoJ	Medium Term	Potentially

Table 4.2. Digital Financial Services: Policy Recommendations (2 of 3)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Financial Infrastructure	**Consider revising the ACH's existing access and participation criteria** to enable both direct access and indirect tiering participation arrangements to all entities licensed by the BOJ, such as remittance service providers. **PRIORITY**	ACH Operator	Short term	No
	Quickly operationalize the interoperability feature of JAM-DEX by the wallet providers under the overall direction of the BoJ. **PRIORITY**	BoJ	Short term	No
	Put in place settlement risk mitigation measures, such as collateral or a guarantee fund mechanism, to mitigate any unwinding risk of the net clearing file in the event of a participant default.	ACH Operator	Short term	No
	Take measures to further streamline and enhance the capabilities of the ACH to provide safer and more efficient services. **PRIORITY**	ACH Operator	Medium term	No
	Ensure that MultiLink engages with stakeholders and draw up a blueprint and action plan to enhance its capabilities to process mobile payments, QR code–based payments, and e-commerce transactions.	MultiLink	Medium term	No
	Ensure that JAM-DEX can use QR code–based payments and e-commerce transactions.	BoJ	Medium term	No
Market Dynamics	**Ensure that the process of licensing sub-agents of the remittance service providers is time-bound** (currently it is open ended).	BoJ	Short term	Yes
	Ban agent exclusivity arrangements, as they stifle market competitiveness and lead to de facto monopolies.	BoJ	Short term	Yes
	Develop national QR code standards to foster interoperability across different payment instruments and PSPs, particularly for merchant acceptance. **PRIORITY**	BoJ + Private Sector	Medium term	Potentially

Table 4.2. Digital Financial Services: Policy Recommendations (3 of 3)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Market Dynamics	**Assess the remittance market in the country.**	BoJ	Medium term	No
	Establish a sub-agent interoperability framework.	BoJ	Short term	Potentially
Financial Inclusion	**Ensure that customers are provided with instant receipts by TAJ** on any of the various systems for the tax amount paid. **PRIORITY**	TAJ	Short term	No
	Automate reconciliation procedures through coordination by the relevant authorities. **PRIORITY**	TAJ	Short term	No
	Define and test the method of integration between the AGD and BOJ's network through an Application Programming Interface (API) to automate the current manual procedures used for uploading government payment files. **PRIORITY**	BoJ + AGD	Short term	No
	Explore synergies between the eGov and the TAJ portals to optimize the use of resources and to provide a seamless and efficient experience to the taxpayers. **PRIORITY**	TAJ	Medium term	No
	Examine the current need for TAJ to have a single tax payment system to avoid duplication of resources, given that currently there is more than one system.	TAJ	Medium term	No
	Expand the existing financial literacy programs.	BoJ + Government	Medium term	No

Notes

1. GPFI (2016).
2. Government Securities Dematerialization Act (GSD Act), 2010; Financial Services Commission Act (FSC Act), 2001; the Securities Act, 1993.
3. The oversight policy document outlines the scope, approach, guiding principles and standards, and the tools of oversight.
4. The other components include: (a) JamClear-CSD (the central securities depository for the Government and BOJ securities), owned and operated by BOJ; (ii) Jamaica Central Securities Depository (JSCD) a fully- owned subsidiary of the Jamaican Stock Exchange (JSE) performing the roles of a central securities depository (CSD), securities settlement system (SSS) and central counterparty (CCP) for corporate securities. The funds leg of the securities transactions of both the government and corporate markets are settled in the JamClear-RTGS system.
5. Though the rules permit Cambios, and money service providers to become restricted members, it is not evident that these two types of entities have been provided with restricted membership in JamClear-RTGS.
6. The regulatory sandbox includes deposit taking institutions, credit unions, money transfer operators, and fintech PSP in partnership with commercial banks. Products/services being tested include mobile wallet, e-commerce solutions, branded debit card, prepaid card.
7. Agents must be approved by BOJ as a safeguard for AML/CFT.
8. More information: https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=JM
9. World Bank Remittance Prices Worldwide (2022): https://remittanceprices.worldbank.org/
10. For more information on the World Bank Greenback Program, see https://remittanceprices.worldbank.org/project-greenback-20-remittances-champion-cities
11. Fore more information on the OECD financial education frameworks: http://www.financial-education.org/home.html
12. Mylenko (2013).
13. World Bank (2007).
14. World Bank (2007).
15. FSB (2022).

5. DIGITAL BUSINESSES

Promoting digital business growth through an enhanced business environment and capacity building

KEY MESSAGES

- **Jamaica is relatively well ranked in terms of the number of digital businesses based on what the market size would have predicted.** The country is ranked eighth in a list of 20 LAC countries on the World Bank's 2022 Digital Business Indicators, showing that Jamaica has more digital firms relative to its market size and population compared to regional peers.

- **Jamaica's top digital subsectors include web services, fintech, and marketing technology.** The software and software-as-a-solution segments, which generally require higher skill levels, are growing but remain among the least developed.

- **Although e-commerce has been growing steadily since the adoption of the E-Transaction Act in 2007, high transaction costs limit further expansion.** With projected revenues of US$669.1 million in 2023, e-commerce is forecast to continue to grow at a compound annual growth rate of 12.74 percent to reach US$1.1 billion in 2027. The GOJ, in collaboration with trade associations such as the Jamaica Manufacturers and Exporters Association, has been coordinating partnerships with global and regional businesses, including Amazon and Caribshoppers.com, to support Jamaican companies seeking to expand their export activity through e-commerce. Despite this traction, there is still opportunity to reduce transaction costs and support the business development capacity of local firms.

- **Digital transformation among MSMEs appears limited.** Less than 10 percent of digital businesses in Jamaica use platform-based or data-driven business models, which is below most regional peers. The next stage of digital transformation would be the wide adoption of both front-office and back-office functions (e.g., enterprise resource planning, customer relationship management, business analytics, and AI). This will help enhance the competitiveness of targeted Jamaican industries.

- **A few government programs, such as the Innovation Grant from Ideas to Entrepreneurship (IGNITE) and the Boosting Innovation, Growth and Entrepreneurship Ecosystems (BIGEE), are building the capacity of digital businesses and improving their access to finance to support their growth potential.** However, these programs are relatively small and could be scaled to further nurture digital start-ups to mature stages. Specialized business development services are insufficient to accelerate the pace of digital transformation. Digital entrepreneurship and associated soft skills, including leadership, need to be enhanced. Lastly, there is a need for more specialized financing vehicles while promoting capital market development for digital businesses that have matured.

5.1. Importance of digital businesses: Promoting productivity and economic inclusion

Digital businesses are defined as those that make intensive use of digital technologies or adopt digitally enabled business models to boost efficiency, reach new markets, and improve customer interaction. They are divided into two broad categories, each with its distinct characteristics: (a) digital start-ups, and (b) established digital businesses. More specifically, digital start-ups refer to early-stage ventures that create new/innovative digital solutions or business models as part of their core products or services. Established digital firms refer to platform-based and data-driven firms that have passed the initial start-up stage, having acquired suppliers, contractors, and consumers.

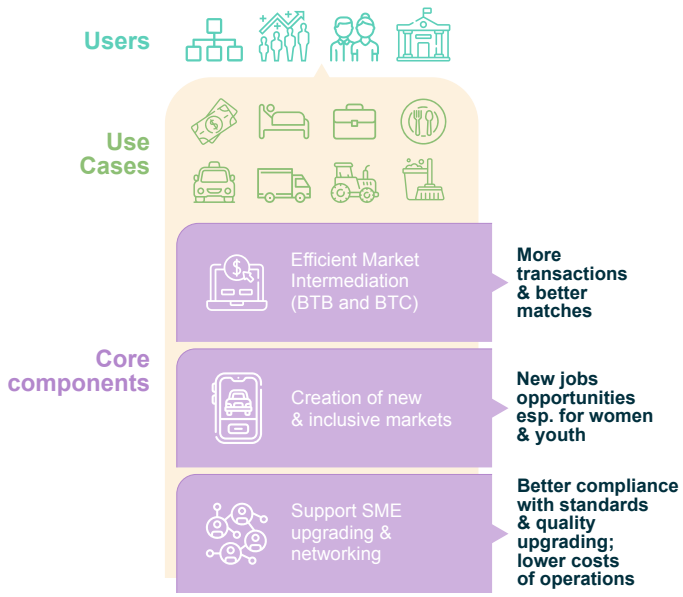
Digital businesses can play a strategic role in unlocking opportunities for economic growth, job creation, and social inclusion in Jamaica (see Figure 5.1). In addition to their own contributions to productivity growth and competitiveness, both start-up and established digital enterprises are key enablers of growth through the digital transformation of traditionally offline businesses. Digital businesses supply new or improved digital technologies and services, facilitate access to larger and more dynamic markets for local firms, and generate strong network and demonstration effects that promote the adoption of innovative business models and digital technologies by offline companies.

Digital businesses can enable the digital transformation of multiple sectors of the Jamaican economy, leading to profitability improvements and productivity gains to make Jamaican firms more competitive in local and international markets. A 2021 digital entrepreneurship assessment by the International Finance Corporation highlighted this finding, showing that the firms that adopted digital technologies were more likely to have higher levels of productivity, output, profits, employment, and wages.[1] More specifically, employment and labor productivity are higher in firms that use electronic devices, digital transaction technologies (such as mobile money to pay suppliers and receive customer payments), and digital management solutions (accounting and inventory control/point-of-sale software). In Jamaica, the expansion of digital businesses offers employment opportunities and can improve the

Figure 5.1. Digital Businesses

New digital business models (e.g. platform or data firms) present unique opportunities for MSMEs to improve market access, scale, and increase efficiency.

Commercial digital platforms are multisided online marketplaces that enable producers and users to create value together by removing market frictions, facilitating interactions and matching, and by exploiting and managing direct and indirect network effects.
Data-driven technology firms systematically and methodically collect or aggregate large datasets and leverage advanced analytics to create value to customers.



Opportunities

- **Removing inefficiencies:** lower transaction costs, lower search costs, lower prices of intermediate and final goods, better quality of products and services.
- **Creation of new activities:** platforms tap into spare physical or human capacity and identify new market niches, creating new jobs, improving financial inclusion, and increasing women labor force participation.
- **SMEs digital tecnology and digital platform adoption:** (i) fighting tax evasion, (ii) making formal the informal, (iii) helping SMEs upgrade quality of their products/services and better comply with sector specific standards, (iv) use data-driven solutions to streamline production and operation processes.
- **Financial Inclusion:** through digital payments and access to credit, but also fostering greater (e)commerce for excluded segments i.e. SMEs, informal economy

Risks

- **Growing dominance of one firm** due to network effects and the "winner-takes-all" market characteristic, especially platform and data-driven business models
- **Anticompetitive practices** like exclusion and discriminatory practices
- **Spontaneous deregulation despite the need to build trust** esp. for new sharing-economy business models e.g. uber vs. taxi.
- **Use of data as a new source of market power.** The increased collection and use of data can result in negative welfare effects if it is used to exclude rivals from the market to the detriment of consumers.

Source: World Bank Digital Assessment Diagnostic Methodology 2.0.

competitiveness of key economic sectors, such as education (for example, rapid skills trainings, digital learning marketplaces, and online education programs), agriculture (crop monitoring and soil quality programs), and logistics (business-to-consumer rideshare and business-to-business delivery services from production areas to consumer centers), as highlighted in Jamaica's Private Sector Diagnostic.

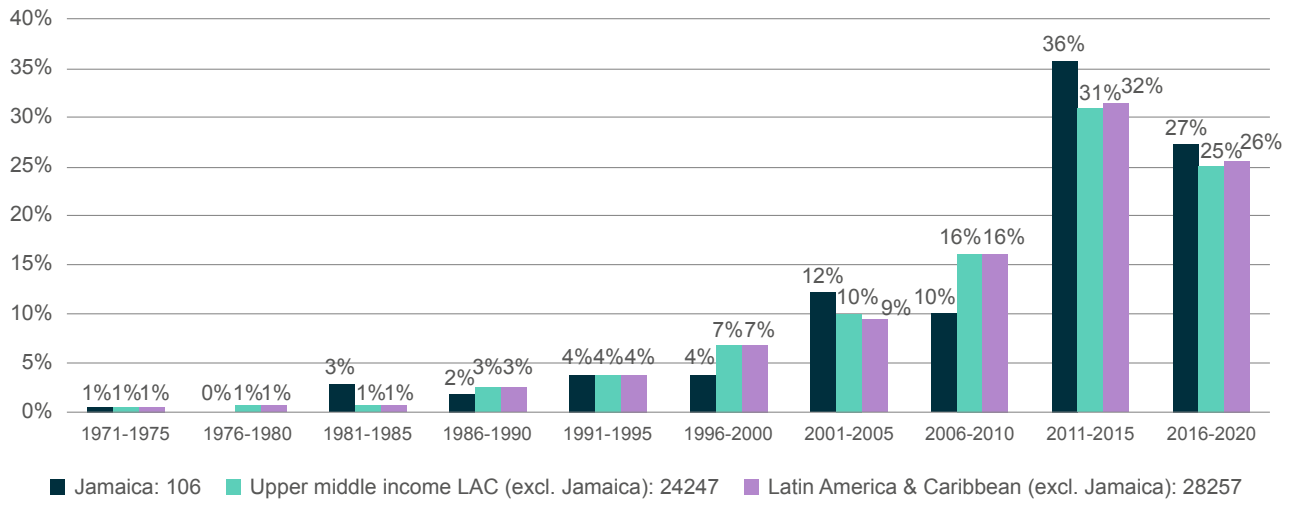
5.2. Current state of digital businesses: Limited digital business maturity and a challenging enabling environment

According to the World Bank Finance, Competitiveness, and Innovation's Digital Business Indicators,[2] Jamaica saw the largest surge of new digital firms between 2011 and 2015, part of a broader trend in the LAC region, based on 106 active businesses. This number was obtained following a web scraping process and may therefore largely underestimate the actual number. As indicated in Figure 5.2. below, more than 63 percent of digital businesses are less than 15 years old compared to 58 percent for the LAC region. However, this relatively young digital business sector is one of the largest in the Caribbean region.

Jamaica is a relatively high performer in terms of digital business density in comparison to other LAC countries. Digital density is estimated using only CB insights data. The CB insights database is smaller (with only 26 Jamaican businesses compared to the 106 mentioned above) but gives a better sense of density using only comparable data for a list of 20 LAC countries. Whereas most LAC countries are low performers when comparing globally, Jamaica is a high performer in terms of the number of digital businesses relative to its market size (i.e., GDP and population in 2021). This shows that Jamaica has more digital businesses relative to its market size compared to regional and other global peers.

Most digital businesses operating in Jamaica are domestically headquartered. Based on a small sample of funded digital firms for which data are available, 82 percent are domestically headquartered (Figure 5.4) compared to 66 percent in LAC. Eighteen percent of foreign firms in Jamaica are from the United States, Sweden, India, and the United Kingdom. The available sample size is small but, as shown in Figure 5.5, domestically headquartered firms seem to be more or less equally distributed across 12 sectors, ranging from edtech to entertainment technology.[3]

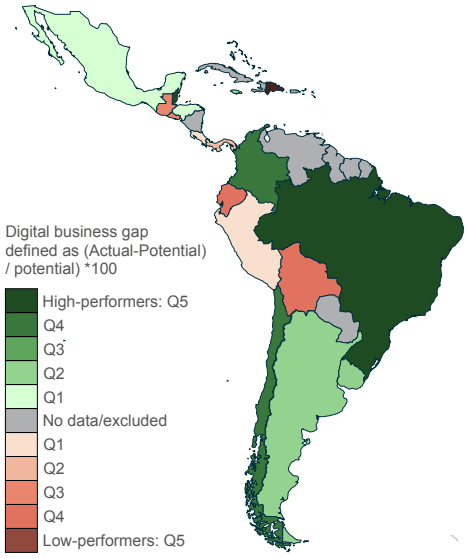
Figure 5.2. Digital Businesses by Founding Years



Source: FCI Digital Business Database 2022.

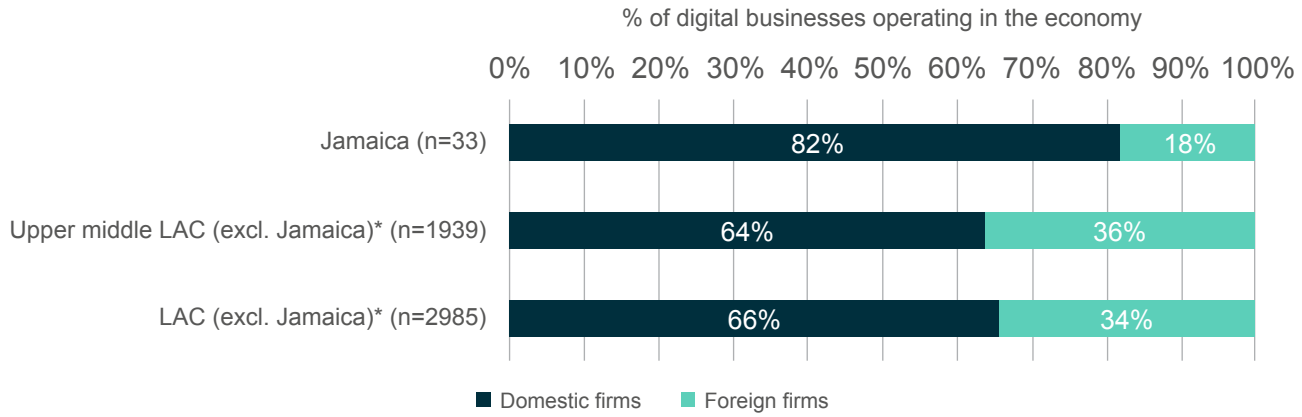
Figure 5.3. Digital Business Density Performance and Number of Digital Businesses (2022)

LAC Country Name	"Digital Business Density Performance when compared to other LAC countries: Defined as (Actual-Potential) / potential) *100"	Number of digital business as of 2022 (only using CB Insights data)
Belize	High-performers: Q5	21
Brazil	High-performers: Q5	3624
Chile	High-performers: Q4	566
Colombia	High-performers: Q4	483
Barbados	High-performers: Q3	13
Uruguay	High-performers: Q3	104
Argentina	High-performers: Q2	540
Jamaica	High-performers: Q2	26
Honduras	High-performers: Q1	29
Mexico	High-performers: Q1	919
Costa Rica	Low-performers: Q1	74
Peru	Low-performers: Q1	176
Bahamas, The	Low-performers: Q2	19
Panama	Low-performers: Q2	57
El Salvador	Low-performers: Q3	17
Guatemala	Low-performers: Q3	45
Bolivia	Low-performers: Q4	15
Ecuador	Low-performers: Q4	51
Dominican Republic	Low-performers: Q5	23
Trinidad and Tobago	Low-performers: Q5	12



Source: FCI Digital Business Database 2022 (using CB insights data only).

Figure 5.4. Percentage of Digital Businesses that are Headquartered Domestically vs. Abroad

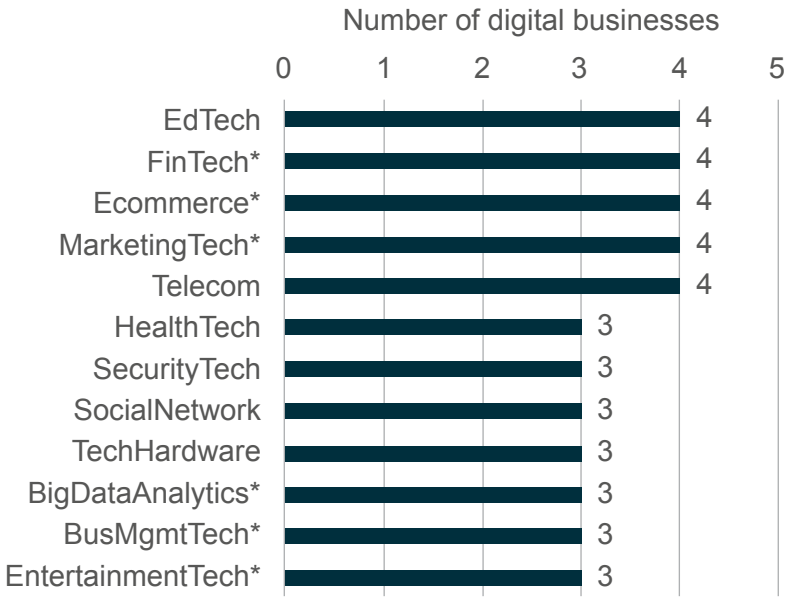


Source: Analysis using Pitchbook data, which provide both operating and headquarter information.
Note: *Pitchbook data only cover selective LAC countries, which are Argentina, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Nicaragua, Panama, Peru, and Uruguay. Note that Brazil is not in this analysis.

In addition to being younger and more homegrown than the regional average, Jamaican digital businesses offer services across multiple sectors/product markets. Over half of digital firms in Jamaica are active in more than one subsector or product market, with 22 percent operating in three or more subsectors/product markets, higher than the regional average.

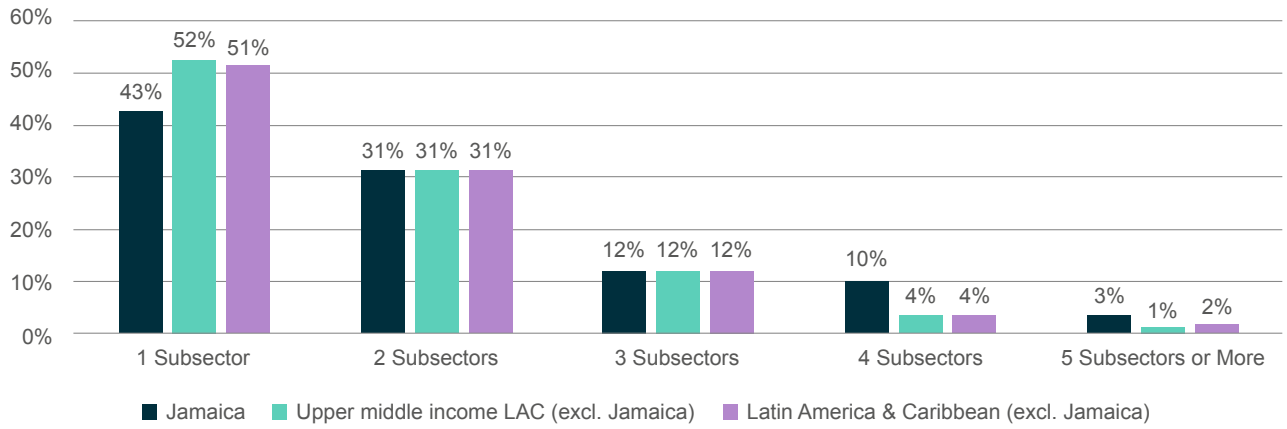
Jamaica's top digital subsectors are web services, fintech, and business management technology. Although most of Jamaica's top digital subsectors are similar to those in the LAC region, web services, edtech, and digital media stand out as uniquely prevalent in Jamaica. The relative size of the software/software-as-a-service segment, a uniquely skills-intensive segment, is slightly lower than in LAC, but with 10 businesses in a relatively small market, Jamaica seems to be faring well, though growing this segment further could help create a more vibrant regional market dynamic.

Figure 5.5. Top Subsectors of Digital Businesses Headquartered and Operating in Jamaica



Source: This analysis only uses Pitchbook data, which provide both operating and headquarter information. Given that the sample size is small, overgeneralizations or broad conclusions on domestic vs. foreign comparisons should be reviewed with caution.
Note: *Pitchbook data only cover selective LAC countries, which are Argentina, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Nicaragua, Panama, Peru, and Uruguay. Note that Brazil is not in this analysis.

Figure 5.6. Distribution of Firms according to Presence in Number of Subsectors/Markets



Source: FCI Digital Business Database 2022.
Note: Number of digital businesses with subsector information - Jamaica : 69, Upper middle-income LAC (excl. Jamaica) : 16947, Latin America & Caribbean (excl. Jamaica) : 20170

Overall trends are indicative of the type of digital solutions being brought to the market. In the earlier years, fintech and web service firms were first to enter the Jamaican market, followed by more business-to-business sectors, such as marketing technology, security technology, e-commerce,[4] big data and analytics, business management technology, and software/software as a service.

Table 5.1. Jamaica's Top Digital Subsectors

Jamaica				Upper middle-income LAC (excl. Jamaica)				Upper LAC countries (excl. Jamaica)			
Top 10 Subsectors	Firm **n	% of firms**	Total Funding (Million USD)	Top 10 Subsectors	Firm **n	% of firms**	Total Funding (Million USD)	Top 10 Subsectors	Firm **n	% of firms**	Total Funding (Million USD)
1 WebServices*	17	11%	0	Ecommerce*	2841	10%	46	Ecommerce*	3332	10%	39
2 FinTech*	16	11%	19	MarketingTech*	2515	9%	42	FinTech*	3010	9%	47
3 BusMgmtTech*	14	9%	18	FinTech*	2377	9%	50	MarketingTech*	2852	9%	36
4 Ecommerce*	14	9%	2	Software/SaaS*	2190	8%	30	Software/SaaS*	2592	8%	37
5 MarketingTech*	13	9%	3	BusMgmtTech*	2080	8%	26	BusMgmtTech*	2481	8%	23
6 Entertainment Tech	12	8%	250	WebServices*	1753	6%	56	WebServices*	2045	6%	49
7 BigData & Analytics*	10	7%	0	BigData & Analytics*	1106	4%	37	BigData & Analytics*	1315	4%	33
8 EdTech	10	7%	0	SecurityTech	1016	4%	34	SecurityTech	1240	4%	30
9 Software/SaaS*	10	7%	10	EdTech	993	4%	13	Entertainment Tech	1194	4%	26
10 DigitalMedia	8	5%	0	HealthTech	967	4%	72	HealthTech	1173	4%	60

Note: *Denotes that this subsector is common across top 10 subsectors in Jamaica, upper-middle LAC (excluding Jamaica), and LAC countries (excluding Jamaica). **Some digital businesses offer digital solutions in multiple subsectors, and hence this number is firm-sector pairs. Total funding can be counted multiple times in different subsectors in this case as the total funding does not differentiate which subsector it supports. Since there are global digital businesses operating in multiple countries and total funding does not differentiate which country the funding is going into, the analysis uses headquarter countries to count them only once.

Table 5.2. Top Five Subsectors by Founding Years – Jamaica

Top 5 Subsectors by Founding Years - Jamaica						
	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020
1	FinTech (n=2)	WebServices (n=4)	Ecommerce (n=3)↑	WebServices (n=5)↑	FinTech (n=6)	BusMgmtTech (n=7)↑
2			MarketingTech (n=3)	MarketingTech (n=2)	BigDataAnalytics (n=6)↑	Ecommerce (n=5)↑
3			WebServices (n=2)↓	SecurityTech (n=2)↑	MarketingTech (n=3)↓	FinTech (n=4)↓
4					BusMgmtTech (n=3)↑	MarketingTech (n=3)↓
5					WebServices ↓ SecurityTech ↓ ECommerce ↓ SocialNetwork ↑ SofwareSaaS ↑ EdTech (each n=2) ↑	SoftwareSaaS (n=3)↑ EdTech (n=3)↑

Note: Top funded subsectors are subsectors with more that 1 digital business that received funding in that time period. ↑ Means the subsector became higher in ranking compared to the previous founding year bracket. ↓ Means that the subsector became lower in ranking compared to the previous founding year bracket.

Jamaica's digital businesses and entrepreneurs have made their mark on the global stage.[5] Some digital entrepreneurs and innovators who come from the diaspora and are co-founders and alum of leading global accelerator programs (for example, Silicon Valley's Y Combinator) are creating similar programs, as in the case of Tech Beach Retreat Lab (TBR Lab),[6] to benefit Jamaican and Caribbean entrepreneurs specialized in digital solutions ranging from agriculture to health care. Globally, Jamaica enjoys a vibrant diaspora that stays connected through professional associations and Jamaican Chambers of Commerce in major metropolitan areas, particularly in the United States, Canada, and the United Kingdom. In addition, institutional organizations, such as the Ministry of Foreign Affairs Diaspora Foundation and the Global Jamaica Diaspora Council, seek to strengthen Jamaican ties through conferences, investments, partnerships, business development, training, and mentoring.

Despite the lack of firm-level technology adoption data, there are indications that firms in general are not adopting technology. Internet adoption among Jamaican firms is limited, and activities that the internet is used for are generally unsophisticated. According to a 2018 survey conducted by the Planning Institute of Jamaica, approximately two-thirds of firms in Jamaica did not use the internet. Among those that did, the vast majority (94.5 percent) used it for sending or receiving emails, and only a few used it for other activities, such as receiving orders for goods and services (45.1 percent), training staff (28.5 percent), or delivering products online (14.3 percent).[7] However, it is worth noting that globally, adoption accelerated in response to the pandemic, leading roughly a third of companies across the developing world to increase their use of, or to start using, the internet, social media, and digital platforms, and 17 percent to invest in new equipment, software, or digital solutions. However, lack of data in the context of Jamaica limits this kind of post-COVID-19 analysis in that country.

Policy and regulatory environment

The Vision 2030 Jamaica ICT Sector Plan provided a framework in 2012 and emphasized the importance of ICT adoption across all sectors, including the public sector. The Office of the Prime Minister envisions Jamaica as a digital society and has the responsibility to provide an overall policy framework to guide a national strategy. Under the leadership of the Office of the Prime Minister and the MSETT, the Vision 2030 Jamaica ICT Sector Plan ensured consistency and continuity in the long-term planning across the economy, emphasized the importance of an ICT plan across key ministries, and catalyzed numerous initiatives, including the establishment of the E-Learning Project, the Universal Access Company Limited, and the Jamaica Intellectual Property Office. Moreover, the plan required the development of a National Cybersecurity Strategy in 2015 and a business process outsourcing (BPO) services sector with the objective[8] of doubling revenue between 2016 and 2020. Several foundational policies are currently underway to accelerate the digital transformation, support the upcoming national digital ID policy, encourage open data initiatives, prevent cybercrime, regulate e-commerce, and protect consumer data, all of which could help unlock the digital transformation of the economy.

As part of the GOJ's vision, the growth of the BPO sector motivated a new National Strategy for the Global Digital Services Sector in 2022.[9] The new strategy focuses on higher-value jobs and shifts BPO to information technology outsourcing (ITO) and knowledge process outsourcing services provided at a 4:1 to 1:1 ratio by 2025. Jamaica's proximity to the North American markets, the COVID-driven mandate of remote work, the country's qualified English-speaking workforce, and its cost competitiveness have unlocked a steady and significant growth of the BPO services sector, with revenues doubling from US$400 million in 2016 to US$780 million by mid-2021[10] and supporting employment growth from 17,000 to 43,167 direct employees in 2021. Based on the 2025 strategy,[11] the objective would be to reach US$1.15 billion in revenue and employment growth of 70,400 direct employees by challenging regional peers, particularly the Dominican Republic and Costa Rica, with higher-value services to continue building Jamaica's comparative advantage in specific vertical market offerings and digital technologies.

The 2013 MSME and Entrepreneurship Policy Framework was updated in 2018 but does not specifically target digital businesses or support the further digitalization of MSMEs.[12] The framework remains incomplete, with a dual agenda to promote transformation and innovation among MSMEs, ranging from existing small firms looking to export to newly established start-ups looking to become a business. This sector-wide framework sought to enhance policy elements across stages of the enterprise growth cycle, from inception to readiness for the regional and international export market. Priority areas include creating an enabling environment, increasing financing access, enhancing business development support, fostering a culture of entrepreneurship, and creating social value and tackling cross-cutting issues.

Although there is no comprehensive digital business policy, the GOJ supports the development of digital businesses through various programs. In 2019, The Ministry of Industry, Commerce, Agriculture and

Fisheries implemented a three-year digital marketing program in collaboration with the Organization of American States (OAS) to support up to 25,000 MSMEs with a web and social media presence. In May 2022, the same ministry announced a more comprehensive MSME digitalization plan in collaboration with the EU, which provides funding for MSMEs to go fully digital. The objective is to help MSMEs digitize their processes and shift their software resources into cloud-based platforms. Other public institutions, including the Jamaica Promotions Corporation (JAMPRO) and the Jamaica Business Development Corporation (JBDC), and trade associations, including the MSME alliance, Smart Business of Jamaica, and the Jamaica Manufacturers and Exporters Association (JMEA), are promoting specific programs and member MSMEs are capturing the digitalization benefits. Moreover, the JMEA is coordinating partnerships with global and regional businesses, including Amazon, SAP, and Caribshoppers.com,[13] among others, to facilitate their members' business transformation and export market readiness. The Development Bank of Jamaica (DBJ) has several programs that include (a) the Innovation Grant from Ideas to Entrepreneurship (IGNITE) program, launched in October 2015, to provide grants to 27 innovative businesses; and (b) the Boosting Innovation, Growth and Entrepreneurship Ecosystems (BIGEE), launched in 2020, a 10-year project to help scale 1,500 businesses through grants and technical advisory services in the first five-year cycle of the program. Lastly, in 2022, the GOJ, through the DBJ, established a US$100 million patent grant facility to help innovators to protect their intellectual property locally and internationally.

The implementation of policies aimed at supporting digital businesses will require an overhaul of the regulatory environment. An in-depth review of the legal and regulatory environment has not been conducted in this study, but the overall regulatory context can benefit from improved provisions that would be specific to digital markets. Additional legal and regulatory reforms might be necessary in the following areas: (a) e-transactions to ensure the legal validity of data messages and digital contracts, for example, in e-commerce; (b) consumer data protection to promote digital trust and supplier data protection and ensure fair trade practices among digital platforms; (c) competition policy and contestable digital markets to prevent unfair market advantage by, for instance, limiting a platform's ability to give preference to its own products in rankings or advertisements; (d) taxation of digital activities to achieve equitable taxation between digital and analog firms; and (e) the gig economy to better regulate platforms that connect individual contractors to employment opportunities so as to promote adequate business practices and social protections for these workers, such as drivers, tutors, and other freelancers. Reforms that are aimed at promoting the gig economy are particularly important and urgent as the government is seeking to foster job creation.

Ecosystem constraints

The digital business ecosystem faces key constraints impeding its development. In addition to the gaps in the legal and regulatory environment mentioned above, these constraints include lack of access to finance, insufficient business development services, weak human capital, poor access to markets, and lack of platform- and data-based tools. Before presenting the main constraints below, it should be noted that no major disparities between women and men or specific challenges to pursuing digital business development opportunities have been identified at this stage.

Access to financing: from early-stage to credit financing

Access to finance is one of the main constraints companies face with respect to growth, transformation, and digitalization. Overall, 27 percent of MSMEs have a bank loan or line of credit compared to the LAC average of 48 percent.[14] More than 40 percent of Jamaican firms—and 47 percent of MSMEs—consider access to finance to be a limitation compared to an average of 32 percent in the region.[15] As highlighted by the Country Private Sector Diagnostic,[16] several factors can explain these disparities, including (a) banks' perception that MSMEs are high risk due to information asymmetries and prevalent informality in these firm segments; (b) lack of adequate traditional collateral owned by MSMEs that banks require; (c) limited bank strategies and programs that are tailored to MSMEs; and (d) limited financial history for MSMEs that makes it difficult for banks to assess risks. When MSMEs do manage to access credit, it usually tends to be at a double-digit interest rate to factor in the risks involved. Consequently, most MSMEs tend to use their own funds or seek alternative sources of credit, delaying expansion and limiting productivity and competitiveness.

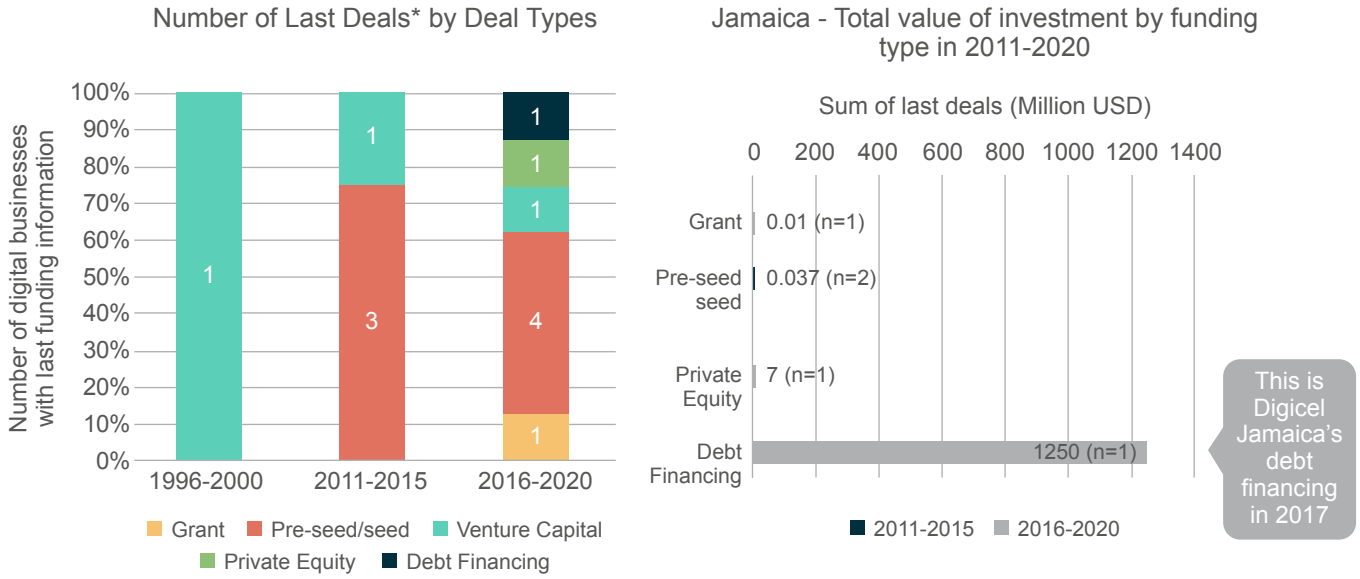
Given that 79 percent of entrepreneurs[17] are between the ages of 18 and 44, access to finance in the private market is particularly challenging for these younger groups in Jamaica and LAC, especially when their digital firms and start-ups are also young. Most options for formal access to finance require that companies have a long history of operating and holding assets to back up their loans. Banks tend to shy away from financing young and small businesses, driving entrepreneurs to alternative financial entities that provide

expensive credit. While most digital start-ups need capital rather than debt to grow, the market for seed, venture, and private equity funds remains underdeveloped. Moreover, incubators and accelerators tend to focus on competency-building and advisory services in the early stages, unlike those in developed markets.

In response to the financing challenges that MSMEs face, the GOJ implemented a series of programs aimed at developing capacity among MSMEs and within the digital entrepreneurship ecosystem. In 2013, the Jamaica Venture Capital Programme was developed by the GOJ through the DBJ to provide alternative equity financing. Entrepreneurs and small business owners had the opportunity to receive funding by pitching their business ideas to qualified local and international fund managers. In 2015, the DBJ launched the IGNITE program to provide grants to locally registered young businesses and accelerate the commercialization of their products and services. Through business service intermediaries, like the Branson Centre of Entrepreneurship, the Jamaica Manufacturers and Exporters Association, and the JBDC, IGNITE provided development funding to 27 entrepreneurs over an 18-month period. In parallel, the DBJ launched several technical assistance programs to introduce incubators to service providers in the venture capital/private equity space. As part of this effort, the DBJ was instrumental in creating the Caribbean Alternative Investment Association with other regional institutions to educate investors and others in the venture capital/private equity space in the region. Since 2021, the DBJ has been assessing strategic options to pursue a Pan-Caribbean fund-of-funds that would boost private capital investment and institutional and retail investor opportunities to participate in the growth of Jamaican businesses. In 2022, the DBJ, in partnership with the MOFPS, the World Bank and private equity firms, established three equity financing alternatives[18] for SMEs.[19]

Overall, Jamaica's funding landscape is still in its early stage. As highlighted in Figure 5.7 below, the number of investment deals for digital businesses in Jamaica remains low (n=11) and they are mostly early-stage financing, which is consistent with the country's small digital business ecosystem. The financing size remains very small (<US$8 million), with the exception of a debt financing for a multinational telecom company. Taking digital firms to the next stage of incubation and acceleration would require a holistic approach to strengthen the linkages between funding and pipeline development. In fact, the first few business angels and venture capital firms have already expressed concern about the limited pipeline. Thus, fostering the supply side of the business angel or venture capital ecosystem needs to be matched by growing the demand side of the digital entrepreneurship pipeline, especially those firms that are ready to graduate from an entrepreneurship support organization (ESO), as discussed below.

Figure 5.7. Entrepreneurship Number of Deals by Deal Types and Value of Investment by Funding Type from 2011 to 2020



Source: FCI Digital Business Database 2022.
Note: Total Deal N of digital businesses headquartered in Jamaica: 11 – because the database does not distinguish funding information of multinational firms by their operating location, the analysis only uses firms headquartered in the country to avoid over counting funding raised by multilateral companies.
**Last deal*: The database records the latest funding for each firm so this captures at most 1 latest funding per firm rather than multiple deals per firm across the years. Formal Investment information comes from the latest investment reported by the firms or through web scrapping, indicating that informal investments (e.g. friends and families) are likely under-reported. *Other Capitalization includes the following funding categories*: Bonds, Capitalization, Corporate, Corporate Asset Purchase, Corporate Licensing, Joint Venture, Secondary Transaction – Open Market, Secondary Transaction – Private, Spin-Off, Share Repurchase, Equity, and Bridge Round (in between rounds).

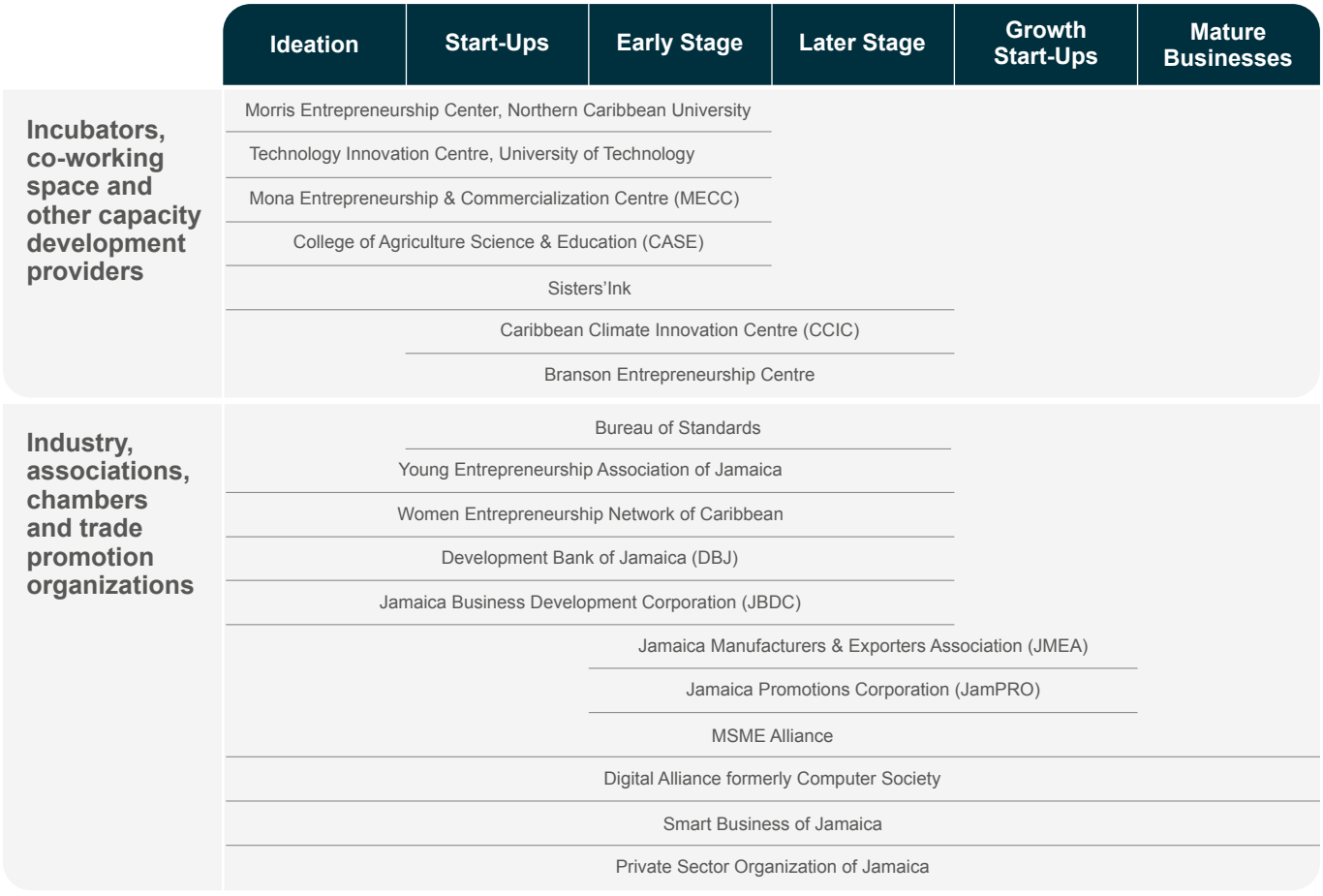
Business development services

The business development services market lacks specialized support, especially to boost growth and mature businesses. As highlighted in Figure 5.8, most ESOs have focused on ideation and incubation of young project holders, launch of start-up businesses, and matchmaking with angel investors. Unlike public agencies such as the JBDC, these ESOs' economic models would require public and private funding to expand services and accelerate support for existing digital firms looking to scale.

The intensity and service quality of these ESOs still vary greatly. ESOs depend on donor-funded initiatives, public budget, or private enterprise sponsorship to pivot to a more sustainable model that includes training, mentoring, incubation, and accelerated service provision. Moreover, the level of professionalization of these ESOs depends on many other factors, including the profile of the leaders, the team in place, the physical and virtual infrastructure, and the technical and managerial knowledge to train client firms and access networks and markets that may lead to partnerships that invest in expansion.

ESOs should contribute to the quality of the pipeline of investment-ready digital firms and in this way attract venture capital and private equity investors. Indeed, investment readiness programs with ESOs and other intermediaries are crucial to provide tailored training and mentoring and other services. Improving the effectiveness of these ESO programs means increased cooperation between all public and private stakeholders to build a consistent and continuous pipeline of entrepreneurs that would meet the basic requirements of venture capital and private equity investors. Without an adequate pipeline, attracting these investors would be challenging.

Figure 5.8. Entrepreneurship Support Organizations and Other Capacity Development Providers in Jamaica



Source: Authors' elaboration based on ecosystem mapping.

Human capital

There is a shortage of digital skills from basic to advanced levels, including in the BPO sector. The GOJ had a deliberate plan to attract more BPO service providers and in 2017 announced that 50,000 people were soon to be employed in that sector. At that time, the sector was attracting high school graduates with only basic digital skills (for an in-depth discussion of digital skills, see Chapter 6). In early January 2019, the Jamaica Employers' Federation had warned[20] that a severe labor shortage could soon impact the BPO sector, as 50 percent of the 45,000 high school students graduating each year did not have the required skills to qualify for call center jobs. The rapid growth of the BPO industry required improved coordination among public institutions and a strengthened partnership with the private sector. Progress has been made in designing and implementing technical and vocational education and training (TVET) programs to meet the basic and intermediate digital skills objectives set forth by the industry. The Human Employment and Resource Training /National Service Training Agency (NSTA/HEART) Trust, in partnership with six community colleges, has been preparing 6,000 people per year to meet the needs of the outsourcing industry with the support of approximately 1,000 trainers. As the industry seeks to balance BPO and ITO services in the next three years, advanced digital skills development will be required, and private partnerships like HEART/NSTA and the Amber Group will be crucial to train hundreds of coders. In its pilot phase, this program has trained 100 coders and is currently being expanded[21] throughout the island to reach 4,000 coders by 2024.

Markets

The small domestic market constrains the growth and competitiveness of digital businesses. Except for the BPO sector, which has been able to grow due to access to regional (U.S., mainly) and international markets, with more than 60 BPO companies serving the global BPO service industry, other sectors are constrained by the lack of markets and regional integration. The scale and level of specialization of Jamaican digital businesses are insufficient to offer competitive services and products to both the local and regional markets in value chains that provide opportunities for digital and IT transformation services. Overall, there are no specialized clusters of firms in competitive niche areas for the benefit of the regional and global markets outside the BPO sector. There are sectoral opportunities identified in high-value agriculture, agroindustry, outsourcing services, and creative industries that could be seized.

The public sector has a strategic role to play in the demand market and may catalyze private market development, as it is in direct need of digital transformation. As one of the nation's top ICT purchasers, the government should seize this opportunity to establish capacity-development programs to increase the direct and indirect participation of digital MSMEs. This can be done with, among other actions, more favorable procurement procedures and requirements to encourage the inclusion of digital MSMEs, especially given that large contracts are frequently awarded to large firms.

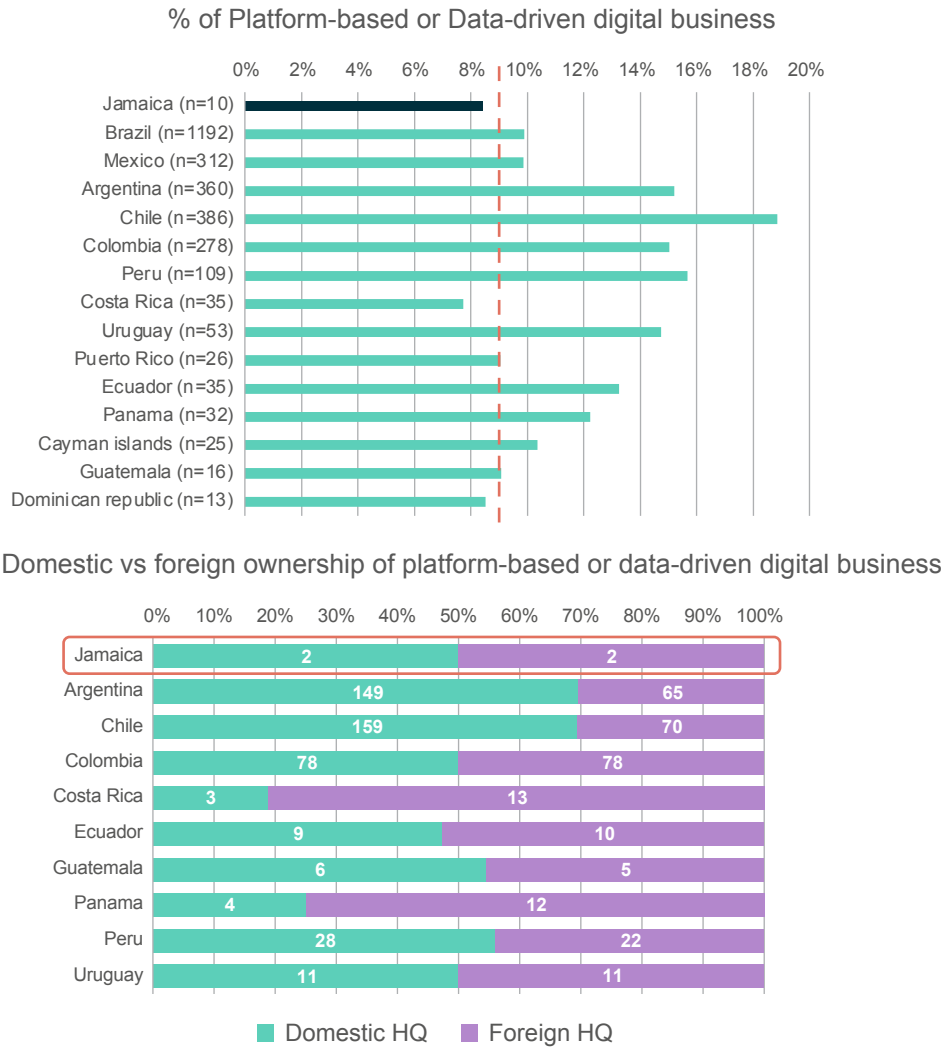
Platform-based and data-based digital businesses

Less than 10 percent of digital businesses in Jamaica use platform-based or data-driven business models, below most regional peers (Figure 5.9). Platform or data-driven business models are essential to driving network effects and helping firms scale. The e-commerce market[22] in Jamaica is projected to total US$1.1 billion by 2027, with a compound annual growth rate of 12.74 percent, reaching 1.2 million users and a user penetration rate of 43.7 percent (up from 39.3 percent in 2023). This increase is partly explained by COVID-19, which sparked a demand surge for online shopping. In this context, and to support better regional market integration, Caribshopper.com and CoolMarket.com are emerging as players in the Jamaican online marketplace offering secure online payments, order tracking, and delivery options.

Despite this performance in e-commerce, there is still room for improvement in the development of Jamaica's e-commerce ecosystem. This is reflected in the United Nations Conference on Trade and Development's 2021 Business-to-Consumer E-Commerce Index,[23] which ranks Jamaica 74th out of 152 countries. Overall, business friendly regulations, coupled with better digital foundations (connectivity, consumer protection and cybersecurity, digital payments, trade regulation) and the enhanced competitiveness of logistical services at the local and regional levels, would likely contribute to increased usage of digital platforms. On the data-driven business models, it is important to stress that MSMEs can make more strategic decisions based on data collection and analysis. In general, the ability and capacity of digital businesses in Jamaica to collect, store, analyze, and share data with the aim of improving their products and services, and hence their revenues and growth, are

limited. However, this is expected to improve over time following the DPA of 2020, which came into effect in 2022 and aims to clarify the scope of the law's application and the requirements for handling personal data.

Figure 5.9. Percent of Platform-Based Data-Driven Digital Businesses, and Domestic vs. Foreign Ownership of Platform-Based or Data-Driven Digital Businesses



Source: FCI Digital database.
Note: Platform-based is defined as firms that facilitate interactions across many participants. Platform business does not own the means of production, but rather creates and facilitates the means of connection. The role of the platform business is to provide a governance structure and a set of standards and protocols that facilitate interactions at scale so that network effects can be unleashed. Data-driven firms systematically and methodically collect or aggregate large datasets and use advanced analytics (such as artificial intelligence, big data, and blockchain) to create value, leveraging data as a key element of their business model. Data-driven businesses can also help traditional industries upgrade through services to optimize production processes, increase sales, streamline decision-making and even re-think revenue models. For the domestic vs foreign ownership analysis, only firm data from Pitchbook is used as it is the only data source that provides operating and headquarters information.

Table 5.3. Digital Businesses: Key Challenges and Opportunities

Strengths	Areas for Improvement
» An ICT 2030 strategy that is currently under implementation » Great traction in developing BPO services since the onset of the COVID-19 pandemic and a recently updated 2025 outsourcing strategy » A set of policy instruments to promote digital entrepreneurship and digital transformation among MSMEs and to support export readiness already in place » High digital business density relative to the region » Institutional capacity to deploy financing and technical assistance for MSMEs though not yet specifically to digital businesses	» Supporting more granular and real-time data collection and analysis to assess firm-level digital transformation adoption (last World Bank survey dates back to 2010) and to better target policy instruments across enterprise size and sectors » Increasing business development support capacity building to accelerate the pace of digital transformation among MSMEs » Strengthening digital entrepreneurship and associated soft skills, including leadership and business development skills
Opportunities	**Challenges**
» Assessing the capital-enabling environment in Jamaica from the business angels to late-stage investments to increase the proportion of digital firms that can scale » Increasing late-stage financing diversity in investment types » Tailoring platform-based and e-commerce business development support solutions by enterprise size and sector opportunities, from industrial export readiness to a very small retail online presence » Creating support mechanisms for advanced technology adoption (AI) that is especially applied to strategic sectors (financial services, agrobusiness, tourism, retail, and creative industries)	» Catching up on the legal and regulatory challenges of the digital economy (cybersecurity and data protection, open data, gig economy, supplier protection, competition policy, and minority investor rights, among others), with decrees and provisions in effect » Using and publishing more real-time data to qualify business threats (cybersecurity) and business opportunities (firm-level digital transformation status) to better target policy instruments across enterprise size and sector » Adapting quickly with an adequate volume of intermediate and advanced digital skills to capture more ITO and knowledge process outsourcing services in Jamaica and larger-size investments » Tackling cost reduction and/or improving quality of service related to infrastructure (including broadband, transport, and logistics)

Source: Authors' elaboration.

5.3. Recommendations: Enhancing the business environment, expanding the support ecosystem, and catalyzing digital market development opportunities

The recommendations focus on the following three strategic areas: (a) improving the enabling environment for digital businesses; (b) expanding the capacity of the ecosystem to support the business and digital competencies of MSMEs; and (c) catalyzing digital market development opportunities.

Improving the enabling environment for digital businesses, including start-ups

Enhance the legal and regulatory environment. As mentioned above, the regulatory environment can benefit from improved provisions. Chapter 7 (Trust Environment) highlights a number of regulatory recommendations that will contribute to fostering digital businesses. In addition to those recommendations, it would be important to consider measures to support the gig economy by better stimulating and regulating platforms that connect individual contractors to employment opportunities so as to promote adequate business practices and social protections for these workers, such as drivers, tutors, and other freelancers. Measures should also be considered to improve the competition policy and contestable digital markets to prevent unfair market advantage by, for instance, limiting a platform's ability to give preference to its own products in rankings or advertisements.

Improve financing tailored to digital MSMEs. The funding landscape is still in its infancy. Through the DBJ, the GOJ has nurtured more funding programs (e.g., ASMEF, Vertex, Stratus) and technical assistance programs (e.g., BIGEE, IGNITE) that seek to improve access to debt and equity finance and will support more digital businesses to reach their growth potential. In the medium term, it is important that these programs and tools become specialized by sector to address vertical-specific challenges and opportunities where Jamaica aims to build a comparative advantage (e.g., global digital services, creative industries, and agroindustry). It is also important to engage with the diaspora, which could mobilize financing (including for mergers and acquisitions) while building competency among Jamaican MSMEs and improving access to markets.

Expanding the ecosystem's capacity to support the business and digital competencies of MSMEs

Strengthen the capacity of the existing entrepreneurship support providers. This would extend the capacity of the JBDC to accompany a significantly higher number of businesses from incubation to acceleration. The Ministry of Industry, Investment and Commerce (MIIC) could strengthen the capacity of existing ESOs by incentivizing their specialization by sector or by growth milestones (e.g., incubation relative to acceleration). In turn, the JBDC would benefit from partnerships to outsource more of its incubation services to focus more on acceleration . Moreover, additional partnerships can be sought with global entrepreneurs, large private sector companies, and the diaspora looking to invest or to support local ventures.

Expand and better target digital transformation programs. From overall business formalization to operational competitiveness and export market readiness, development programs such as BIGEE should continuously assess lessons and best practices to enhance MSMEs' digitalization and managerial capacity. Some of these lessons include 1) addressing gap areas with specific instruments based on in-depth data collection; 2) segregating companies according to size and/or need (foundational, transformational, and experimental); 3) determining support activities for institutional capacity and implementation arrangements; and 4) ensuring continuous monitoring and evaluation. Another important factor would be to structure some of these programs preferably by industry to promote vertical-specific methods and tools that can help develop competitive clusters of MSMEs by strategic industry and provide adequate institutional capacity to accompany these clusters of businesses according to enterprise size, growth maturity, and industry. Overall, in addition to ongoing programs to enhance the digital literacy of the general population, it is critical to foster greater digital business and entrepreneurship skills.

Catalyzing digital market development opportunities

Develop specialized clusters of digital businesses for greater competitiveness and expansion at the regional level. The first step would be to conduct a comprehensive analysis of Jamaica to build specialized market niches where it can use its comparative advantage in select industries. Based on the findings, the GOJ could consider creating specific programs, incentives, and support mechanisms to build a cluster of firms in that digital market category. As some Jamaican digital businesses scale up, they need to prepare for more competitive offerings that could be integrated into regional markets and, in some cases, international markets. By developing specialized clusters of digital firms and attracting regional investments, Jamaica can continuously improve its competitiveness from business environment to infrastructure, financing, and competency building in the long term. This would lead to a virtuous cycle of regional market leadership, access to regional private investment, and regional market integration. Consequently, foreign direct investment would continue in specialized niche areas in Jamaica while local firms specialized in those strategic niches would continue to compete and form partnerships in Jamaica and beyond.

Increase the participation of digital MSMEs in public tenders to grow their market beyond the private sector and in this way expand their competency. Feedback provided by the private sector highlighted major hurdles to the participation of MSMEs in public tenders, including procurement practices that could be discriminatory toward small and medium-sized businesses and in some cases, women-owned businesses and young entrepreneurs. As one of the nation's top ICT purchasers, the public sector should foster competitive procurement that is progressively inclusive of small businesses to support their development. Providing services and products to the public sector will contribute to strengthening their experience and expertise. This could be done indirectly by incentivizing partnerships between large and small firms, including women-owned and young businesses.

Table 5.4. Digital Businesses: Policy Recommendations (1 of 2)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Improving the enabling environment for digital businesses, including start-ups	**Continue the review of the legal and regulatory environment to**, among other goals: (a) promote the gig economy by better regulating platforms that connect individual contractors to employment opportunities; and (b) improve the competition policy and contestable digital market to prevent unfair market advantage for the existing main players.	MIIC	Medium Term	Yes
	Improve financing tailored to digital MSMEs. Adapt existing funding programs (e.g., ASMEF, Vertex, Stratus) and technical assistance programs (e.g., BIGEE, IGNITE) to ensure that these programs and tools become specialized by sector and address vertical-specific challenges and opportunities for Jamaica. Engage with the diaspora to mobilize international financing.	MOFPS, with DBJ	Medium Term	Possible, depending on type of financing

Table 5.4. Digital Businesses: Policy Recommendations (2 of 2)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Expanding the capacity of the ecosystem to support the business and digital competencies of MSMEs	**Strengthen the capacity of the existing entrepreneurship support providers.** Strengthen the capacity of existing ESOs by incentivizing their specialization by sector or by growth stages (e.g., incubation vs. acceleration). Seek partnerships with global entrepreneurs, large private sector companies, and the diaspora looking to invest or to support local ventures.	MIIC with JBDC	Short term	Possible, depending on type of financing
	Expand and better target digital transformation programs. Expand support programs while ensuring they continuously assess lessons and best practices to enhance MSMEs' digitalization. Structure programs preferably by industry.	MIIC with JAMPRO and JBDC (in partnership with private sector professional associations such as Jamaica Manufacturers and Exporters Association)	Medium term	Possible
Catalyzing digital market development opportunities	**Develop specialized clusters of digital businesses.** Consider creating specific programs, incentives, and support mechanisms to build a cluster of firms in the targeted digital markets with regional growth potential.	MIIC with MSET and MOFPS)	Medium term	Possible, depending on types of incentives
	Increase the participation of digital MSMEs in public tenders. Encourage public procurement practices that are inclusive of small businesses, including women-owned and young firms.	Office of the Prime Minister	Long term	Yes

Notes

1. This study surveyed 2000 MSMEs in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.
2. The WB FCI Global Database integrates funding data collected from 3 proprietary data sources (CB Insights, Pitchbook, Crunchbase), using techniques from web-scraping to gather firm information from entrepreneurship networks, VC or other investment deals. They specialize in collecting information on tech start-up or digitalized firms that would be attractive for VC/PE investors due to certain innovative elements in their business models or core product offering. When government data is available, this database is compared with the national economic census to assess representativeness and accuracy.
3. The number of businesses with information on headquarter location in figure 5.4 (41) is higher than the number of businesses in figure 5.3 (33) as one company can be present in more than one sector.
4. See https://www.trade.gov/country-commercial-guides/jamaica-ecommerce
5. Historically Crunchbase accounted for 338 businesses primarily based in Jamaica and North America that involved a Jamaican technology entrepreneur. More information available at https://www.crunchbase.com/hub/jamaica-companies
6. TechBeach (2021).
7. PIOJ (2018).
8. JAMPRO BPO 2020 Objective - https://dobusinessjamaica.com/news/2016/04/5211/
9. GSS (2022).
10. Smith (2021).
11. GSS (2022).
12. MIIC (2018).
13. See https://caribshopper.com/
14. World Bank Jamaica Enterprise Survey 2010, https://microdata.worldbank.org/index.php/catalog/1085
15. Ibid.
16. IFC (2022).
17. Gaynor-Clarke et al. (2023).
18. JIS (2023).
19. These three funds include Vertex SME Holdings, Stratus Private Equity and SME Fund and Jamaica Actus Small & Medium Enterprises Fund 1 (JASMEF) respectively managed by Jamaica Money Market Brokers (JMMB) Securities Limited, National Commercial Bank (NCB) Capital Markets and Victoria Mutual Investments and Actus Partners.
20. Brooks (2019).
21. Louisy (2023).
22. See https://www.statista.com/outlook/dmo/ecommerce/jamaica (accessed on 05/23/2023)
23. The UNCTAD's index on measuring e-commerce and harnessing digital trade for development. This index also aims to build the capacity of countries to produce official statistics on e-commerce and the digital economy, and that can be used to guide policy making. The latest report can be fournd here: https://etradeforall.org/wp-content/uploads/countryprofiles/2021/JAMAICA.pdf.

6. DIGITAL SKILLS

Building a technology-enabled society through a shared vision for digital skills development

KEY MESSAGES

- **The majority of the Jamaican workforce is likely to have at most basic digital skills.** Only 36 percent of workers (ages 25–64) have obtained a Caribbean Secondary Education Certificate, and most are unlikely to have received formal digital skills education. Universities offer programs to develop advanced digital skills, but access is out of reach for most youth, primarily due to poor learning outcomes in basic education and affordability.

- **The demand for digital skills outpaces supply and will continue to grow.** Half of the workforce is currently employed in sectors that are not technology intensive. But the demand for digital skills will continue to grow, as firms and government agencies continue to integrate ICT into their operations and IT subsectors develop and demand advanced digital skills.

- **The development of digital skills for the future workforce is hampered by important structural challenges that include:** 1) low numeracy and literacy skills proficiency, 2) a persistent lack of connectivity and access to devices, 3) lack of teacher capacity to use and foster digital skills in the classroom, and 4) emigration among the most educated, who are likely to have acquired intermediate or advanced digital skills.

- **Numerous stakeholders offer basic and specialized digital skills training, primarily catered to youth.** Some providers offer formal training that is quality assured and certified; others offer quick skilling programs for which quality assurance and formal certification are unclear. Implicitly or explicitly, most programs target individuals below 34 years of age.

- **Jamaica's policy framework for digital skills needs definition and coordination.** A national digital skills strategy that clarifies roles, establishes coordination mechanisms, adopts a common digital skills framework, develops a digital skills assessment system, and assigns monitoring, evaluation, and accountability measures could help address existing fragmentation.

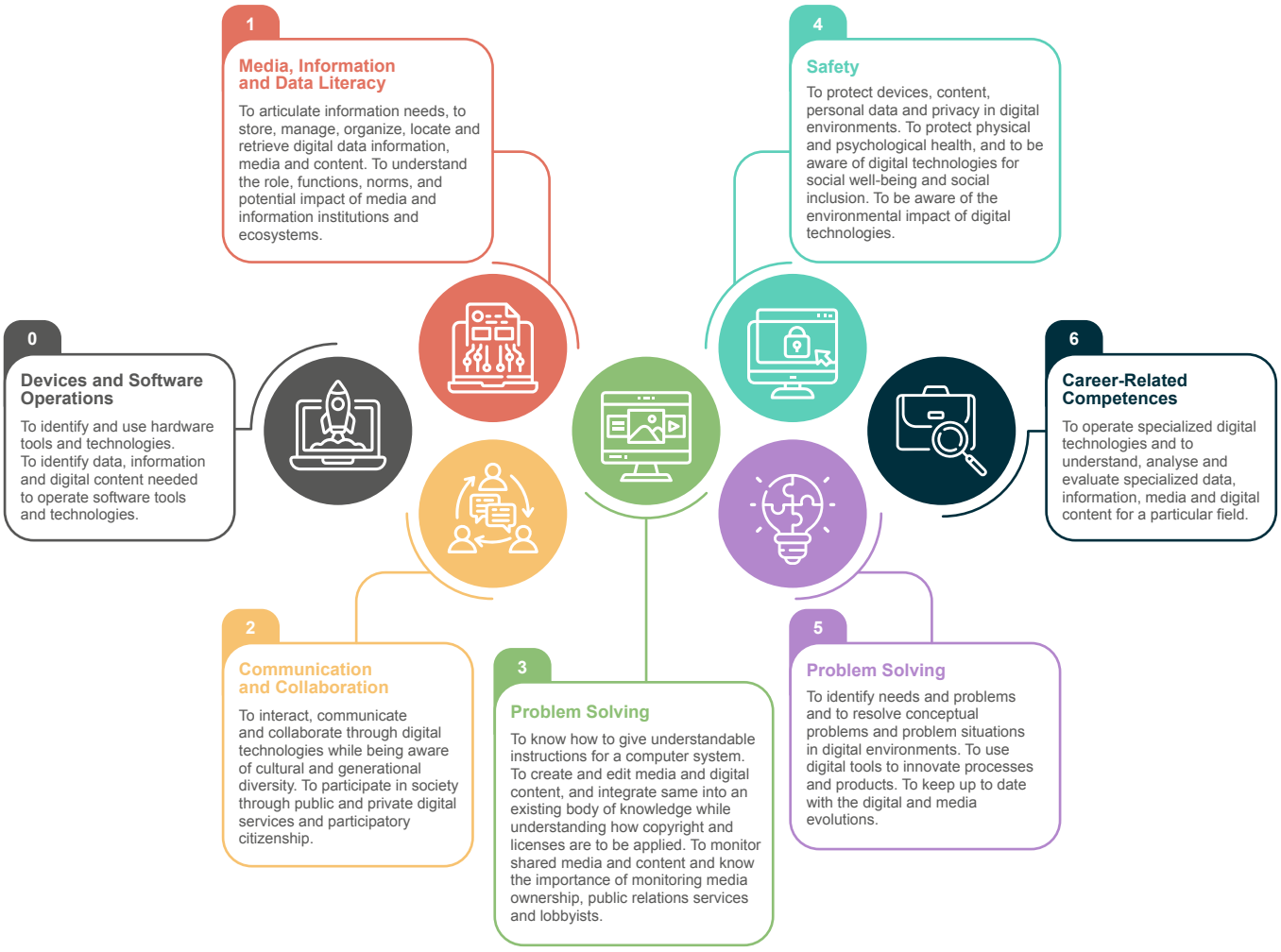
- **Current measures to enable digital skills development need more robust monitoring and evaluation.** Despite significant government investments to integrate ICT into basic education, improve connectivity, and distribute digital devices, challenges in these areas continue to be seen as the main roadblock to digital skills development. Robust evaluations are essential to revise, recalibrate, and adjust policies and programs so that they achieve the intended effect.

6.1. The importance of digital skills: Developing digital skills to build the foundation for a technology-enabled society

Digital technologies have transformed how people live and work and will continue to do so. They have changed the channels through which businesses interact with providers and clients, the mechanisms used to deliver public services, the speed at which information is disseminated, working arrangements across sectors and occupations, and access to education and training opportunities, among many other areas of human activity. Although this transformation was already underway by 2019, the COVID-19 crisis accelerated it worldwide. It is undeniable now that digital skills are essential for countries, companies, and individuals to contribute to, use, and benefit from new technologies.

Digital skills go beyond the ability to operate digital devices, and they span different skill levels, from basic to highly specialized. Digital skills are ubiquitous, often misunderstood, and oversimplified. Increased attention to digital skills has resulted in multiple attempts to reach a common understanding of what they are.[1] This is particularly important for policy dialogue, as in non-technical discussions they are often reduced to the activities that are most familiar to the public, such as basic web navigation or the more advanced capacity to write computer programs. This assessment follows UNESCO's adaptation of Europe's DigComp 2.2 and defines digital skills as "the confident, critical, and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society."[2] As illustrated below, the framework analyzes digital skills in seven domains and offers examples of each skill domain in four proficiency levels: basic, intermediate, advanced, and highly specialized (see Figure 6.1).[3]

Figure 6.1. UNESCO's Digital Literacy Skills Framework - Domain



Source: Perueet al., 2022. "Digital, Media and Information Literacy in Jamaica: Research Report."

6.2. Current state of digital skills in Jamaica: Uncoordinated efforts to address the high demand for and low supply of digital skills

Jamaica has set out on an ambitious agenda to improve the digital skills of its workforce in order to become a "technology-enabled society." Out of the 141 countries assessed in the 2019 Global Competitiveness Index, Jamaica ranked 93rd on an indicator of digital skills among the active population.[4] To remedy the situation, the GOJ has prioritized moving toward a more technology-enabled society by developing a policy framework, leveraging the TVET system to develop digital skills among the young workforce, and other efforts. The sections below discuss these efforts and outline opportunities for improvement.

Policy framework

Digital skills are essential to realizing Jamaica's Vision 2030. The country's long-term development plan aspires to support the island's transition to a knowledge economy.[5] The Vision has four goals, two of which provide a strategic framework for the government's digital skills efforts:

- The first goal, which seeks for Jamaicans to achieve their fullest potential partially through accessing "world-class education and training," focuses on basic and intermediate digital skills for personal and professional activities, regardless of occupation. The Ministry of Education and Youth (MOEY) and the HEART/NSTA are the main agencies responsible for efforts under this goal.

- The third goal, which aims to build a technology-enabled society, connects the availability of specialized talent in ICT, among other fields, to the country's economic prosperity. National and sector strategies to achieve this outcome support innovation and research through the promotion of specialized digital skills at the tertiary level, the strengthening of links between higher education institutions and businesses, and the encouragement of lifelong learning in ICT areas.[6] The Vision lists multiple responsible agencies in this area but does not assign a leadership role to any.

Two major policies to advance Vision 2030 set a regulatory framework for the investment in digital skills development:

- The *2019 National Science, Technology, and Innovation (ST&I) Policy*: Vision 2030 places the National ST&I Policy at the center of national efforts to integrate ST&I across economic sectors and activities, including education. The latest version of the policy, launched in 2019, includes an objective to "increase and improve the human resource capital for ST&I."[7] Among the strategies to achieve it are conducting a training needs assessment, increasing research and innovation capacity across education levels, and aligning STEM [science, technology, engineering, and math] education with ST&I priority areas (see Annex 3 for a summary of the policy's goals and strategies). As of late 2022, the MSETT had conducted a situational analysis to inform the design of a national implementation plan for this policy, but the plan had not yet been made publicly available.

- The *2022 ICT in Education Policy*: To implement Vision 2030, in 2009 the government developed a National Education Strategic Plan that highlighted "a negligible use of educational technology at all levels,"[8] and recommended the development of the ICT in Education Policy. Coordination challenges delayed the design and enactment of this policy, which was officially launched in 2022. According to the MOEY, the absence of a policy and plan to guide the use of ICT in the delivery of education has "led to inadequately designed programs and ad hoc implementation."[9] The policy aligns itself with the MSETT's ST&I policy and promotes the use of ICT in education delivery and administration by incorporating ICT into teaching practices and school administration, increasing connectivity and access to devices, and promoting research and innovation (see Annex 4 for a summary of the policy's goals and strategies).

Jamaica has devised important policies to enable the development of digital skills but has yet to define concrete measures and goals in this area. The focus of Vision 2030 is the development of human capital and the policies mentioned above to integrate ICT into the classroom, increase access to the internet and devices, and create a system where formal education supports innovation are steps in the right direction. However, the connection between those policies and digital skills development is implicit and not measured. Indeed, progress on Vision 2030 and associated policies is measured

against outcome indicators, none of which assess digital skills. No indicators in Vision 2030 relate to improvement in digital literacy, integration of ICT into learning, or the development of a highly skilled workforce for ICT and innovation. Progress toward these strategies is therefore not measured in the medium-term socioeconomic frameworks that monitor the implementation and progress of Vision 2030. The most recent framework, which reported on the achievements up to 2018, referred only to the revision of curricula to integrate STEAM [science, technology, engineering, arts, and math] into TVET offerings as an achievement.[10] To the extent that the ST&I policy does not yet have an implementation plan, it is unclear whether or how it will measure improvements in digital skills. The ICT in Education Policy's Master Plan also does not include indicators to monitor digital skills development, but it does plan to measure access to online learning opportunities and the use of ICT in teaching and learning by students and teachers.[11] Jamaica does not have a digital skills action plan or strategy, framework, or standardized assessment. All of these instruments could include more concrete measures and goals specifically focused on digital skills.

The involvement of various government agencies in digital skills promotion seems fragmented. The 2019 ST&I policy highlights difficulties with governance and coordination as one of the challenges that Jamaica has faced in implementing ST&I initiatives. The policy's reference to "independent ST&I-related agendas" across government agencies that lead to "the duplication of efforts to a significant degree"[12] rings true for the education and training sector. Despite the creation of the National Commission on Science and Technology to address this issue, underfunding and short staffing have prevented the agency from fulfilling its mandate to date.[13] Although most stakeholders recognize the MSETT's leading role in ST&I policy and thus in digital skills development, the deference appears to be constrained to policy formulation. Coordination mechanisms around digital skills interventions between the MSETT, MOEY, HEART/NSTA, MLSS, JAMPRO, and public universities are informal at best and often reliant on personal relationships. As such, collaboration is temporary, program specific, and rarely inclusive of all actors. The sporadic sharing of information across stakeholders leads to duplication of efforts and a divided vision of the digital skills development landscape and goals.

Teaching digital skills in Jamaica does not follow a framework that is commonly recognized, accepted, and used. Digital skills frameworks offer clarity and alignment on digital competencies. They can 1) guide cohesive digital skills development and measurement across multiple education levels, 2) enable learners to develop relevant and articulated digital skills and achieve credentials to access job and education opportunities, and 3) help employers define, acquire, and nurture the digital talent they need. To achieve these functions, digital skills frameworks must be commonly recognized and used across education levels, which is not the case in Jamaica. The National Standards Curriculum (NSC), which integrated STEM as a teaching methodology for all subject areas offered in grades 1–9, includes attainment targets for digital skills that were designed using the standards put forth by the International Society for Technology in Education (ISTE).[14] In place since 2016 when the NSC was launched, those attainment targets inform the delivery of the curriculum but are not evaluated (see Annex 5 for a summary of the NSC's attainment targets). Starting in grade 7 students take stand-alone ICT classes that do not use the ISTE as a framework but rather align themselves with the skills that students must have mastered by the end of grade 9 to initiate their preparation for school-leaving exams in subsequent grades. Digital skills development in grades 10–13 varies depending on the path chosen by the student and therefore does not follow a common framework. The same is true for post-secondary and tertiary education and training.[15]

Digital skills are integrated into some sectors of the national qualifications framework (NQF-J), but they are not harmonized or codified in a national system. Housed under the Jamaica Tertiary Education Commission (JTEC), the NQF-J is organized into five sectors: general education, technical and vocational education, occupational degrees, tertiary education, and lifelong learning (see Annex 6). The extent to which digital skills are integrated into the NQF-J is unclear as each sector has its own dynamic. The qualifications required to obtain general education certificates under the general education sector are vague, and officials are not able to determine whether digital skills are integrated into them. Competency standards and qualifications for programs delivered by the technical and vocational education, occupational, and tertiary education sectors include digital skills based on occupational or professional requirements, but they do not conform to a common framework for digital skills. The system to recognize prior non-formal and informal learning under the lifelong learning sector does not yet have a path to assess skills and codify them into qualifications. The effect of the integration of digital skills into the NQF-J is likely to be minimal for two main reasons: 1) the JTEC has yet to be established by law and its role is unclear, impeding its regulatory functions and ability to enforce policy, and 2) higher education institutions and employers do not recognize the NQF-J as a common framework to understand skills and qualifications or to support alternative learning pathways.[16]

The Broadcasting Commission is currently working toward the development of a digital skills framework. The agency announced in August 2021 its intention to establish a digital literacy skills framework for Jamaica, with a focus on tackling misinformation in digital media and promoting a critical and ethical use of digital information. A year later, the agency's Digital Media and Information Literacy framework has gone far beyond its initial goal. In partnership with the Mona School of Business and Management of the University of the West Indies, it has set a national digital skills baseline and benchmarks, created a digital competency model for Jamaica using UNESCO's Digital Literacy Skills Framework, designed a standardized digital skills assessment tool to be used in education and employment settings, and devised strategies and policy implementation mechanisms.[17] As of late 2022, the different pieces of the Commission's effort were being discussed with multiple stakeholders to gain feedback and to explore a path forward for its implementation.

Measuring the impact of policies

The effect of measures to integrate ICT into education and training is yet to be evaluated. The integration of ICT into the NSC in 2016 and the subsequent ICT in Education Policy seek to modernize the learning experience and to develop digital skills among children. However, the extent to which ICT has been integrated into the classroom and its effect on students' digital skills are unknown. According to the Jamaica Education Transformation Commission,[18] reviews of the implementation of the NSC since its 2017 pilot have not followed a robust methodology, so it is impossible to determine whether and how teachers have used technology in the classroom. Information on students' digital skills up to grade 9 is non-existent, though student performance on the Caribbean Secondary Education Certificates (colloquially known as CXCs or CSECs) offers some, albeit imprecise, insight into high school graduates' digital skills.[19] Despite the widely publicized efforts to distribute devices and improve connectivity in schools by eLearning Jamaica, the USF, and the National Education Trust, there is no evaluation of the effect of these efforts on the use of technology in the learning process, let alone in digital skills development. On the contrary, the lack of access to devices and poor to no connectivity are consistently raised by stakeholders as the main challenges to fostering digital skills in Jamaica.

Data on key elements of the digital skills landscape are scarce. Information on what digital skills are, the career paths they lead to, and available training and education opportunities in the country is not available. This information is not only useful for students to explore and pursue ICT careers but crucial for workers and employers looking to understand where and how to upskill to keep abreast with technological change. Indeed, informants in the private sector suggested that the lack of information in this regard is an important challenge for most SMEs in supporting employee upskilling. In addition, there is no data available on the current digital skills among Jamaican students and workers. The first attempt to take a snapshot was conducted by the Broadcasting Commission under the initiative to create the Digital Media and Literacy Framework, but it is not yet publicly available. Data on digital skills demand can be drawn from the labor market intelligence publications of HEART/NSTA and the MLSS, which offer useful snapshots. Both institutions have labor market information system webpages with the potential of offering more regularly updated data on digital skills demand, but both websites are only partially functional.[20]

Digital skills development is hampered by several inequality dimensions. Unlike in most of the world, in Jamaica it is boys and men who are at a disadvantage when it comes to educational attainment. To the extent that basic literacy and numeracy are foundational for the development of digital skills, lower education outcomes among men impede their engagement in digital skills development initiatives. Poverty is also a significant obstacle to the development of digital skills. Experts characterize the delivery of formal education in Jamaica as done by "two extremely different school systems, one that is world-class and serves mainly the 'Haves,' and other, pertaining to the vast majority, that serves the 'Have-Nots' and it is largely failing."[22] Given that the availability of equipment, connectivity, and stand-alone IT classes is more likely to exist in private and high-performing public schools, children and youth from low-income families have more limited (if any) access to both formal or self-guided digital skills learning opportunities in the formal education system. These limitations are particularly acute in rural areas, where officials argue that government connectivity initiatives have been hampered by topography-related challenges.[23] The perception that digital skills are needed only for youth and young adults (under 35) creates cultural and de facto limitations to the engagement of older adults in digital skills training.

Supply of digital skills

To understand the forces at play in the supply of digital skills, it is important to recognize the structure and size of Jamaica's formal education system. As of 2019, the Jamaican education system provided services to around 570,000 students across four levels: early childhood (16 percent), primary (39 percent), secondary (37 percent), and tertiary (7 percent).[24]

- Early childhood education enrolls children between 3 and 5 years old and it is not compulsory.
- Primary education is compulsory and enrolls children aged 6–11 in grades 1–6. Students in grade 6 sit the Primary Exit Profile exam; test scores are used for secondary school placement.
- Secondary education is compulsory and organized into two cycles. The first is for students aged 12–14 in grades 7–9. The second cycle enrolls students aged 15–16 in grades 10–11 and is geared toward preparing students for the standardized exam of their choosing.[25] As of 2022, students had to continue on to grades 12 and 13 to further prepare for tertiary education or pursue associate degrees.[26]
- Tertiary education is not compulsory and is offered to those who have completed secondary education and have achieved CXCs or CSECs in at least five subjects.[27]

Existing workforce

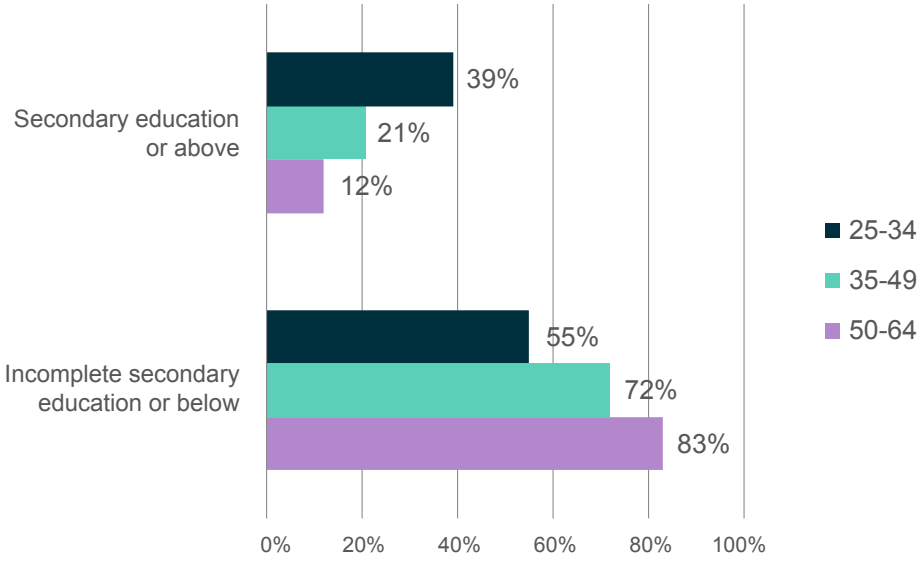
a. Snapshot of current supply

Digital skills among most of the existing workforce are likely to be basic. For the most part, the education of Jamaica's current workforce is at the secondary level. The Jamaica Survey of Living Conditions offers a glimpse into the educational level of the working population through data on the highest examination passed. As of 2019, according to an analysis of the Survey, only about 35 percent of the prime working-age population (25–54 years) had an academic certification of any kind.[28] In the same year, the average years of schooling stood at 13. This apparent contradiction speaks to a system that makes high school leaving certifications unattainable for many high school graduates.[29] Around 12 percent of Jamaicans between 24 and 64 years old had a certified general secondary education, 6 percent had a certificate, diploma, or associate degree, and 13 percent had a tertiary education degree. As illustrated below, the educational attainment of Jamaica's workforce has improved over the years. While 83 percent of those aged 50–64 have incomplete secondary education or below, 55 percent of those aged 25–34 are in this category. Given that most Jamaicans join the workforce after high school and that the integration of technology into primary and secondary education curricula dates to 2016, current workers are likely to have learned digital skills informally. Those skills are also likely used for consumption of digital content, access to digital services, or performance of basic tasks at work. Indeed, the ITU estimates that less than 40 percent of the Jamaican population has basic ICT skills, less than 20 percent have standard ICT skills, and less than 10 percent have advanced skills.[30]

The Jamaican TVET system has contributed to an increased supply of intermediate digital skills among the young workforce. In 2021, HEART/NSTA enrolled 11,095 students in ICT training programs and produced 3,750 certified graduates. Adding the certified graduates in 2021 to the almost 11,000 HEART/NSTA graduates from ICT training programs between 2017 and 2020, the institution may have contributed almost 15,000 young workers with intermediate digital skills to the Jamaican workforce. It is possible that HEART/NSTA also develops basic digital skills among students in non-ICT programs, which would increase their contribution to a digitally literate workforce even further. However, it is difficult to estimate to what extent it does so with the available data.

There are not enough workers with advanced and highly specialized digital skills to meet the country's needs. The limited availability of advanced and highly specialized digital skills in Jamaica is a common concern among employers and government officials.[32] Assuming that these types of skills are developed at university-level programs, this concern is substantiated by the fact that only about 13 percent of the current Jamaican workforce has completed a higher education degree.[33] Reasons that contribute to this scarcity include 1) overall low literacy and numeracy skills, which are foundational to acquiring digital skills at any level,[34] 2) low enrollment in higher education programs, with an estimated enrollment rate of 27 percent,[35] and 3) emigration, which takes place predominantly among the most educated.[36] Beyond enrollment, the quality of tertiary education programs appears to have room for improvement. The most recent data on the availability of digital skills show that, out of approximately 15,000 tertiary education graduates in 2016, only around 670 (or 4 percent) excelled in computing.[37] Employers complain that tertiary education graduates are not prepared to enter the world of work, and graduates themselves argue that higher education institutions do not prepare them adequately on what to

Figure 6.2. Educational Attainment of Jamaicans between 24 and 64 years old, by age group



Source: Author with data from: Planning Institute of Jamaica, 2019. "Jamaica Survey of Living Conditions."[31]

expect in the job market, provide highly theoretical content with little opportunity for practical experience, and offer programs that are outdated, not relevant, and grounded in the regurgitation of content.[39]

b. Rapid skilling programs

Multiple stakeholders have initiatives to develop basic and specialized digital skills, primarily catered to youth. In the private sector, they include major companies, such as Flow, the NCB, Microsoft, Digicel, and the Amber Group. Multilateral partners include the Inter-American Development Bank (IDB) and the World Bank. In some cases, skills development initiatives are carried out in partnership with government agencies, most notably HEART/NSTA, the MOEY, and JAMPRO. Other active government agencies in digital skills development include the USF and public universities such as the University of West Indies (UWI). Initiatives vary widely in terms of the target population, skill level, and scope. Some target high school students, others focus on ages 17–34 regardless of their activity, and others seek to support unemployed and underemployed youth. In terms of skill levels, initiatives like UWI's Caribbean School of Data focus on basic digital literacy, while initiatives like the World Bank's seek to upskill developers. Beneficiaries range from around 100 in NCB's initiative to an estimated 155,000 in Microsoft's skills development program. (See Annex 7 for a summary of rapid skilling initiatives.)

Initiatives claim to grant certificates, but it is unclear whether they are all formally recognized. Rapid skilling initiatives that partner with institutions authorized to issue formal qualifications, such as HEART/NSTA and registered education and training providers, offer successful trainees a credential that is recognized by employers and the formal education system. There are multiple opportunities for short-term digital skills training that only grant certificates of completion that do not lead to a formal qualification. The extent to which these opportunities enhance job placement is unclear as some employers may recognize certifications that are popular but not formal (e.g., Google Analytics or AWS Certified Cloud Practitioner), but private sector stakeholders argue that most employers (and thus students) prefer formal qualifications.

Mechanisms to assure the quality of private short-term training on digital skills are unclear. The increased offerings of short-term digital skills training can help address affordability, access, and skills gap challenges. However, the quality assurance mechanisms are unclear. Controls traditionally exercised through registration and accreditation of providers and programs seem to be easily bypassed as there are unregistered providers currently operating without constraint. Controls associated with the awarding of credentials also fall short as these providers issue certificates of completion that are not aligned with the formal education credential structure.

The hope is that market forces reward the highest quality programs, but the knowledge acquired by students who invest in these short-term digital skills courses may not be recognized for employment or further education opportunities. This would not be the case if there were a functioning system for the recognition and assessment of learning in non-formal and informal settings, but this is an area still in development in Jamaica.

Opportunities for the development of digital skills for the current workforce are limited. Most of the rapid skilling initiatives found in this assessment are targeted at youth. Programs that do not have an explicit target find that most of the participants are below 34 years old. Public funding for initiatives to upskill the current and older workforce is scarce. According to the latest data available, as of 2018, more than 75 percent of adults between 25 and 64 reported not having engaged in skills training programs in the past year, about 10 percent had received training at HEART/NSTA, and about 4 percent had received private training.[40] Although stakeholders agree that most digital skills programs focus on youth, they also highlight that businesses that have gone or are going through a digital transformation are either actively engaged or interested in upskilling their workers. This is the case in larger companies and specific sectors, such as BPO, financial and telecommunications services, logistics, and creative industries.[41] Smaller companies in these and other sectors struggle to understand how to best support the digital upskilling of their employees.

c. Digital skills pipeline

If government efforts to integrate ICT into the classroom continue, the development of basic digital skills in primary and secondary schools should continue to improve. Although government support for the integration of technology into basic education had started before COVID-19, the crisis accelerated the pace. Efforts to grant internet access, distribute devices, set up learning management platforms, and provide training to teachers were at the center of the emergency response and have shown the promises and limitations of a more technology-heavy learning experience. Government officials anticipate significant investments in technology within the next two years to address the challenges and capitalize on the opportunities that the COVID-19 crisis put forth. However, although the effect of these investments on digital skills development in Jamaica is assumed to be positive, it is largely unknown.

HEART/NSTA is expected to continue supporting the development of workers with intermediate digital skills. Assuming that the completion rate of 35 percent across HEART/NSTA's ICT programs is held by current students and that the program takes two years to complete, HEART/NSTA will certify more than 7,000 ICT graduates in the next two years. The agency reports having made investments in 2021 to increase and improve connectivity in 32 training institutions and plans to establish a center of excellence for agriculture and manufacturing that will offer ICT-intensive programs, such as robotics and geospatial services.[43] HEART/NSTA's engagement in digital literacy training[44] and partnerships with companies, such as CISCO, Digicel, and Seprod, to develop digital skills at different levels should further increase the number of workers prepared to use digital technologies at work.

Although advanced and highly specialized digital skills are currently limited, the tertiary education system offers opportunities to develop them. According to records from the University Council of Jamaica, there are 51 registered tertiary education institutions in the country, 65 percent of which are private. Eleven of these institutions offer accredited programs on advanced and highly specialized digital skills. They include computer science, management information systems, data science, information technology, cybersecurity, and software engineering. Out of 83 programs of this kind, 26 are at the certification level, 15 at the associate degree level, and 42 at the undergraduate level or above.[45] Most advanced programs are offered by universities, predominantly the UWI, the University of Technology, and the Northern Caribbean University.

However, opportunities for specialized digital skills at the tertiary education level are out of reach for most. The enrollment rate in secondary school is 82 percent, but in tertiary education it is 27 percent. Several factors place tertiary education out of reach for the majority. First, an education system that appears to reserve the best quality educational opportunities for high performers and to limit the chances of success of the rest.[46] Second, high-stakes examinations that are unaffordable to many can act as an insurmountable barrier to pursuing tertiary education.[47] Third, the financial cost of ICT-related degrees, with tuition fees that vary from US$2,500 to US$35,000 per program, are likely to be unaffordable to many, given that the annual salary in Jamaica is approximately US$7,000.[49] The effect of this situation on the development of advanced and highly specialized digital skills can be exacerbated by the long-established orientation of Jamaicans toward business management, law, medicine, and traditional engineering degrees.

d. Other factors that challenge digital skills supply

Despite widespread access to basic education, individuals do not gain basic competencies in school that are essential to developing digital skills. A 2021 analysis of standardized test scores showed that, despite continued improved performance over the past decade, only about half of Jamaica's students meet the

minimum literacy skills, and a little over one-third meet the minimum numeracy skills.[50] Given that about 70 percent of eligible students sit the standardized high school test, the share of individuals with basic literacy and numeracy skills can be below what test scores show. The World Bank estimates that the 11 years of schooling that Jamaicans go through yield learning outcomes equivalent to only seven years of schooling in a country with an optimal quality of learning.[51] Low education quality affects workforce productivity: "a child born in Jamaica today will be 53 percent as productive when they grow up as they could be if they enjoyed complete education and full health."[52]

Support for teachers to develop and use digital skills in the classroom appears to be insufficient. Jamaica's approach to developing digital skills in basic education through the integration of ICT into all subject matters, as opposed to stand-alone ICT classes, requires important investment in teacher training to 1) address teacher apathy and reluctance to integrate technology into their practice, 2) build teachers' digital skills and knowledge of new technologies, and 3) train them on pedagogical skills that apply new teaching approaches and digital tools.[53] Officials recognize that capacity building for teachers must be a priority and with that in mind, in 2017, the MOEY partnered with UNESCO to develop an ICT Competency Framework for Teacher Education. The Framework has been piloted in two teacher training institutions, but there is limited information on its implementation, use, or outcomes. Digital skills development opportunities for teachers are available pre-service, in teachers' colleges such as the Mico University College,[54] and in-service through multiple partnerships with the Jamaica Teachers' Association or stand-alone initiatives led by development partners and private sector foundations (see Annex 7).

Despite teacher training being a priority, most believe that the lack of teacher capacity still poses a significant challenge to advancing digital skills in the country. In addition to a critical shortage of quality teachers in STEM subjects,[55] current teachers have faced difficulties in integrating the new methods and technologies needed to effectively implement the NSC. These include the low awareness of NSC's STEM-infused approach to teaching, insufficient mastery of and discomfort with new skills, classroom time constraints, poor internet access, and a lack of digital tools.[56] Teacher participation in training has also been challenging. Stakeholders with close knowledge of in-service teacher training initiatives explain that they are often cut short due to teachers' competing priorities, scheduling challenges, and personal time constraints. Incentives for upskilling in this field are limited as professional development of teachers is not mandatory or linked to the renewal of teacher licenses or professional advancement.[57]

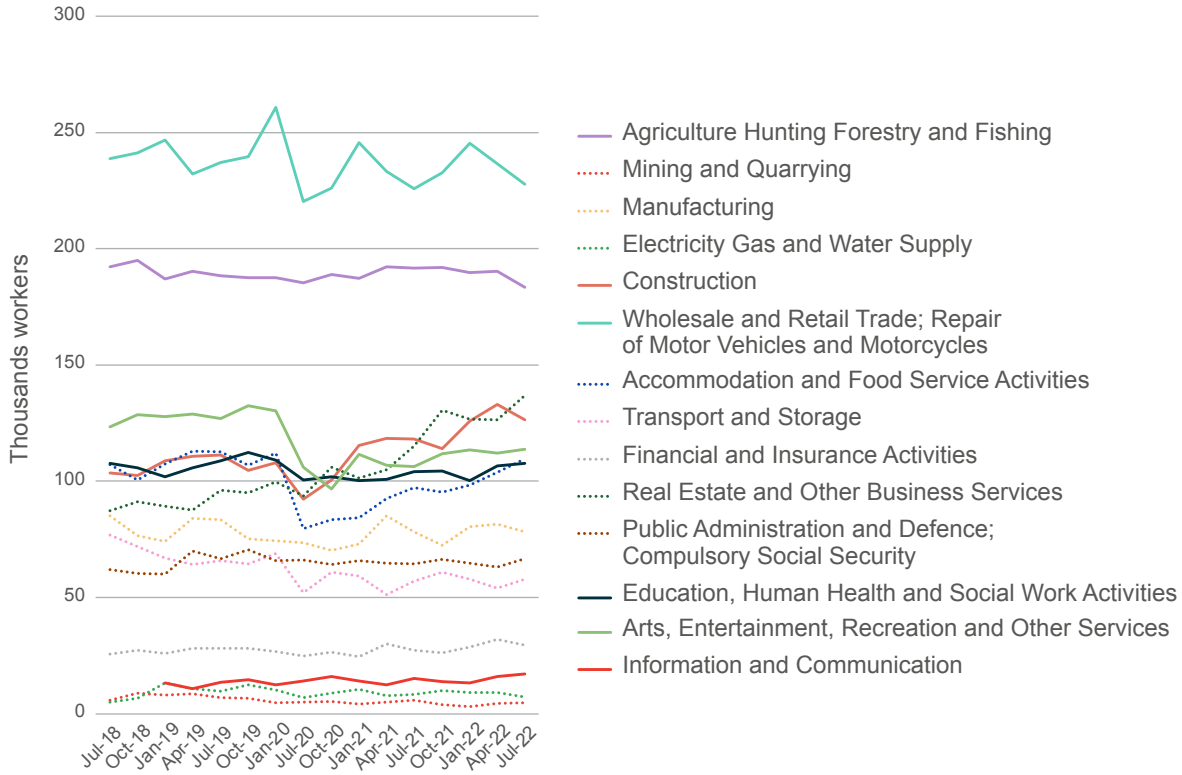
The lack of connectivity and access to devices is a persistent challenge. Despite the existence of two agencies dedicated to enhancing connectivity and access to technology for educational purposes (USF and eLearning Jamaica, respectively), government officials estimate that half of students do not have devices and 50–60 percent did not attend online classes during COVID-19 due to the lack of connectivity, particularly in rural areas.[58] A survey on ICT infrastructure in schools shows a similar picture: 69 percent of school representatives find it inadequate, and an additional 18 percent find it obsolete.[59] There are disparities in both connectivity and access to devices that place private and reputable public secondary schools in a privileged position.[60] Informants explain that the apparent discrepancy between the seemingly constant government investment in this area and the perceived lack of access is due to the limitations of distributed devices and broadband to support learning activities. (For a more detailed discussion on digital infrastructure in general, see Chapter 2.) The absence of a strategy to support these investments, including learning plans, the demand for capacity development for teachers, students, and parents, and the need for more equitable distribution are other challenges that informants argue have limited the impact of efforts in this area.

Demand for digital skills

Currently, the largest sectors in terms of employment are not technology intensive. As of July 2022, half of the Jamaican workforce was employed in one of the following sectors: wholesale and retail (18 percent), agriculture and fishing (14.5 percent), real estate (10.8 percent), and construction (10 percent) (see Figure 6.3.).[61] This suggests that the largest share of the demand for digital skills is likely to focus on basic and intermediate skills among businesses in the sectors that have invested in optimizing operations through the use of technology. At 17,000 workers as of July 2022 (1.3 percent of the total workforce), the ICT sector is among the smallest employers in Jamaica, though it is the second-fastest growing.

However, the demand for digital skills at all levels currently surpasses supply, and it will continue to grow. The need to avoid in-person interactions during the COVID-19 crisis gave impetus to the integration of technology into the operations of Jamaican businesses of all sizes and sectors. As a result, the demand for workers with different levels of digital skills is expected to grow. A recent study found a shared preoccupation among government officials and businesspeople with

Figure 6.3. Number of Jamaican Workers, by economic sector



Source: Author, with data from STATIN.

the limited availability of qualified IT professionals in Jamaica, and the resulting inability to sustain and enhance the digital transformation of public services and private business operations.[62] Informants from the private sector also expressed the need for digital skills among the general population to support businesses' digitalization efforts. They explained that some firms that have gone digital have seen little return on their investment as there has been no uptake of the digital services and products offered, while the demand for them in physical locations has remained constant or grown.

Emerging and growing subsectors are expected to increase the demand for advanced or specialized digital skills. HEART/NSTA's 2021 skills demand study, which uses employer surveys and interviews, identified digitalization, automation, and e-commerce as some of the main drivers of change in the demand for skills. The study identified 48 skills that employers consider necessary to increase productivity, half of which are intermediate to highly specialized digital skills (see Annex 8). According to the MLSS, which uses vacancy data, the digitalization of work catapulted by COVID-19 increased the demand for advanced and highly specialized skills, such as data analysts, digital marketers, IT user support technicians, developers, database and network professionals, and information security analysts.[63] The MLSS's analysis of job openings in the past four years shows that emerging and growing subsectors, such as knowledge process outsourcing, cybersecurity, creative industries, and manufacturing, have increased job opportunities for sector-specific advanced and highly specialized skills (see Annex 9).[64] An example is the BPO and ITO services industry, which has been growing since the late 2010s and requires adequate digital skills to support its development (more in Chapter 5).

The demand for digital skills in the public sector is bound to increase as ongoing initiatives to modernize procedures and the delivery of citizen services advance. The integration of ICT into education delivery and administration has raised the need for teachers and school leaders, most of whom are public sector employees, to develop or improve their digital skills. Beyond the education sector, the GOJ has partnered with IDB to bring a digital transformation to national security, identification systems, and the delivery of public services.[65] All of these initiatives will require important upskilling of civil servants to re-position human capital in new areas of work and effectively integrate new technologies into daily operations. Although there is no precise estimate of the increase in digital skills demand, IDB studies in other countries found that about half of civil servants have jobs with a high or medium automation potential and hence need upskilling.[66]

Table 6.1. Digital Skills: Key Challenges and Opportunities

Strengths	Areas for Improvement
» Jamaica Vision 2030, which recognizes the importance of human capital to support the country's transition to a knowledge economy » An established national qualifications framework » HEART/NSTA's partnerships with employers to develop digital skills among youth » Vibrant market for provision of short-term digital skills training	» Absence of a digital skills framework that is commonly recognized, accepted, and used » Lack of indicators to assess the impact of current initiatives and policies on digital skills development » Fragmentation of interventions spearheaded by various government agencies » Lack of consolidated and curated information on available digital skills development opportunities and credentials » No recognition of prior learning systems for digital skills and ICT professions » Inadequate quality assurance of short-term training digital skills programs » Low access to digital skills training opportunities for prime-aged workers
Opportunities	**Challenges**
» Initiatives in place to enable digital skills development (i.e. integration of ICT into NSC, device distribution, internet access) » Policies in place to enable digital skills development and further Vision 2030 (i.e., National ST&I Policy, ICT in Education Policy) » Active engagement of multiple government agencies in digital skills promotion » Development of a digital skills framework by the Broadcasting Commission	» Absence of digital skills baseline data » Limited to no information on implementation, challenges, impact, or effect on digital skills of important investments on teacher ICT training, device distribution, and access to internet » Rural-urban divide in the delivery of education quality, access to devices, and connectivity. » Low enrollment in higher education » Low numeracy and literacy proficiency » Limited incentives for teacher upskilling

Source: Authors' elaboration.

6.3. Recommendations: Creating a national digital skills strategy to improve coordination around a shared vision

Improve coordination around a shared vision for digital skills development in Jamaica. The vibrant engagement in digital skills development of public and private stakeholders suggests a shared understanding of their importance and a commitment to act on it. However positive, uncoordinated action leads to inefficiencies and slows down progress. The creation of a national digital skills strategy can help address this issue. Uruguay offers an interesting example of coordinated and strategic actions around government support for digital skills development. Since 2010 the country has put forth a strategic vision for the integration of technology and education under the Plan Ceibal. More than a decade later, the country has continued to promote the use of innovative technologies in education and built an information hub where education practitioners can access support resources and knowledge.[67]

The ITU offers a sample roadmap to develop national digital skills strategies:[68]

Table 6.2. ITU's Sample Roadmap to Develop National Digital Skills Strategies (1 of 2)

ITU Roadmap		Considerations for Implementation in Jamaica	Potential Sector Lead
Actions	**Tasks**		
Engage stakeholders	Use a formal coordination body, such as a coalition, council, or task force.	**Government and private actors are interested and active. Coordination body could start with:** MSET, E-learning Jamaica, USF, MOEY, MLSS, HEART/NSTA, JAMPRO, Private Sector Organization of Jamaica, Broadcasting Commission, JTEC, University Council of Jamaica, major universities (UWI, Utech, Mico College), Jamaica Teacher's Association, National Council on TVET, private short-term training providers' representative, development partners (IDB, British Council, UNICEF, UNESCO, Caribbean Community and Common Market, World Bank), large firms' foundations (Microsoft, Google, Flow, NCB, Amber Group).	Government agency with the mandate, understanding, and vision for digital skills and cross-agency implementation capacity
	Analyze stakeholders' strengths and weaknesses and identify their role.	» Most stakeholders have clear priorities, but some have overlapping roles. » Some stakeholders have a mandate that requires their action in digital skills but are inactive, while others without this mandate are active. » MSET is currently carrying out an ST&I landscape assessment that could help inform this task.	
	Agree on governance and working methods.	Challenges may arise, given the duplication of roles and lack of a clear leader.	
Set digital skills development goals	Define the main categories of digital skills that the strategy will develop.	Stakeholders have yet to agree on what digital skills are. The work put forth by the Jamaican Digital Media and Literacy Framework can offer a common definition and understanding.	Government agency with mandate to monitor Vision 2030
Identify supporting policies	Inventory existing policies and analyze how they can be used to support the goals of the digital strategy.	» Vision 2030 (Goals 1 and 3) and the National ST&I Policy (Goal 4) offer an important reference point. » The ICT in Education Policy offers insight on the national approach to digital skills development.	Government agency with mandate to lead inter-ministerial coordination

Table 6.2. ITU's Sample Roadmap to Develop National Digital Skills Strategies (2 of 2)

ITU Roadmap		Considerations for Implementation in Jamaica	Potential Sector Lead
Actions	**Tasks**		
Identify supporting data	Identify current and future trends that can affect digital skills.	» An analysis of advanced countries in the digital skills realm found that infrastructure and business digitalization[69] are important engines for the development of digital skills. Indicators in these and other important non-sectoral factors should inform the strategy. » Multiple agencies have carried out work that could provide useful context: » Sectoral analyses by JAMPRO and the British Council » Labor market trends research by MLSS » Sectoral skills needs analyses by HEART/NSTA, Jamaica Employers' Federation, and Private Sector Organization of Jamaica (in the planning stage) » It is important to identify policy gaps to be addressed by the national digital skills strategy.	Public or private agency most actively collecting data and analyzing labor market trends
Prepare a national digital skills strategy draft	The strategy should specify at a minimum: » Skills targets across formal and non-formal education » Baselines, benchmarks » Priorities, challenges » Implementation roles, timelines, and budget » Progress and outcome indicators, monitoring, evaluation, and learning, and accountability measures	The work put forth by the Jamaican Digital Media and Literacy Framework can offer a starting point.	Government agency with the mandate, understanding, and vision for digital skills and cross-agency implementation capacity
Gather feedback, finalize and launch the strategy			Digital skills coordinating body

The implementation of a national digital skills strategy should incorporate lessons from previous efforts to integrate ICT and education. Assessments of digital skills policies in advanced countries find three common elements that have been present across Jamaican policies for years: investment in technological infrastructure in education institutions, ICT training for teachers, and integration of digital technology into the curricula.[70] Yet, the implementation results and outcomes of interventions in these areas are still largely unknown. Ideally, the strategy should be informed by detailed data on activity results, implementation arrangements, challenges, and assessments of the effect of current efforts on student learning. At a minimum, the strategy should include and enforce robust mechanisms for monitoring, evaluation, and adaptation to start collecting and using such important data. The latter is crucial for success as the strategy should be updated regularly to keep pace with the constant emergence of new technologies, their transformative impact on the economy and society, and their effect on the understanding and prioritization of digital skills. Singapore, for example, updates its ICT master plans for education every five years.[71] Uruguay also revises and updates the Plan Ceibal regularly.

Regardless of the development of a national digital skills strategy, the Jamaican landscape for digital skills development would benefit from improvements in the following areas:

» **Digital skills measurement:** In an era of evidence-based policy making, the absence of data on the digital skills of Jamaican students and workers is a significant hindrance to the design of appropriate policies and interventions. Stakeholders involved in the development of the Digital Media and Information Literacy Framework conducted a nationwide survey on digital skills to establish a baseline and created a digital skills self-assessment tool that would allow members of the public to determine their skill levels. Although the awareness of the need for such data is positive, the methodology and results of these exercises were unknown as of late 2022. There are multiple approaches to assessing digital skills, including self-reported, knowledge-based, and performance-based assessments.[72] Self-reported assessments, which ask individuals to evaluate their knowledge/skills, are the least costly to create, deploy, and score but have limitations, as individuals rarely gauge their skills accurately. Examples include Europe's "MyDigiSkills" and its "Digital Skills Assessment Tool." Knowledge-based assessments, which measure individuals' declarative and procedural knowledge, are also widely used. LinkedIn's Skill Assessments is an example of a knowledge-based tool. Performance-based assessments, where individuals are observed while performing real-life problems, are more costly but also more accurate. Given that they allow for cross-country comparisons and benchmarking, the performance-based approach is used by international assessments, such as the Program for the International Assessment of Adult Competencies (PIACC), International Computer and Information Literacy Study (ICILS), and the Program for International Student Assessment (PISA). Regardless of the assessment method chosen, it must be aligned with the national framework for digital skills. The ITU's Digital Assessment Guidebook[73] offers detailed and practical advice on how to undertake national digital skills assessments.

» **Monitoring and evaluation of key measures.** Publicly available information suggests that the government has invested heavily over the years in 1) developing the capacity of teachers to integrate ICT into the classroom, 2) granting access to broadband and digital equipment to schools and students, and 3) during the COVID crisis, facilitating online learning. However, challenges such as low supply of teachers with ICT skills, inadequate digital infrastructure, and lack of learning channels, continue to be perceived as the main roadblocks to digital skills development, without monitoring and/or evaluation data that can prove otherwise:

- ***Teacher digital skills training:*** Multiple informants reported that they have partnered with the Jamaica Teachers' Association to provide digital skills training, but no information on program implementation or effect is available. Requirements for the sustained and reliable collection of basic information about trained teachers (names, subject areas, schools), training program completion rates, teacher performance, or post-training competencies could offer a useful, albeit limited, indication of progress. The establishment of process evaluation requirements to understand implementation arrangements, challenges, and adaptations would offer invaluable insight to recalibrate future offerings. Investment in independent evaluations to determine if and how teachers incorporate ICT into the classroom and its effect on student learning is critical to informing revisions to the current approach to digital skills development in primary and middle schools. In addition to program evaluations, interventions to upskill Jamaican teachers could benefit from international experiences, such as Argentina's Educ.ar, Uruguay's Plan Ceibal, or Colombia's Co-Lab platforms, which offer a wide range of online classes and pedagogical resources for teachers to incorporate ICT into their practice across subject matters.

- ***Access to broadband and digital equipment:*** The USF and e-Learning Jamaica produce annual activity reports with basic figures on improved connectivity and device distribution. However, those reports provide little detail on the quality and capacity of equipment and broadband to sustain regular learning activities, limitations that lead most stakeholders to maintain that students still do not have access to the right technology. Requirements for more robust, detailed, and regular information on the delivery of both equipment and broadband could offer insight into technical areas of improvement. Investment in evaluations on the use of these elements in educational settings would offer information on important factors, such as technical needs, required support, and capacity building, as well as other challenges. The most recent evaluation of this type dates to 2015. Given that connectivity and the use of ICT in education is particularly challenging in Jamaica's rural areas, the country could explore regional experiences on the integration of ICT in education in these contexts, such as community-based solutions to promote digital skills in Argentina, Paraguay and

Bolivia, or Microsoft's partnerships in Colombia and Mexico to provide digital skills training in rural communities.

- ***Online learning:*** After the COVID-19 crisis, policy recommendations were raised to "facilitate the integration and development of blended learning to ease the demand for additional teachers and classrooms," as well as to use online learning to facilitate teacher access to professional development opportunities. Although the exploration of alternatives to address these constraints is positive, the impact of online education on the learning outcomes of the lucky Jamaican students who have access to it is largely unknown. Measures to permanently incorporate online learning into the education system should be carefully studied and supported by evidence on the impact of remote education on the already precarious learning outcomes of Jamaican students. Regional examples of such evaluations include Argentina and the collection of data from 5,000 schools, 25,000 teachers, and almost 3,000 households to evaluate their emergency education response to COVID and inform pedagogical approach adjustments and return-to-school plans. The United States conducted multiple research studies to assess the effect of remote schooling on learning outcomes, many of which found drastic falls in numeracy and literacy, particularly among the most vulnerable children.[76]

» **ICT stand-alone classes from early education.** Research on the education practices among leading countries in international digital skills assessments suggests that "early acquaintance with IT leads to better skills."[77] This is particularly the case when students use the computer interactively (e.g., to prepare homework) as opposed to passively (e.g., to access online information only). The same study reports that "one additional year of computer experience is associated, on average, with a nine-point increase in digital literacy." Jamaican informants explained that the NSC is designed to integrate ICT into teaching, but children do not receive stand-alone ICT classes until grade 7. Given the challenges in developing the capacity of teachers and granting individual access to technological devices, it is difficult to imagine that children before grade 7 are given the exposure to digital devices as repeatedly and interactively as the study suggests is needed to develop digital skills. Some may have sporadic access to ICT lessons through initiatives like "The Hour of Code," which offers coding workshops to primary school students. The introduction of stand-alone ICT classes in primary school could complement the NSC to offer students more recurrent exposure to technology. The curriculum of such classes can be ambitious. In 2018, the United Kingdom introduced a coding program for ages 5–14 that teaches kindergarteners "the notion of algorithms, creation and debugging of simple programs, and how to use computers to create, organize, store, manipulate and recover digital content."[78]

» **Prior learning assessment and recognition.** The development of digital skills is uniquely fit for non-formal and informal education. Self-paced online tutorials and courses, online company-issued certification programs, and in-person short training programs are only a few of the many avenues available to becoming digitally savvy. Although informants believe that formal education and nationally recognized credentials are still important to secure employment, companies have begun to discuss the need to focus on skills instead of diplomas to recruit talent. A robust mechanism to assess and recognize the digital skills developed by individuals through alternative means is bound to be the backbone of an agile education system that can keep abreast with technological change and produce the talent that businesses need. The vision of JTEC is aligned with this reality when it emphasizes the need to make learning pathways more flexible and to introduce micro-credentials and stackable degrees in Jamaica.[79]

» **Workforce and citizen upskilling.** Digital skills among the current workforce, and adults in general, are a key factor for economic competitiveness. Most digital skills interventions in Jamaica focus on individuals 34 and younger, which leaves out an important proportion of the population who are part of the workforce, potential customers for digital businesses, and citizens deserving of reaping the benefits of the digitalization of public services. Advanced systems invest in the development of digital skills for all through different mechanisms.[80] Denmark integrates employee training into its labor market policies to maintain employability and competitiveness. New Zealand, Sweden, and Singapore channel them through digital skills bodies that assess needs and provide employee training opportunities accordingly. Luxembourg, Korea, and Uruguay[81] also tackle digital exclusion by assessing skills needs among the most vulnerable, particularly the elderly, and offering skills upgrading guidance and support.

The expansion of digital skills is essential to the advancement of Jamaica's economic and social development as outlined in Vision 2030. The country has taken important measures to facilitate digital skills development, including the integration of ICT into the curriculum for basic primary and secondary education,

investments to improve connectivity and access to devices among schools and students, and support for ICT programs at the higher education level. The effect of these measures in digital skills development is yet to be evaluated. The active engagement of multiple government and private stakeholders in digital skills is positive but could benefit from better coordination and a shared vision. The creation of a national digital skills strategy that offers a common understanding of digital skills, assigns clear roles to all stakeholders, leads efforts to assess digital skills, and articulates concrete and measurable goals around digital skills development would greatly potentiate the country's efforts.

Table 6.3. Digital Skills: Policy Recommendations

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Inter-institutional coordination	Improve coordination around a national digital skills strategy that clarifies agencies' roles, establishes coordination mechanisms, adopts a common digital skills framework, develops a digital skills assessment system, and assigns monitoring, evaluation, and accountability measures. **PRIORITY**	TBD	Medium Term	No
Digital skills assessments	**Establish baselines and benchmarks for digital skills development in the country.** **PRIORITY**	MOEY, Department of Schools' Services, Student Assessment Unit	Short term	No
Monitoring, evaluation, and learning	**Increase monitoring standards and transparency in the implementation of teacher digital skills training,** initiatives to increase access to broadband and devices, and the implementation of the NSC. Invest in evaluations to identify the effect or impact of these initiatives on, among others, digital skills development. **PRIORITY**	MOEY, Planning and Development Division, Programme Monitoring and Evaluation Unit USF e-Learning Jamaica	Short term	No
Curriculum	**Offer ICT stand-alone classes from early education onward.**	MOEY, Department of Schools' Services, Core Curriculum Unit	Medium term	No
Flexible learning pathways	**Build on the current system for the recognition of prior learning** so that it can assess and recognize the digital skills developed by individuals through alternative means, and thus become the backbone of micro-credentials and stackable degrees.	MOEY, Department of Schools' Services, Curriculum and Support Services JTEC	Medium term	No
Workforce and citizen upskilling	**Increase access and support to digital skills training** and encourage the engagement of older adults.	HEART/NSTA Trust	Short term	No

Notes

1. For additional information on the different digital skills frameworks see: Vanek, Jen, 2022. “Digital Skills Frameworks and Assessments: A Foundation for Understanding Adult Learners’ Strengths and Learning Needs”, Collaborative Research for Educating Adults with Technology Enhancements – CREATE, and also World Bank, 2020. “Digital Skills: Frameworks and Programs”. Washington DC: World Bank Group
2. Vuorikari et. Al. (2022).
3. For detailed information on the digital skills dimensions, competency areas, competencies, proficiency levels, examples of knowledge, skills and attitudes, and use cases, see: Vuorikari Op. Cit.
4. This indicator is based on World Economic Forum’s Executive Opinion Survey, which asked respondents “In your country, to what extent does the active population possess sufficient digital skills (e.g. computer skills, basic coding, digital reading)?” [1 =not all; 7 = to a great extent].
5. PIOJ (2009).
6. Sector strategies include the 2008 Labour Market and Productivity Plan and the Education Sector Plan
7. MSETT (2019).
8. MOEY (2009).
9. MOEY (2022).
10. PIOJ (2018).
11. MOEY (2022).
12. MSETT (2019).
13. NCST was instituted in 1993 and legislated to be a statutory body in 2007. The 2019 ST&I Policy gives it a central role in implementation and coordination, but informants could not identify plans to support the agency’s ability to fulfill its mandate.
14. Informants from the Ministry of Education and Youth expressed that CARICOM’s guidance was also incorporated in the design of the NSC, but no details on the guiding document were provided.
15. Informants suggested that NCTVET used the ISTE framework to draft TVET standards for digital skills, but the information was not corroborated by either HEART/NSTA or NCTVET.
16. The Jamaica Education Transformation Commission (2021b).
17. Broadcasting Commission of Jamaica, 2021. “Tackling Jamaica’s Media and Information Literacy Deficit”. YouTube video last retrieved in December 2022 from official website: https://www.broadcastingcommission.org/#tz-
18. Ibid.
19. To the extent that grades 10-11 focus on preparing for students who plan to sit the CXC exams, students’ performance in the test offers insight into their digital skills. In 2021, Information Technology was one of the subjects where students performed the best with a passing rate of 86%. However, given that only 69% of eligible students sit these exams, and only a subset chooses to be evaluated on information technology, this figure largely overestimates the extent to which digital skills are developed in high school. Figures taken from: Ministry of Education and Youth, 2021. “Remarks by Hon Fayval Williams, Minister of Education, Youth and Information, at Press Conference on CSEC / CAPE 2021 Exam Results”. Kingston, Jamaica.
20. HEART/NSTA’s LMIS portal is available at https://lmip.heart-nsta.org/Default.aspx. MLSS’s LMIS portal is available at https://www.lmis.gov.jm/
21. Like in many Caribbean Islands and in Latin America, enrollment, completion and learning outcomes at all education levels are lower for boys than for girls. See: World Bank Blogs (2023).
22. The Jamaica Education Transformation Commission, 2021. Op. Cit.
23. According to ITU’s Digital Development Dashboard, 82% of urban households have internet access at home, while 67% of rural households do. However, these figures rely heavily on mobile broadband subscriptions. The same source shows that only 15 in 100 inhabitants have a fixed broadband subscription. Access to stable connectivity in a device that supports quality learning experiences is likely to be much smaller in both urban and rural areas.
24. JETC (2021b).
25. At grade nine, students are expected to choose between the general and vocational education path. Those who choose the former, spend grades 10 and 11 preparing for the Caribbean Secondary Education Certificate (CSEC) administered by the Caribbean Examinations Council and often referred to as the “CXC”. The CXC is required to progress into further education or training and to be employed in occupations that require some literacy and numeracy skills. Students who choose the vocational path, can sit the City and Guilds Exam or the National Vocational Qualification in Jamaica Exam (NVQ-J), both to certify technical or vocational skills.
26. MOEY (2021b).
27. As of 2021, MOEY data suggests that 69% of students who complete 11th grade sit the CXC exam. Of the 27,789 who sat it in 2021, 57,8% were female. Female registered students were more likely to actually sit the exam and be awarded a passing grade in one or more subjects than male students.
28. PIOJ and STATIN (2020).
29. There are two known challenges that make high school leaving certifications unattainable for many: their relatively high financial cost, and the low quality of education that renders students unprepared to succeed in the CXC exam, which certifies high school completion and is required to access most formal education and employment opportunities. As a result, even though students go through all the years of compulsory education, approximately 23% of 11 graders do not sit the exam (By applying a negative 2.5% enrollment growth rate between 2018-2021 to 2018 School Census data, the World Bank estimates that in 2021 there were 36,119 students in 11th grade. MOEY reports that 27,789 students sat the CSEC in the same year)
30. ITU’s estimations of digital skills in Jamaica suggest the country is among the average for the most part: in 40% of the countries for which data are available, less than 40% of individuals reported having basic skills, in almost 70% of the countries less than 40% of individuals had

standard skills, and only in 15% of the countries had more than 10% of individuals reporting having advanced skills. ITU (2021).

31. The 2018 JSLC offers data on the highest-level examination passed by prime working age individuals (24-64) disaggregated by age. This graph aggregates “None”, “JH School Certificate”, “Grade 9 Achievement”, and “Secondary School Certificate“ into “Incomplete secondary education or below“. The remaining certificates, including “CSEC“, “City and Guilds“, and “NVQJ“ are aggregated into “Secondary education or above“.
32. UNDP, 2022. “Digital Readiness Analysis – Jamaica”.
33. PIOJ and Statistical Institute of Jamaica (2020).
34. JETC (2021a).
35. Ibid.
36. UN (2021).
37. AVASANT (2018).
38. IADB, 2019. “Program for Skills Development for Global Services: Loan Proposal”.
39. The Jamaica Education Transformation Commission, 2021. Op. Cit.
40. PIOJ and STATIN (2020).
41. While some may argue that the scarcity of information on employee upskilling is due to the private nature of companies’ training, it is still true that few people report having participated in upskilling recently in several iterations of the Jamaican Survey of Living Conditions. The survey also shows that, as it is usually the case, those in the poorest quintile are the least likely to access upskilling opportunities and those in highest quintile the most. Two examples of employee training substantiate the point that it is mostly a practice in large companies and certain sectors: Digicel’s partnership with HEART/NSTA to train and certify 2000 employers on digital skills and PwC Jamaica internal employee upskilling initiative called “The Digital Accelerator Program”, which intends to develop workers’ knowledge and skills around data analytics, automation, and cybersecurity.
42. ECLAC (2022).
43. HEART-NSTA Trust (2021).
44. As part of this effort, on September 2022, HEART/NSTA launched the Tech$ense digital literacy program. Currently the program offers introductory training in cyber security and the internet of things.
45. Approximately 30 programs lead to a bachelor’s degree, 11 to a master’s degree and 1 to a doctoral degree.
46. Performance on the Primary Exit Profile test administered in 6 grade can determine students’ chances to access tertiary education. Poor performers are assigned to poor-performing secondary schools, which are not likely to prepare them well for the GNAT test at grade 9, which places good performers in the best high schools. Condemned to low-quality education from an early age, poor test performers have little chances to succeed in the CXC exams.
47. Tertiary education programs require applicants to pass CXC exams in at least five subjects. English and math are subsidized, but students must pay for the rest. To sit the CXC exam, students must be recommended by their school, which is evaluated based on students’ CXC scores. As a result, schools choose to not recommend poor performers for the exam raising a barrier to further education that is difficult to circumvent.
48. Calculations use program tuition fee data for ICT-related undergraduate degree programs provided by the University Council of Jamaica: https://airtable.com/shrqtdVC8w7mTStdC/tblDMtNMIFCrwVFjw/viwBPzbYVmk3rP6Cg. In local currency, the average cost of a 3.5-year ICT program amounts to JMD 1,667,000 (USD 10,800) and median amounts to JMD 1,267,000 (USD 8,200).
49. Per estimates retrieved from https://www.averagesalarysurvey.com/jamaica in December 2022.
50. JETC 2021a and 202b.
51. World Bank and UNICEF (2021).
52. JETC (2021a).
53. UNEVOC (2022).
54. To better prepare teachers for online education delivery during COVID, in 2021 the Mico University College partnered with the Jamaica Teaching Council (JTC) to reorganise the college’s practicum training for final-year students to enable them to operate in the online learning environment. Jamaica Information Service (2021).
55. JETC (2021b).
56. British Commission, 2022. “STEAM Education Research Project Report”. Kingston, Jamaica.
57. Except for teachers applying to be master teachers. JETC, 2021. Op. Cit.
58. ECLAC (2022).
59. British Commission (2022)
60. Ibid.
61. PIOJ and STATIN (2020).
62. UNDP, 2022. Op. Cit.
63. MLSS (2022).
64. MLSS (2022) and MLSS (2018).
65. In 2018, the GOJ and the IADB agreed on three loans to incorporate ICT in different government functions: 1) Security Strengthening Project, to enhance the capacity of national security agencies to combat crime by using data and technology (USD 20 million), 2) National Identification System (NIDS), to improve the delivery of public services for citizens through the creation of a personal identity information for citizens and residents (USD 68 million), and 3) the Public Sector Transformation Program – digital transformation to improve the efficiency and quality of public sector services (USD160 million). AVASANT (2018).

Notes

66. Roseth, B. Et. Al., (2021).
67. Plan Ceibal's objective is becoming Uruguay's center of educational innovation and digital technologies promoting integration at the service of education to improve the quality of learning enhancing innovation, inclusion and personal growth. For more information, visit ceibal.edu.uy.
68. ITU (2018).
69. UNESCO (2018).
70. Ibid.
71. Ibid.
72. These masterplans are "blueprints for developing an ICT-enriched environment for learning and teaching". For a brief description of the goals of each master plan and Singapore's journey to maintain education delivery up to date vis-à-vis technological change, visit the country's Ministry of Education webpage. Ministry of Education of Singapore, 2022. "Educational Technology Journey". Last retrieved: January 19, 2023.
73. ITU (2020).
74. IADB (2021). "Digital Skills in Rural Areas: An Imperative to Reduce Gaps in Latin America and the Caribbean".
75. JETC, 2021. Op. Cit.
76. Brookings Institute (2022).
77. UNESCO, 2018. Op. Cit.
78. Ibid.
79. JETC, 2021. Op. Cit.
80. UNESCO (2018).
81. Uruguay has a program in place to upskill the elderly on netiquette, critical consumption and analysis of online information, and data privacy protection. Agency for Digital Government and Information and Knowledge Society (2022).

7. TRUST ENVIRONMENT

Toward a national cybersecurity strategy

KEY MESSAGES

- **Jamaica has made notable progress in its umbrella data protection framework, but adopting secondary legislation and ensuring regulatory effectiveness would strengthen its implementation and enforcement.** Secondary legislation is important to clarify gaps and bring further legal certainty to the implementation and enforcement of the DPA in such areas as data processing and the appointment of data protection officers. In addition, the independence of the new Office of the Information Commissioner should be strengthened.

- **Statistical data on cyber incidents and threats are fragmented and may be insufficient for technical analysis and policy development.** Jamaica could consider developing information-sharing and incident-reporting frameworks and seek the collaboration of public and private sector organizations with the Jamaica Cyber Incident Response Team (JaCIRT), which is currently nominal.

- **JaCIRT needs the appropriate technical, human, and financial resources and support from international partners (e.g., the World Bank) to deliver on its broad mandate as a national CIRT that includes a GOV-CIRT's functions.**

- **Since the adoption of its last cybersecurity strategy in 2015, Jamaica's cybersecurity landscape has changed, and a new strategy and roadmap are needed.** The impending establishment of the National Cybersecurity Authority is a good opportunity to create a cybersecurity governance structure that adheres to the current and future needs of the country's National Cybersecurity Strategy (NCS).

- **Jamaica is neither a signatory party nor an observer to the Council of Europe's Budapest Convention.** As the Cybercrimes Act of 2015 is being reviewed and amended, it may be practical to seek its alignment with the Budapest Convention and other international standards to speed up Jamaica's accession in the future and keep pace with the fast-changing cybercrime landscape.

- **Jamaica has not identified its critical information infrastructure (CII) sectors.** In its "Plan Secure Jamaica" (2016–2023), the GOJ has recognized the importance of protecting CII assets, which remain highly exposed to cyberattacks. The NCS could be an instrument to take CII protection forward in terms of governance (roles and responsibilities) and legal and technical measures.

- **Demand for cybersecurity professionals in Jamaica is growing while access to professional education at the tertiary level is minimal.** The consultation and development of a new NCS could be a vehicle through which to create more education and training opportunities and thus fill out the skill and talent gaps.

7.1. The importance of a trust environment: Enabling the digital economy by upholding foundational rights

The rapid evolution of technologies continuously shapes the relationship between humans and digital tools by redefining the role of technology and highlighting the rights of the individual in the digital society. As the digital services provided by public and private organizations expand in scope and depth of application, the people using them need confidence that their fundamental rights are adequately protected. This is the starting point for trust in digital technologies, and it has a "human-centric" focus[1] that spans through such areas of individual rights and freedoms as: privacy, inclusion, non-discrimination, freedom of expression, property rights, the right to fair dealings, the right to a clean, healthy, and sustainable environment,[2] and so forth. Governments and businesses need to proactively address the potential risks and threats associated with the misuse of technology to prevent and penalize infringement on fundamental rights and thus meet digital users' expectations of safety and protection. As the wide array of these rights is considered to be interdependent and mutually reinforcing, their intersection with the ICT sector begets a new interrelationship that needs to be thought through and considered by policy makers (Table 7.1.)

From the perspective of technological advancement, conventional trust shaped by industry 4.0 technologies also plays a prominent role in enabling open innovation.[4] Trust drives and underlines industry 4.0 technologies (big data, IoT, cyber-physical systems, blockchain, etc.), technological business processes, and organizational capabilities. These factors are critical for technology-driven markets,[5] digital transformation, and increases in the digital value chain. Furthermore, Industry 4.0 technologies, when combined with the human-centric trust, form a digital trust, which can be instrumental in improving the technological and open innovation performance of businesses.[6]

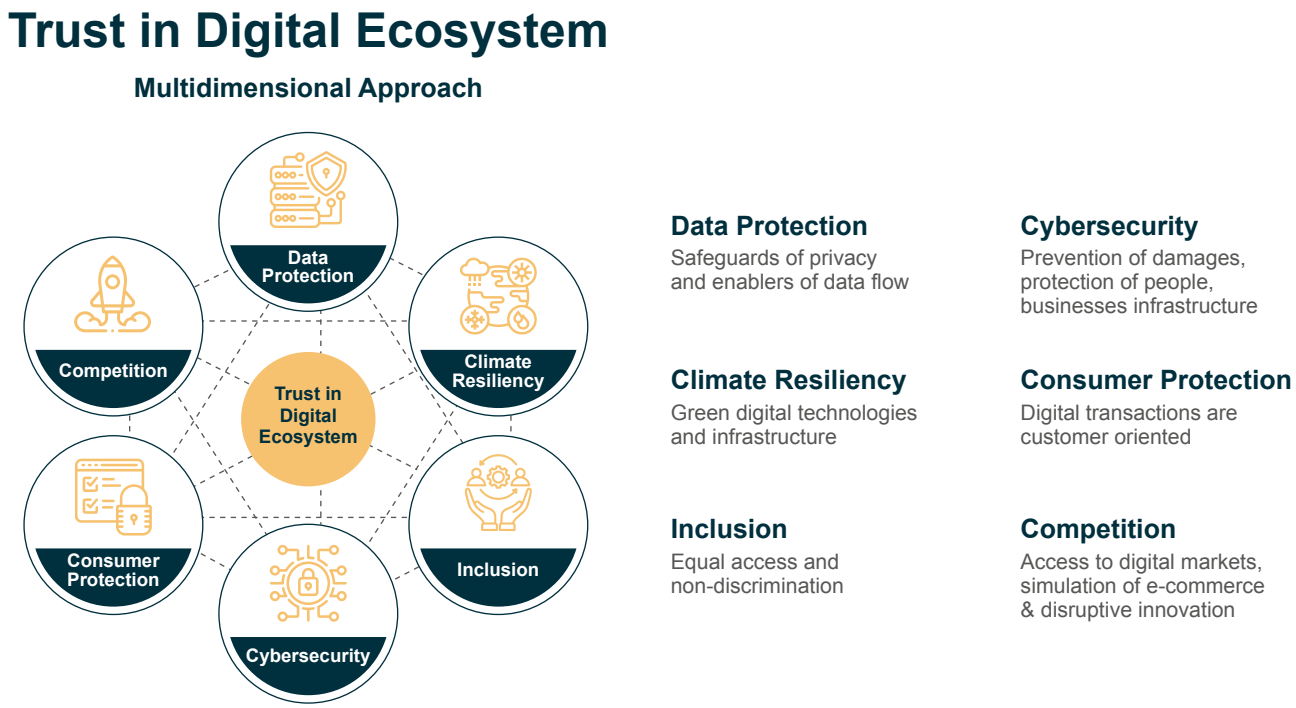
The broader concept of trust in the digital ecosystem is composed of standards and tenets derived from foundational rights and the quest for innovation, various elements of which (for instance, inclusion) are addressed in this report (Figure 7.1). The advancement of technologies makes the nascent framework of digital trust continuously evolve.[7] The key components of the digital trust ecosystem spread across all digital pillars and minimize digital risks, maximize the value of the digital economy, stimulate competition, and safeguard individual rights. This section will focus on a few of the fundamental elements of the broader trust concept: data protection, digital identification, cybersecurity, and cybercrime.

Table 7.1. Rights and Intersection with the ICT Sector [3]

Rights	Digital Tools and Safeguards
Privacy	Ethical AI and Big Data Analytics; Encryption; IoT
Protection from Hate Speech and Response to Violent Extremism	Safeguards for Safe Use of the Internet
Accountable Governance and Law Enforcement	Good Governance and Data Management; Cyber Capacity
Child Rights	Safeguards for the Safe Use of the Internet
Customer Due Diligence	Compliance with Privacy Safeguards; Cybersecurity
Non-Discrimination	Access to the Internet and Digital Technologies
Controlled Climate and Environmental Impact: Raw Material Sourcing/E-Waste/Climate Change	Business Models and Safeguards

Source: Authors' elaboration.

Figure 7.1. Multidimensional Layers of Digital Trust

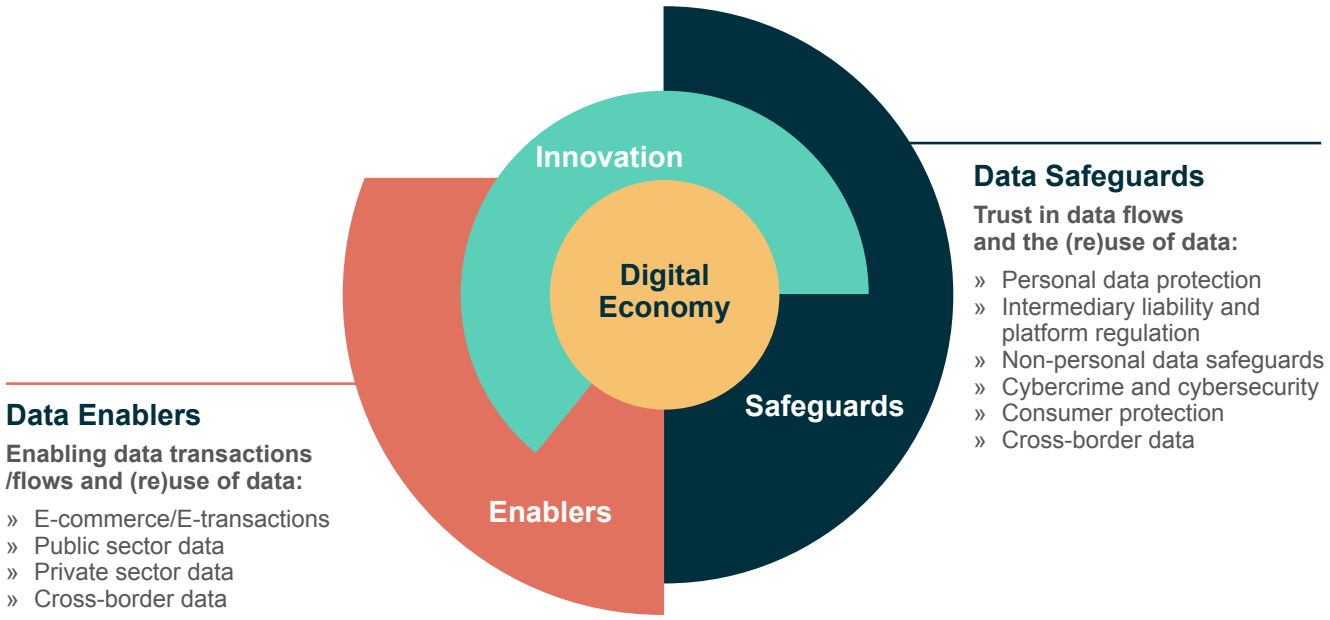


Source: Authors.

7.2. Current state of the trust environment in Jamaica: Progress through the data protection framework

A comprehensive data protection framework enables a trusted environment of economically valuable data flow and the (re)use of data. The World Bank's 2021 World Development Report, "Data for Better Lives," classifies data policies and regulations of data governance systems as safeguards and enablers[8] (Figure 7.2). *Safeguards* are the norms around the collection and use of data that are designed to promote trust in the data governance and data management ecosystem. *Safeguards* also limit how data are secured and accessed, and they outline the obligations of those who collect, process, or use data to take precautions to ensure the data's integrity and protection, including intellectual property rights and other limitations on the use of non-personal information. On the other hand, *enablers* are those policies, laws, regulations, and standards that facilitate the use, reuse, and sharing of data within and between stakeholder groups through openness, interoperability, and portability.[9]

Figure 7.2. Data Enablers and Data Safeguards of the Trust Environment



Source: Authors. Based on WDR21 approach.

Table 7.2. Summary of Key Safeguards and Enablers for Jamaica and Selected Benchmark Countries in the LAC Region

	Enablers				Safeguards	
Dimension / Country	E-commerce/ e-transaction law	Digital ID system for online authentication	Open data act/policy	Data portability rights	Personal data protection law	National cybersecurity strategy/plan
El Salvador	Yes	NO	Yes	NO	NO	NO
Costa Rica	Yes	Yes	Yes	NO	Yes	Yes
Colombia	Yes	Yes*	Yes	Yes	Yes	Yes
Mexico	Yes	NO	Yes	Yes	Yes	Yes
Dominican Republic	Yes	Yes	Yes	NO	Yes	Yes
Jamaica	Yes	Yes	Yes	Yes	Yes	Yes

Source: Framework from World Bank (2021a). For Colombia, Mexico, and Dominican Republic, data from World Bank (2021a); for El Salvador, Costa Rica, and Jamaica, data are based on original analysis.

Privacy and data protection

Jamaica has made notable progress on developing its data protection framework and was the 15th Caribbean nation to enact its own set of privacy and data protection laws. In June 2020, the National Assembly of Jamaica passed the DPA, which is substantially aligned with the European Union General Data Protection Regulation (GDPR) (see Table 7.3).[10] However, the substantive provisions under the DPA, which include the rights of data subjects and the legal obligations of data controllers, are not yet in effect because the DPA provides a two-year transition period ending on November 30, 2023. From the next day onward, full DPA compliance will be required, and the sanctioning regime will begin to operate.

The DPA framework is relatively new and needs further elaboration at the legislative, judicial, and regulatory levels. The data protection framework in Jamaica consists of constitutional provisions adopted in 2011, one primary statutory law adopted in 2020 that may be supplemented by secondary regulations, and a few sectoral regulations that address the critical aspects of data management, privacy, and personal data protection (see Annex 10). Existing legal and regulatory frameworks intersecting with data and consumer protection provisions may need to be reviewed and assessed against DPA provisions to ensure harmonization. For instance, the Banking Services Act, 2014 and the Electronic Transactions Act[13] set up limited data protection standards for processing consumer data, but the Payment Clearing and Settlement Act[14] and the Bank of Jamaica FinTech Regulatory Sandbox Guidelines[15] do not contain any data protection or privacy provisions for the payment service sector. It would be important to review these regulations and other sectoral laws (e.g., telecommunications, health, etc.) and make amendments as needed to confirm alignment with DPA provisions and thus ensure consistency and coherence in data and customer protection standards across Jamaica's legal framework. The DFS findings can also be used to cross check and validate these assessments (see Chapter 4 on Digital Financial Services).

The DPA defines the general scope, principles, and requirements of handling personal data in the country. The DPA applies to public and private sector organizations of all sizes, including MSMEs, that collect and process personal data in the country regardless of their physical location—that is, the DPA adopts a *territorial and extraterritorial conditional jurisdiction* (e.g., even though the data processing occurs abroad, the DPA applies when the data collection targets subjects in Jamaica). In that case, the non-Jamaica-based data controllers must appoint a representative established in the country. The DPA also applies to the identifiable data of living individuals or individuals who have been deceased for less than 30 years.

The DPA prohibits data processing by public or private organizations unless they are duly registered with the Office of the Information Commissioner (OIC) as data controllers. Any time before the end of the two-year transition period, public and private organizations that process data under DPA provisions are required to register with the OIC to act as data controllers. Otherwise, the OIC can apply sanctions as per DPA provisions.

The DPA sets out the following rights of data subjects modeled by the GDPR: the right to access, the right to rectification, the right to data erasure, the right to object, and the right not to be subject to automated decision making (Box 7.1). As mentioned above, the data subject's rights are subject to certain exemptions that the DPA expressly outlines.

The DPA encompasses the right to data portability,[18] but unlike the GDPR,[19] it explicitly conditions this right to payment of a fee. Although some countries permit data controllers to charge fees for data transfer, the payment requirement must be exercised with caution as it may lead to an undue burden on data subjects, affecting consumer rights and competition. Recent studies on the trio of data portability, competition, and innovation suggest that similar to number portability in the telecommunications sector, the data portability right can positively affect the demand side and incentivize businesses to improve the quality of services and products and promote competition at large.[20] Moreover, when coupled with demand-side regulations, the data portability right can potentially decrease switching costs between online platforms in competitive markets and stimulate research on and development of data-driven "innovation such as artificial intelligence to improve users' engagement and retention to avoid churn."[21] Nevertheless, the monitoring of data compliance must ensure that data subjects are not burdened by high fees and are able to exercise their right to data transfer.

Online privacy remains unregulated, and there are no specific provisions aimed at using cookies or collecting location data. The DPA does not regulate the use of cookies and the collection of location data; however, the OIC may issue specific directives or guide-

Table 7.3. Alignment of the DPA with the EU GDPR[11]

GDPR Elements	Jamaica DPA 2020
Material scope and definitions	Substantially aligned
Territorial scope	Fully aligned
Fundamental principles relating to the processing	Substantially aligned
Lawfulness of processing	Fully aligned
Consent	Substantially aligned
Special categories of personal data	Substantially aligned
Individual rights	Partially aligned
Obligations of data controllers	Substantially aligned
Obligations of data processors	Partially aligned
Data breach notifications	Substantially aligned
Impact assessments and prior consultation	Substantially aligned
Data protection officers	Partially aligned
Codes of conduct and certifications	Substantially aligned
International transfers	Substantially aligned
Supervision	Substantially aligned
Cooperation and mutual assistance	Partially aligned
Remedies	Partially aligned
Specific processing situations	Substantially aligned

Source: Authors' elaboration based on GDPR and Jamaica's DPA 2020.

lines to address both issues. Despite this, some privacy policies from domestic and international organizations doing business in Jamaica are contemplating provisions concerning the use of cookies and data geolocation. (The other main provisions of the DPA are outlined in Annex 10.)

DPA compliance and enforcement mechanisms

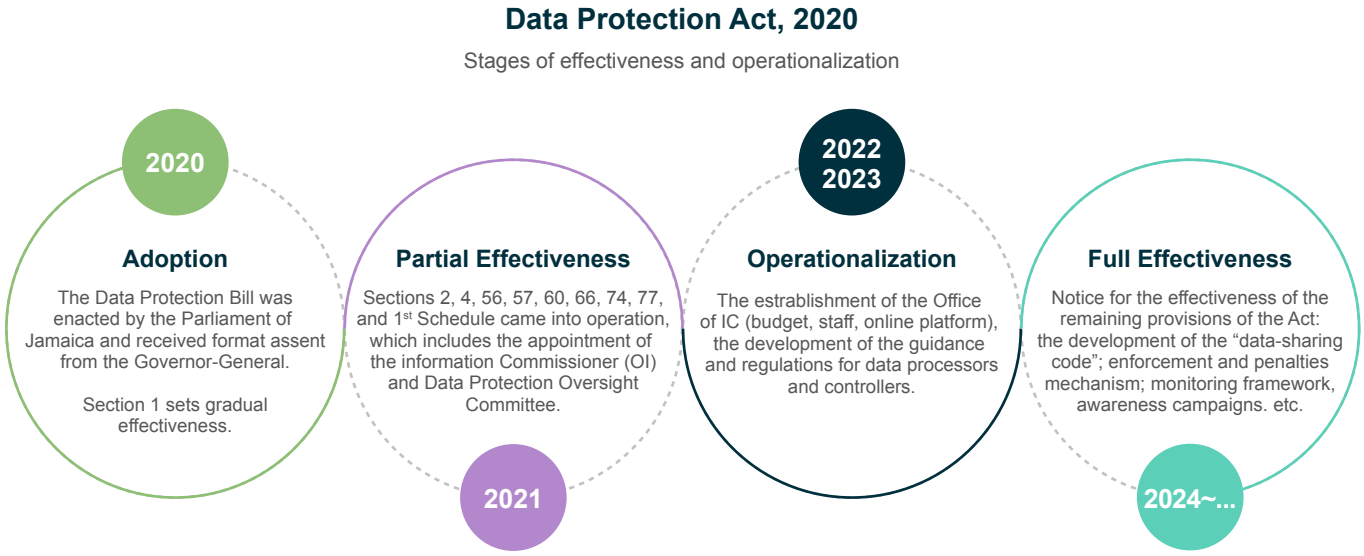
Implementing DPA provisions and establishing concrete compliance mechanisms remain a work in progress. The consolidation of the current DPA depends on several factors, including the achievement of certain effectiveness milestones that must be met for full DPA enforcement (see Figure 7.3). Those milestones started with the adoption of the DPA in 2020 (*adoption stage*), the establishment of the OIC, the appointment of the Information Commissioner,[22] and the creation of the Data Protection Oversight Committee in December 2021 (*partial effectiveness stage*). The Commissioner [23-24] is working around the clock to set up the needed technological, financial, and human resources to reach an operational level (*operational stage*). The next milestone instructs, as noted above, that data controllers under the DPA will have until November 30, 2023, to ensure that their internal data processing policies and practices comply with the provisions of the DPA. The final milestone, namely full DPA enforcement, starts on December 1, 2023 (*full effectiveness stage*) and covers, among other measures, the adoption of additional monitoring and enforcement mechanisms.

The OIC is the primary data protection supervisory authority, and the GOJ should consider strengthening its operational and financial independence from policy makers. The Governor-General appoints the Commissioner after consultation with the Prime Minister and the leader of the Opposition, and the current Commissioner was appointed in December 2021. The MOFPS is responsible for allocating the OIC's budget for each fiscal year based on OIC estimates. The budget is then reviewed and approved by the MSETT. For staff hiring, approvals from the MSETT and MOFPS are required based on valid reasons. Ensuring the Com-

Box 7.1. Recognition of Data Subjects' Rights under the DPA[16]

- **Right to be informed/right to access:** the right to know what data are being collected and processed. This is the same as the right to be informed under the DPA.
- **Right to rectification:** the right to correct information that may be inaccurate. For the purpose of the DPA, the term "rectify" means to amend, block, erase, or destroy, and "inaccuracy" includes any error or omission.
- **Right to erasure:** the right to request a business that collects and processes personal information to delete it. This is the same as the right to rectification under the DPA.
- **Right to object/opt out of processing:** the right to opt out of processing personal data for targeted advertising, the sale of personal data, and profiling activities with personal data that may affect the consumer.
- **Right not to be subject to automated decision making:** the right not to have personal information be used in automated decision making (marketing) unless the data subject gives consent or is a data controller customer. The DPA also has provisions related to automated data processing and stipulates two mechanisms for invoking the right not to be subject to automated decision making. The *first rule* entitles data subjects through written notice to the data controller to opt out of automated decisions related to the evaluation of an individual's performance at work, creditworthiness, reliability, or conduct. The *second rule* allows data subjects the right to prevent the processing of their data for direct marketing purposes. This enables one of the key safeguards for digital consumers.

Figure 7.3. DPA: Effectiveness and Operationalization Stages



Source: Authors' elaboration.

missioner's functional independence and autonomy is instrumental to delivering its legal mandate. The DPA expressly recognizes that the Commissioner should act independently in the discharge of the functions and not be subject to the direction or control of any person or other entity, except for the oversight of the Data Protection Oversight Committee. (For more information on the OIC's legal mandate, see Annex 11.)

It is critical that the OIC be established as soon as possible to begin formal operations and deliver on its legal mandate. Since the appointment, while authorizing the design of the OIC's structure and operations, the Commissioner has undertaken the necessary steps to set up the office, which include recruiting qualified staff, selecting the physical location and premises, arranging internal and public capacity-building activities, and establishing relationships with international bodies that may support the OIC's work. In 2022, the Commissioner envisioned a staff of approximately 60, utilizing an almost fully automated system with digitalized information to carry out all the required functions, including registration of data controllers, review of data privacy impact assessments, investigation of complaints, tracking of prosecution breaches, and the provision of advice and guidance as necessary to the government and different sector groups and to the public. Nevertheless, the progress achieved over the past 14 months (since the partial effectiveness stage) has been minimal due to operational challenges. The selection of the physical site of the office was slowed down due to the complex leasing procedures for government-funded operations and the impact of COVID-19 on agencies' operational capacities. The recruitment of staff per the required qualifications and experience is another major and two-fold challenge. First, the remuneration assigned to the OIC staff is not compatible with what the private sector offers or even the compensation at some other government agencies, meaning that the advertised managerial positions for the OIC have not been particularly attractive to highly experienced professionals. Second, the pool of candidates with the necessary skills and experience in data protection is small in Jamaica.

The adoption of secondary regulations and OIC directives and guidelines are required to facilitate the DPA's compliance and enforcement mechanisms. At the time of this writing, no secondary regulations, directives, or guidelines for data processing had been developed to support and supplement the primary statute. To comply with the data protection standards,[25] data controllers will have to take appropriate technical and organizational measures, such as the appointment of a Data Protection Officer (DPO) (per established criteria), and determine internal protocols for data privacy impact assessments, data access, storage, disposal, and retention, and other procedures and operations. To facilitate DPA compliance, the OIC will need to elaborate how specific legal provisions under the DPA will be implemented; for example, under the Act, controllers are required to inform data subjects on data retention periods, but the provision states that "personal data processed for any purpose shall not be kept for longer than is necessary for that purpose,"[26] which may require a precise clarification to help avoid ambiguity. The GDPR, as a leading model, outlines data retention policy, documentation, and accountability requirements as key components to facilitate compliance, which helps to avoid ambiguity and uncertainty in data processing and management.

Further guidance will be important in the appointment of DPOs, and clear rules will help private and public sector organizations to more swiftly adapt their internal policies and procedures to DPA requirements and resolve uncertainties. The current DPA provides limited guidance on the DPO's status, roles, and qualifications but requires data controllers to appoint an "appropriately qualified person."[27] No conditions for performing the DPO's duties are outlined as yet. Data protection authorities in other countries have developed specific guidelines related to the DPO's appointment and qualifications. For instance, in France, the French Data Protection Authority issued a comprehensive "Practical Guide on GDPR: Data Protection Officer"[28] that outlines how to manage the work of DPOs and related issues. In addition to specific guidelines, the OIC should ensure that enough certified DPOs are available in the country, since the demand for those professionals will substantially increase when the DPA enters into force. For that purpose, the OIC, in conjunction with academia and industry, may find it useful to develop training and certification programs.

The working and collaboration framework between data controllers and the OIC has yet to be developed, though this type of guidance would reinforce the principles of legal certainty, transparency, and accountability with regard to data compliance systems. Along with a code of practice outlining the enforcement functions of the OIC under the DPA (Sec. 41), comprehensive guidance should be adopted to define procedural aspects, such as the corresponding registration with the OIC, reasonable fees for annual registration, annual filings of data protection impact assessments, channels of communication, and requests to conduct data assessments, among others.

Sensitizing the general public and specific groups may help to raise awareness of DPA provisions and the OIC's roles and responsibilities, possibly facilitating DPA compliance. As a best practice, when a Data Protection Authority is established, one of the first activities is to educate the public on the new data protection provisions. In Jamaica, the Information Commission-

er has been conducting these kinds of activities to inform the general public and to gather information on specific groups' main issues and concerns concerning the DPA's application and scope. One of the main challenges for the OIC is to change the mindset and culture of individuals and business leaders with regard to privacy and data protection. Regular awareness activities targeting different demographics, including vulnerable groups, such as children, older adults, and MSMEs, will provide input to further inform decision makers about policy and regulation development, including secondary regulations and guidelines.

Promptly addressing the uncertainties and concerns of public and private organizations will be an important priority for the OIC as soon as the effectiveness stage begins. Domestic stakeholders have emphasized the need to adjust their current data management protocols and procedures to DPA provisions, and there is some level of uncertainty around the novel approaches to data classification, data processing, data security, risk management, reporting obligations, and requirements and recommendations for internal procedures and protocols. To address these concerns, establishing two- or multi-way communication channels with the private sector could be a first step. The specific sectors that may require additional support may also need specific recommendations and/or guidance on good practices and tools for effective data management. The rulemaking is likely to be successful when "regulations are based on evidence, with stakeholder impacts and spillover effects fully considered through regulatory impact analysis."[29]

In addition, there is a need to clarify rules on cross-border data flow. The cross-border data transfer provisions of the DPA[30] stipulate that personal data shall not be transferred to a state or territory outside of Jamaica unless it ensures an adequate level of protection for the rights and freedoms of the data subjects. Further policy work is necessary here, as the meaning of "adequate level of protection" remains ambiguous. Supplementary cross-border data transfer scenarios for consequential data transactions, certification and privacy notice mechanisms, public sector cross-border transfers, and certain derogations will foster certainty domestically and provide more clarity for overseas counterparts.

As "children's data is an especially vulnerable link in the data ecosystem and is often misappropriated,"[31] addressing risks and undesired impacts in this area is a priority. In numerous countries, data protection authorities have taken on the role of educating parents, children, service providers, and service leaders on the roles, responsibilities, and standards for protecting children's data and online safety (see Box 7.2).

Box 7.2. DPA Case Studies: United Kingdom and Sweden

» **United Kingdom's DPA**

The UK's Information Commissioner's Office (ICO) has developed the *Age Appropriate Design Code* (AADC), (entered into force in September 2021), which establishes 15 interlinked standards for "information society services likely to be accessed by children," including apps, programs, search engines, social media platforms, streaming services, online games, news or educational websites, and websites offering other goods or services to users over the internet.

» **Sweden's DPA**

The Swedish Authority for Privacy Protection, in collaboration with other agencies, produced a guide on "*The rights of children and young people on digital platforms. Stakeholder guide*." The guide provides support to a wide range of stakeholders and advises on techniques to protect children from the potential harmful impacts and consequences of digital activities.

Digital identification

An inclusive, trusted, and secure digital ID system can bring several benefits, but the reality is that almost half of the world's population, particularly those in lower-income countries and members of marginalized and vulnerable groups, do not have any official form of identification. Globally, an estimated 1 billion people do not have official proof of identity,[32] and one out of two women in low-income countries does not have an ID, limiting their access to critical services and participation in political and economic life.[33] Unfortunately, Jamaica is not an exception to this global trend. For instance, in 2020, a report from the Caribbean Research Institute revealed that only 25 percent of Jamaica's adult population had a valid driver's license, 43 percent a valid electoral ID, and 56 percent a valid passport, leaving the rest of the population without any form of legal identification. On average, this population segment faces several barriers, such as logistical and bureaucratic difficulties, unclear policies and procedures, and technical failures, that prevent them from accessing existing forms of ID.[34]

Jamaica has a range of enablers in place to facilitate not only e-commerce transactions but also comprehensive digital identity regulations. These include e-commerce legislation (Electronic Transactions Act of Jamaica - Act No. 15 of 2006), digital ID system regulations (the 2020 National Identification and Registration Policy for Jamaica, the National Identification and Registration Act of 2021, and the National Identification and Registration Regulations of 2023), and legal recognition of electronic signatures (Electronic Transactions Act of Jamaica).

Since the 1970s, Jamaica has discussed multiple policy and legislative initiatives to establish a comprehensive NIDS. For many years, Jamaica did not have a national identification database or any specific governing NIDS legislation. It was not until 2016 that Jamaica adopted the National Identification System Policy (NISP), which defined the policy, legal, and institutional frameworks for establishing an NRS to support secure, reliable, and robust identity verification and authentication for citizens and residents of Jamaica. Following the NISP, Jamaica adopted the National Identification and Registration Act of 2017. However, in 2019, the Jamaican Constitutional Court unanimously ruled that the 2017 Act's collection of biometric data and mandatory enrollment violated the Jamaican Constitution and infringed upon the right to privacy, declaring the Act null, void, and of no legal effect, thereby dissolving the NIDS. This ruling set a precedent for respecting the privacy rights of all Jamaicans.[35]

After that decision, the GOJ recognized the NIDS as a foundation from which to advance positive changes. The GOJ also highlighted that modern digital economies are built on implementing strong digital identities for citizens who embrace privacy rights and security as the cornerstone of sustainable, transparent, and robust identification systems.[36] Following that line, in 2020, Jamaica adopted the 2020 National Identification and Registration Policy (2020 NIRP) and then passed the National Identification and Registration Act of 2021 to set the foundation and regulations for implementing and managing a robust and sustainable NIDS. The 2020 NIRP was the result of inter-ministerial efforts led by the National Identification System Policy Review Committee, which came to establish a secure NIDS that supports reliable and robust identity verification and authentication for every enrolled citizen and resident of Jamaica, strengthening identity security, cybersecurity, and the simplification of bureaucracy.

When the Jamaican Parliament passed the National Identification and Registration Act of 2021, there were multiple concerns about the public consultation process, such as the limited engagement of civil society organizations and insufficient attention to their privacy concerns and recommendations. A Joint Select Committee of Parliament was established to take submissions from members of the public during the NIDS review process. Academia and civil society organizations brought some privacy concerns to this Committee, such as the amount of data collected, the necessity of that collection, and the safety of the stored data. Those groups were also concerned about the scope of the NIDS' use, possible misuse of the collected data, and issues regarding access and exclusion, particularly of minority groups, such as Rastafarians and people with disabilities. However, the Committee disregarded those concerns in part, providing some of its own recommendations while integrating those of others (see below). The groups later criticized the 2021 Act because it does not provide explicit provisions on data minimization and data retention and is unclear about system architecture and its ability to ensure the encryption and anonymization of sensitive data.[38]

The NIDS rollout has been done in phases, beginning in December 2022 with the technical pilot (testing phase), and the national rollout is expected to begin in the second quarter of 2023. The post-technical pilot phase is the final step before the establishment of the National Identification and Registration Authority (NIRA). Early in 2023, 300 Jamaican volunteers signed up to participate in testing the national identification card enrollment and insurance process.[39] More than 24 post offices nationwide are operating as registration centers equipped with high-speed internet and technological

devices to accommodate enrollment.[40] By mid-2023, all other parish capitals are expected to have enrollment sites. In parallel, the NIRA and the National Identification and Registration Inspectorate (NIRI), key agencies for NIDS implementation, are being established.

Establishing the NIRA and the NIRI are the subsequent steps to operationalizing the NIDS. The NIRA will assume the civil registration system and be responsible for managing identity-related services and developing protocols for their operation, including generating and assigning a national ID number and issuing a national ID card to enrolled individuals. The NIRA will manage two national databases: (a) the National Identification Database, which will store all identity information collected from the NIRA through citizen enrollment, and (b) the Civil Registration Database, which stores the information kept by the Registrar-General For Civil Registration. For its part, the NIRI will be responsible for undertaking audits, summoning the NIRA as required, and taking enforcement actions. The NIRA and NIRI will be operational by the end of 2023 or early the following year.[41] As part of establishing these agencies, competent authorities should consider establishing a robust digital ID governance structure, including the NIRA and NIRI, with clear mandates, functions, and responsibilities and sufficient resources to ensure the effective and sustainable implementation of the NIDS.

Jamaica's NIDS rollout could benefit from incorporating international best practices and lessons learned from other countries (see Table 7.3). By drawing on the experiences of other countries, Jamaica can ensure that its own system is effective in serving its intended purpose. Competent authorities have looked at Estonian and Indian digital ID models, but they could consider other examples, such as those in New Zealand and the United Kingdom. New Zealand's RealMe digital identity system provides secure access to government services and has been well-received by citizens due to its convenience and privacy features that protect users' personal information. RealMe also follows strict security protocols like encryption, multi-factor authentication, and regular security audits. Similarly, the United Kingdom's Verify system has successfully enabled secure access to public services while protecting privacy. It has established trust principles that emphasize user control, transparency, and accountability, ensuring that users have control over their own data and can grant or revoke access to it as they see fit. Jamaica could consider adopting similar approaches to ensure its system is user friendly and accessible while providing robust security measures to protect citizens' data privacy. Additionally, the country could benefit from establishing partnerships with other countries or organizations to learn from their experiences and ensure a successful rollout.

Table 7.4. Trust Frameworks for Digital ID and Services (country examples)

New Zealand - The Digital Identity Service Trust Framework Bill of 2022:[42]	The UK - Digital ID trust framework aims to:[43]
☑ Principals and rules ensure trust in ID system. ☑ The system is opt in. ☑ Sharing between government departments remains controlled. ☑ Privacy and security standards are built in. ☑ Identity theft risks are managed.	☑ Create a digital "trust framework" to oversee a robust accreditation and certification process (proof of adherence to the rules of the trust framework) ☑ Enable a legal gateway between public and private sector organizations for data checking ☑ Establish the validity of digital ID

Source: Authors' elaboration.

Cybersecurity and cybercrime

COVID-19 sped up the digitalization process worldwide, bringing about business innovation and rapid technological change, but it also revealed vulnerabilities and brought about new cybersecurity threats and risks. Cyberattack vectors, such as ransomware, phishing, and distributed denial of service, are causing severe harm to critical infrastructure operations, economic value, and livelihoods.[44] Even when there is no tangible damage, concerns among citizens and consumers regarding potential cyber risks undermine trust in the adoption and usage of digital products and services. As the world is increasingly interconnected and digital technologies underpin personal lives and business activities across many sectors, cybersecurity must become an integral and instrumental component of the overall digital ecosystem.

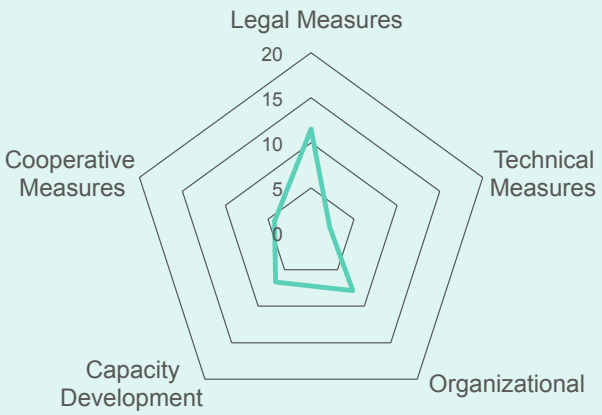
National cybersecurity capacities

National cybersecurity capacities in Jamaica are still at a formative stage.[45] The ITU's 2020 Global Cybersecurity Index, which measures a country's cybersecurity commitments in terms of legal, technical, organizational, capacity development, and cooperation measures, ranked Jamaica 106th out of 182 countries and 15th in the Americas region, indicating that the country has a low- to medium-level cybersecurity commitment.[46] It has an overall score of 32.53, with legal measures its main strength, on which it scored 11.4 out of 20 (see box below).

Jamaica is highly prone to significant cyberattacks due to its limited cybersecurity resources and capacities. In the first semester of 2022, the Caribbean countries experienced more than 144 million cyberattack attempts, with ransomware the most common vector. Jamaica is the fourth most attacked country in the region,

Box 7.3. Global Cybersecurity Index

The Global Cybersecurity Index highlights Jamaica's progressive efforts in establishing a foundational legal and policy framework for cybersecurity architecture. (see attached figure). However, other dimensions of cyber maturity, such as capacity development (e.g., public cyber awareness programs, education, and professional training), and organizational measures (institutional mechanism for cyber risk management and critical infrastructure protection) require further development. Furthermore, Jamaica scores low on technical measures (capacity of cyber response mechanisms) and lacks proactive engagement in regional and international cooperation and in building domestic public-private partnerships.[47]



Development Level:
Developing Country, Small Island Developing States (SIDS)

Area(s) of Relative Strenght
Legal Measures
Area(s) of Potential Growth
Technical Measures

Overall Score	Legal Measures	Technical Measures	Organizational Measures	Capacity Development	Cooperative Measures
32.53	11.54	2.18	7.87	6.68	4.26

Source: ITU Global Cybersecurity Index v4, 2020.

with 12 million attempts, surpassed only by Guyana, Suriname, and Barbados.[48] In 2021, JaCIRT registered over 80 cyber accidents that targeted private and public sector enterprises and individuals.[49] The nature of those cyberattacks varies but includes online fraud (the most reported category of online offenses), information security breaches (the second most reported category), and abusive content (harmful speech, sexual defacement, etc.).[50] Almost a dozen individuals reported identity theft in 2021. In 2022, Checkpoint, a security company, reported that Jamaican organizations are attacked 123 times per week compared to 897 attacks per week per organization in the Americas.[51] According to the Major Organized Crime and Anti-Corruption Agency (MOCA), the estimated loss to cybercrime is greater than JMD$12 million annually, a figure based on reported incidents. Since there are no mandatory incident reporting requirements for public and private organizations, the number of cyber incidents and the estimated loss in Jamaica could be much higher. The discrepancy between the recorded number of cyber threats and factual reality usually arises from the lack of a consistent, committed, and wholistically integrated approach across all digital ecosystem stakeholders to combating cybercrime.

Cybersecurity strategies and policies

Jamaica has been a pioneer in the LAC region in integrating cybersecurity into its policy and legal frameworks and in establishing key cybersecurity bodies early on. Jamaica has undertaken consistent steps to build up its national cybersecurity capacities, including through the adoption of the Vision 2030 document in 2009,[53] the Cybercrimes Act in 2010, the National Security Policy in 2013,[54] and the first NCS in 2015, as well as the establishment of the Communication Forensic and Cybercrime Unit in 2010 and JaCIRT (as a Division under the MSETT), among other measures.

Since the adoption of its last NCS in 2015, Jamaica's digital and cybersecurity environment has changed, so it would be useful to understand implementation success and prepare a new cybersecurity strategy and a roadmap. Due to the lack of regular review, monitoring, and reporting mechanisms, the success of the implementation of the 2015 NCS is unclear. In 2023, Jamaica has different needs and priorities in the cybersecurity domain, particularly after COVID-19. A new strategy will help to increase cyber resilience in the face of cyber threats and the ever-growing cybersecurity challenges. A 2021–22 Accomplishment Report from the Ministry of National Security stated that a multistakeholder national cyber policy and strategy development working group was established to draft a new NCS, but the status of this draft strategy remains unclear.[55]

Cybersecurity governance in Jamaica is changing, as the government is setting up a new National Cybersecurity Authority (NCA), but its time frame remains uncertain. The new agency will monitor cyber threats, provide skills training, and develop human capital. Its set-up is led by the MSETT. However, it is unclear when this new agency will be formally established and whether it will be leading the development of the new NCS.[56] The GOJ has also announced the establishment of a national cybersecurity academy to provide various cybersecurity trainings.[57]

The establishment of the NCA provides Jamaica with an opportunity to develop a clear cybersecurity governance structure. Most countries in the LAC region have made little progress in cybersecurity in the past decade because they lack clear national cybersecurity governance through which roles, functions, and responsibilities are clearly assigned. For instance, in the past decade, Colombia has adopted three national cybersecurity strategies, but it was not until 2022 that the country came to resolve some of the existing governance issues.[58] Other countries in the LAC region, such as Chile, Dominican Republic, Costa Rica, and Brazil, are working to make their current national cybersecurity governance more inclusive and thus more effective in improving their national cybersecurity capacities.

Through greater international cooperation on cybersecurity and cybercrime, Jamaican authorities can raise the bar on strategic and organizational cybersecurity measures. The maintenance of network and information systems, the analysis of strategic data, data storage and transfer, the prevention and resolution of cyber incidents, and greater coordination—all are essential components of strengthened cyber maturity in Jamaica. Proactive measures may be useful in engaging in bilateral, regional, and international cooperation to combat cyber threats. For example, the newly updated 2021 National Cyber Security Strategy of Singapore represents some new and potentially relevant practices in safeguarding the collective interest in cybersecurity.

Incident response

JaCIRT operates as the national CIRT, handling the incident response management cycle nationally, and as a GOV-CIRT, but it is not yet a member of the Forum of Incident Response and Security Teams (FIRST). JaCIRT was established by the MSETT following the adoption of the NCS. Its GOV-CIRT mandate includes the secure operations of the GOJ's IT resources through the coordination of incident response for MDAs, and it provides other services to protect IT assets from cyberattacks as well as mitigation and recovery after

incidents occur. JaCIRT is not yet a FIRST member but is part of the Computer Security Incident Response Team (CSIRT) Americas Network and collaborates actively with other incident response teams in the LAC region.

To deliver on its broad mandate, JaCIRT needs substantial support to enhance its technological, financial, and human resources. JaCIRT's core competencies as national CIRT and GOV-CIRT span beyond incident management and include continuity planning; forensic analysis of digital artifacts and custody of evidence; and vulnerability assessments, penetration testing, and security audits.[60] Although its staff is well qualified and trained in digital forensics, their capabilities are limited. There is no internal strategy, and the budget for training is also limited. JaCIRT relies on international partners for its staff training needs (IDB, OAS, LAC4, EU CyberNet, and others).

Statistical data on cyber incidents and threats are fragmented and may be insufficient for analysis and policy development. Cyber incidents can be voluntarily reported through JaCIRT's website or social media pages, phone calls, or walk-ins. Although JaCIRT encourages public and private sector organizations to report incidents to maintain a national-level registry, Jamaica has no mandatory incident reporting framework. National-impact cyber incidents remain underreported and unregistered. As this area is addressed, it would be important to elaborate on information gathering, management, and publishing functions, which are not yet fully developed and can be improved.

In Jamaica, the collaboration of public and private sector organizations with JaCIRT is rather nominal and has plenty of ways to evolve. Although it is becoming more common, in Jamaica currently there are no specific measures to incentivize private sector stakeholders to work collaboratively with the public sector on cyber resilience. For instance, some countries have shifted the primary role of mitigating cyber risks to the private sector, while the government provides a roadmap, assistance, and guidance derived from the lessons learned and analyzed cyber threat trends.[61]

Cybercrime

Jamaica is neither a signatory party nor an observer to the Council of Europe's Budapest Convention. The Cybercrimes Act of 2015,[62] Jamaica's primary law for addressing cybercrime, has been under scrutiny and public review since 2021 under the Joint Select Committee of Parliament. Proposed areas for amendments include range and type of damages, the kinds of injuries involved (e.g., consideration is given to mental/psychological injuries), clarification of issues involving illegal access and intent, increases in penalties for certain types of criminal offenses, the procedural aspects of search and seizure warrants, and so forth. Despite these important amendments, Jamaica has not joined the Council of Europe's Budapest Convention, a missed opportunity to promote international cooperation in the harmonization of its cybercrime laws and to secure the other benefits that come with accession.[63] The Council has encouraged the Caribbean Community and Common Market (CARICOM) countries to join the Budapest Convention; Dominican Republic became a signatory party in 2013, and Trinidad and Tobago were formally invited in 2021 and are on course to accede.[64] It may be thus timely to ensure that amendments to the Cybercrimes Act are aligned with the Budapest Convention's provisions and other international standards in order to speed up Jamaica's future accession.

Jamaica actively participates in the main international forum on the fight against cybercrime, but a more proactive approach to engaging the country's relevant agencies in regional and international activities is needed. At the regional level, Jamaica is a member of the CARICOM community, and its members subscribed to the Cybersecurity and Cybercrime Action Plan (CCSCAP) in 2017. CCSCAP addresses practical, harmonized standards of practice on cybersecurity and identifies the following priority areas: public awareness, sustainable capacity, technical standards, the legal environment, regional and international cooperation, incident response, cybercrime investigation, and capacity building. At the international level, Jamaica takes part in the work of the United Nations' International Convention on Countering Information and Communications Technologies for Criminal Purposes. Nevertheless, stakeholders interviewed highlighted that more collaboration at the regional and international levels would contribute to a robust mechanism for the implementation of strategic initiatives in Jamaica.

Jamaica's priority to combat cybercrime includes strengthening law enforcement and technical capacities. In 2010, the Jamaica Constabulary Force (JCF) was established under the Organized Crime Investigation Division, the Communication Forensic and Cybercrime Unit (CFCU).[65] To maximize institutional and infrastructural capacity, the JCF is working on establishing the Command, Control, Communication, Computer, and Cyber Center (C5 Center), which aims to enhance operational and investigatory capacity and tactical advantage in managing all categories of cases, including cybercrimes. The implementation of the project is in a nascent phase[66] but has received financial and technical support. For instance, the CFCU received significant technological equipment worth over US$30 million from the Ministry of National Security in early 2023 through the project PRO-CYBER, which focuses on technology and infrastructure improvement, training and develop-

ment, technical equipment, software licensing, and workspace.[67] The CFCU has also improved its investigation capabilities. According to the 2022 JCF Commissioner's Annual Report, the number of cyber forensic samples assessed by the CFCU increased from 3,395 in 2020 to 4,719 in 2021.

Jamaica also has a specialized cybercrime unit within MOCA, the independent law enforcement agency. The Cyber Forensics and Risk Management Unit has advanced cybersecurity capabilities and resources, including cyber forensics; a security operations center; a malware investigation lab; a big data analytics and fusion center; cyber threat intelligence; and vulnerability assessment and penetration testing. This Unit's staff members are highly skilled and trained and regularly carry out internal and external audits of GOJ and MDA networks.[68] MOCA's authority to investigate cybercrimes is triggered once it is determined that the nature of the offense may cause serious harm to government interests, national security, or critical infrastructure or may lead to significant financial losses. The jurisdiction to investigate is determined by a preliminary analysis of the reported offense. However, more precise rules on the investigatory jurisdiction between the JCF and MOCA will contribute to more effective and coordinated law enforcement activities in combating cybercrimes.

The lack of interagency cooperation on cybercrime matters has become a concern to the country's aspiration to build robust cybersecurity capabilities and wholistic institutional mechanisms. The established cooperation and collaboration channels should facilitate information and knowledge exchange among law enforcement agencies to enhance their core service delivery and mandate to prevent, detect, and investigate cyber offenses. This and other gaps impede the country's effort to strengthen the cybersecurity architecture.

The dearth of human resources with the relevant technical knowledge limits Jamaica's ability to prosecute cybercrimes, despite initiatives to address this shortage. In 2009, the Office of the Director of Public Prosecution (ODPP) established the Digital Evidence and Cybercrimes Unit (DECU) to prosecute crimes involving digital evidence and cybercrimes. However, DECU has only 15 prosecutors (out of the 58 attorneys who work within the ODPP) who handle cases involving digital evidence. For a high-volume caseload in the smallest circuits, two prosecutors will handle 90 cases over four weeks, and in the larger circuits, three prosecutors will manage up to 300 cases over eight weeks. In addition, modest remuneration leads to a low retention rate of qualified attorneys. The ODPP conducts some training courses on how to utilize investigative tools to secure the preservation, production, search, and seizure of electronic materials and data, the examination of digital evidence, and the admissibility of digital evidence in court. However, the course material needs to be revised and updated regularly, and the subject's level of complexity has increased. Through other efforts such as the Octopus project, Jamaica's officials, including law enforcement officers, prosecutors, and judges, have been occasionally trained in cybercrime and digital evidence issues. The JCF's efforts to increase technical capacity include launching a personnel training video series on investigative tools and digital evidence to prosecute crimes[69] and publishing a handbook on key elements of criminal offenses.[70] In addition, in 2017, the DECU published guidelines on the prosecution of section 9 cybercrime offenses.[71]

Communication channels between the different actors, including law enforcement agencies and the judicial system, for continuous exchange of information and coordination still have a low impact. Ineffectual communication channels reduce the justice system's effectiveness, impacting the rate of cybercrime cases that finally reach a conviction. The ODPP is pushing for fines and sentences under the Cybercrimes Act to be aligned with the severity of cases, particularly those associated with AML and anti-gang activities, and to amend the Act to strengthen its substantive provisions and procedural powers.

The judges from the parish and high courts responsible for adjudicating cybercrime cases need further training to strengthen their capacities in cybercrime offenses and digital evidence analysis. The judges are well versed in civil and criminal matters, but their knowledge of and expertise in adjudicating cybercrimes and analyzing digital evidence are not up to date, and further specialized training is required. Regular training helps but is insufficient to deal with complex and cross-border cybercrime cases. Judges are also limited by the scope of the provisions of the Cybercrimes Act, particularly by the ceiling on sentencing, which is only seven years. As noted, the ODPP is advocating for more substantial sentences and fines, but the Cybercrimes Act needs to be amended for this to be possible. In Jamaica, there is also a discussion within the legal community on the composition of the parish and high courts that are trying cybercrime cases, that is, whether those cases should be tried before a judge or a jury.[72]

Critical information infrastructure protection

Jamaica has not yet officially identified its critical information infrastructure (CII) sectors, though the GOJ has recognized the importance of protecting CII assets. The NCS acknowledged the need to protect critical infrastructure systems and established five specific activities to ensure their security and resiliency. In 2016, Jamaica adopted the "Plan Secure Jamaica"

(2016–2023), the country's first holistic national security plan focusing on 10 strategic areas, including critical infrastructure protection and cyber defense.[73] However, it is unclear whether those CII activities have been accomplished.

Essential services are therefore highly exposed to cyberattacks unless the GOJ identifies and protects the CII sectors and assets. To ensure the security of national CII, a comprehensive national CII protection plan should be an integral part of the new NCS and incident response mechanisms and a focus of cooperation between public and private sector operators of essential services. These efforts can complement the Plan Secure Jamaica. In just one example, the newly adopted cybersecurity strategy in the United States outlines an approach to the symbiotic defense of CII carried out by whole-of-government cyber defense actors[74] and the private sector.

Cyber awareness, education, and training

In the NCS of 2015, Jamaica recognized the importance of cyber awareness campaigns and education in building a trustworthy digital environment. The NCS established public education and awareness campaigns as strategic objectives in the development of a cybersecurity culture.[75] Following those NCS goals, the MSETT and JaCIRT have organized national cybersecurity awareness-raising campaigns targeting different demographics, including school children, individuals, and public and private sector organizations. The educational activities are organized based on an annual Public Education and Awareness Plan adopted by JaCIRT and are connected to thematical calendared dates. For instance, October is National Cybersecurity Awareness Month, which is commemorated with a series of weekly events led by JaCIRT highlighting phishing scams, the protection of personal information online, and so on. As part of the "Stop Think and Connect" international campaign, the MSETT has partnered with schools and universities to provide cybersecurity materials to students on how to stay safe online and to incentivize career development in cybersecurity. Still, it should be noted that these cybersecurity training, workshops, and educational events are conducted by those entities on an ad hoc basis.

The JaCIRT website has scanty coverage of educational programs and adversary materials and needs further upgrades to meet the needs of all demographic groups. Regarding accessibility to the permanent content that advises individuals and companies on cyber safety, the JaCIRT website is limited. It does not provide sufficient information on prevention and protection methods from cyberattacks, for example, nor does it offer the public customized, updated, and comprehensive educational materials. A lack of knowledge of available protection against digital offenses is a barrier to building trust in the financial system and to promoting digital transactions and services, which are critical to further developing the digital economy. Access to periodic, inclusive, and engaging content tailored to the needs of public and private entities and individuals of different demographic groups is instrumental to expanding the outreach of the cybersecurity awareness programs. In Singapore, the Cyber Security Agency set up interactive and engaging approaches to attracting the attention of internet users, including the most vulnerable groups (minors and seniors), to cyber-safe conduct. Through collaborative efforts and multistakeholder partnerships, the Agency leads outreach programs for the general public, seniors, and youth, who can learn about good cyber hygiene practices through quizzes, entertaining video series, and games by visiting the Agency's website.[76]

Private sector and civil society organizations also fund and deliver awareness-raising campaigns, but their impact is limited due to a lack of consistency and collaboration channels with JaCIRT. The Jamaica Bankers Association consistently delivers cybersecurity training programs to its members and has funded national-level public education programs and awareness-raising campaigns on cybersecurity implemented by the MSETT.[77] The Jamaica Information Service Think Tank has also provided awareness-raising campaigns and capacity-building activities, such as cybersecurity and data protection forums, targeting educators and administrators.[78] Those organizations and others work closely with the MSETT and JaCIRT to deliver these campaigns, though stronger coordination among the key actors would increase their impact.

Despite the growing demand for professionals with specialized skills in cybersecurity, access to professional education on this subject at the tertiary level is minimal. Most ICT-related academic programs and degrees, including cybersecurity, have limited enrollment capacity and are inaccessible for many due to excessive costs (see Chapter 5 for more on Digital Skills). Jamaica's knowledge and skills development and professional training components are still under development (formative stage), requiring further coordinated actions to reach a stage of higher maturity.[79] To fill this talent gap, the GOJ needs to expand educational opportunities in cybersecurity through scholarships, increase enrollment caps, and/or create additional programs. The GOJ, sectoral representatives, small businesses, and academia should consider creating working groups to address the national priorities in this domain.

Cybersecurity courses[80] are not yet part of the curricula of primary and secondary schools. Even though school children are occasionally trained in staying safe online and in similar cybersecurity-related concerns, the

MOEY and other competent authorities have not integrated specific cybersecurity courses into the school curricula to enhance children's cybersecurity competencies and to create a more secure digital culture. This should be addressed in the new NCS and supported with robust activities and sufficient resources.

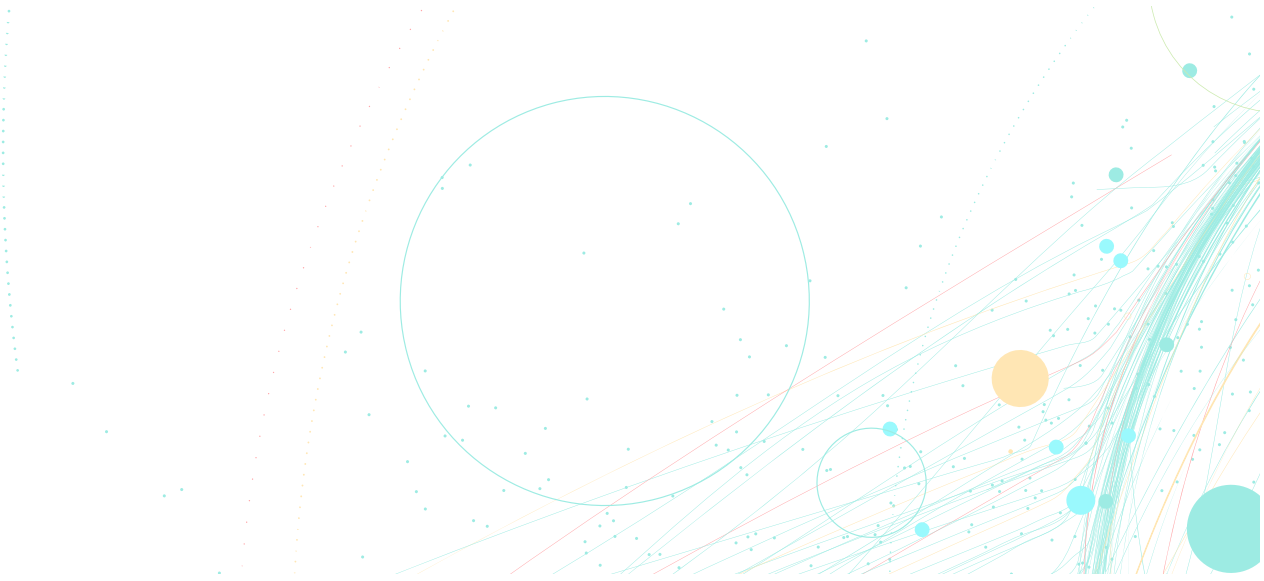
Table 7.5. Digital Trust Environment: Key Challenges and Opportunities (1 of 2)

Strengths	Areas for Improvement
» Jamaica has built the foundational grounds to develop a robust digital economy. » There is a strong orientation toward further digital development with attention to international trends. » There is a clear potential to design a collaboration framework with the private sector to align interests and needs in pursuing digital development objectives. » The GoJ has established important collaboration mechanisms with international partners that are willing to support the country with technical assistance and financial resources. » Comprehensive data protection and cybercrime legal frameworks are in place, though both need further refinement. » The GoJ is committed to addressing cybersecurity issues and thus enhancing national capacities. » Cybersecurity awareness-raising campaigns are conducted by JaCIRT and cover a variety of subjects. Working in coordination with academia, industry, and civil society groups will increase their impact.	» Data enablers that incentivize data flows, such as digital ID, open data, e-transactions, and interoperability of platforms, need further development. » The institutional, financial, and operational independence of the OIC needs to be enhanced to ensure the supervision and enforcement of the DPA. » Private sector stakeholders should be engaged in the discussion on sectoral needs and the specifics of the implementation of data protection safeguards. » Data protection awareness programs and public education campaigns should be initiated. » Collaboration with civil society on matters of data protection and cybersecurity should be strengthened. » There should be more incentives for and commitment to nourishing human digital capital (expertise and skills). » The most recent NCS does not contain a roadmap to enhance national capacities and define current needs and priorities. » There is no whole-of-government cybersecurity governance structure in place. » A National Cybersecurity Agency with specific functions needs to be established and should have an inclusive and multistakeholder approach. » JaCIRT's incident response capacity is limited and needs more resources to deliver on its mandate. » CII sectors and assets have not been identified and regulated to ensure adequate protection and guarantee service delivery. » There is limited capacity and resources to investigate, prosecute, and try cybercrimes; more resources and training opportunities are required. » There is no national cyber crisis management framework, and national and sectoral cyber drills are not systematically organized. » Cybersecurity degree programs in tertiary education need to be strengthened and the enrollment capacity of the programs expanded to accommodate market demand.

Table 7.5. Digital Trust Environment: Key Challenges and Opportunities (2 of 2)

Opportunities	Challenges
» Elevate Jamaica's digital economy to a new level of digital development by strengthening the trust environment. » Align the domestic legal field with recognized good practices to increase investment flows and business transactions. » Develop resilient cybersecurity architecture to prevent and minimize cyber risks. » Foster people's trust in technologies and reinforcement of the rule of law and constitutional guarantees. » Incentivize growth and innovation in the ICT sector as a percentage of GDP. » Consider establishing a triparty working group (government, academia, and industry) to address cybersecurity education issues and demands. » Integrate local governments (e.g., municipalities) into national cybersecurity policy development to help strengthen the country's cybersecurity resilience. » Incentivize the local cybersecurity market to promote the development of services and products.	» Siloed approach to delivering digital programs in agencies that could potentially benefit from cooperation and exchange of expertise » Lack of digital and security labor force (IT, cybersecurity, data protection officers) and insufficient incentives (e.g., scholarships) to attract more students and professionals to IT and security careers » Weak technical and institutional capacity to strengthen cybersecurity architecture (physical infrastructure, coordination mechanism, information sharing with the private sector, etc.) » Absence of formal forums and channels of communication for cooperation to further digital trust development within the national trust ecosystem and with close regional and international partners » Limited adoption and supervision of security standards and best practices in the public sector

Source: Authors' elaboration based on the digital economy assessment.



7.3. Recommendations: Align with international standards such as the Budapest Convention and identify critical information infrastructure sectors

This section identifies the main areas where additional effort should be undertaken to improve the digital trust environment in the domain of **data protection and cyber security** in Jamaica:

Data Protection

Short term
Full operationalization of the OIC and guarantees for the independence of the OIC mandate
Collaboration with private and public sectors stakeholders for further development of adequate supplementary data protection regulations and guidance and an update of existing legislation
Design of a strategy for cross-border data transactions and protection of CII
Medium term
Development and adoption of supplementary data protection regulations, codes, and guidance
Establishment of a compliance and enforcement mechanism for data protection
Promotion of public awareness and understanding of the risks, rules, safeguards, and rights in relation to processing personal data/information (including children's data protection)
Longer term
Administration of the data protection compliance framework
Upholding of societal and business expectations of trusted, safe, and environmentally friendly technologies, services, and digital space

Cybersecurity

Short term
Adoption and operationalization of the updated (new) NCS and amended Cybercrimes Act
Design of the architecture of the NCA
Investment in cyber expertise, knowledge, and talent development
Medium term
Establishment of the NCA
Creation of a cohesive national mechanism for preventing and detecting cyber threats
Longer term
Review and update of national strategy and increases in capacity per risk assessment Expansion of multistakeholder collaboration at regional and international levels to further knowledge and expertise exchange

Table 7.6. Trust Environment: Policy Recommendations (1 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Implementation of the Data Protection Act	**Operationalize the OIC and ensure its capacity to carry out its legal mandate and perform the necessary functions.** Based on the DPA, the OIC is the main data protection agency and it requires adequate financial, technical, and human resources to carry out its mandate. **PRIORITY**	MOFPS, MSET	Short term	No
	Develop a step-by step strategy and a roadmap of priorities for the full operationalization of the DPA. In accordance with the DPA, the OIC must develop a wide range of data-compliance norms that outline the data-protection mechanism. **PRIORITY**	OIC	Short term	No
	Ensure timely development and adoption of supplementary substantive data protection regulations, codes, and guidance.[81] There is no clarity on how the private and public sector entities that process personal data should comply with the DPA. In addition to the subjects mentioned in the statute, the supplementary guidance needs to elaborate on: » Criteria for data controllers » Role and rules of performance for data processors » Rights and obligations of the DPO » Records requirements, including the legal basis for data processing and consent » Retention periods of the database, basic documents, and data » Requirements for data storage and access, etc. **PRIORITY**	OIC	Short term	No
	Ensure development and adoption of the supplementary procedural data protection regulations, codes, and guidance. The following areas require guidance: » Privacy impact assessment: annual submission (mechanism and rules) » Breach notification procedures » Rectification procedures	OIC	Short term	No

Table 7.6. Trust Environment: Policy Recommendations (2 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Implementation of the Data Protection Act	» Enforcement and penalties, registration process, and fees for data controllers/processors » Sectoral needs and specifics of data protection PRIORITY	OIC	Short term	No
	Clarify cross-border data transfer rules and criteria on "adequate states and territories" and develop a guide on privacy impact assessments (personal data, critical infrastructure data, etc.).	OIC and government agencies with digital/trade mandates	Medium term	No
	Refine the data protection framework in the area of the right to data portability, which is currently conditioned on payment of a fee. Consider clarifications on the verification of the age of digital consent by online providers.	OIC	Medium term	
	Harmonize legislation and regulations that intersect with data protection principles and areas of protected rights.	OIC and government agencies with relevant sectoral mandate	Medium term	Yes
	Conduct sectoral consultations to determine the need for a sector-specific data protection regulation. PRIORITY	OIC	Medium term	Yes
	Conduct awareness campaigns on the meaning of digital privacy and methods of protection, including children's safety online. In addition, conduct awareness campaigns targeting MSMEs and supporting compliance with data protection regulations.	OIC, MOEY, JaCIRT	Short term	No
Cybersecurity strategy, governance, and policy development	**Develop a new NCS** to ensure a holistic approach to cybersecurity between government agencies and incentivize cyber hygiene in the private sector. PRIORITY	MSET, JaCIRT, and government agencies with relevant cybersecurity mandate	Short term	Yes
	Update the substantive cybercrime framework to ensure that it is harmonized with internationally recognized standards and best practices. PRIORITY	Law enforcement agencies with relevant cybersecurity mandate, and legislative branch	Short term	Yes

Table 7.6. Trust Environment: Policy Recommendations (3 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Cybersecurity strategy, governance, and policy development	**Identify critical infrastructure sectors and assets** and outline a risk management plan. Establish legal and technical measures to protect critical infrastructure sectors and assets. **PRIORITY**	MSET, JaCIRT and government agencies with relevant cybersecurity mandate	Short term	Yes
	Finalize dialogue on the design of the NCA architecture. Ensure that the new cybersecurity governance structure, the NCA, becomes operational and functions in an inclusive and coordinated manner. This will also support the implementation of the new NCS. **PRIORITY**	MSET, JaCIRT	Short term	Yes
	Enhance the technical and organizational capabilities of JaCIRT in incident response management.	MSET, JaCIRT	Midterm	No
	Improve statistical data management for cybersecurity incidents and cyber offenses.	MSET, JaCIRT, law enforcement Agencies	Midterm	No
Capacity building and skills and knowledge development	**Improve and expand cybersecurity awareness-raising efforts** by enhancing the quality, variety, and interactive format of the materials on cybersecurity, covering a wide range of issues and demographics, including the elderly and youth. Develop a program of incentives and educational and technical support for the private sector, including MSMEs. **PRIORITY**	MSET, JaCIRT	Short term	No
	Enhance the knowledge and capabilities of officials and professionals within law enforcement, prosecutor's offices, and the judiciary. The competent authorities should consider joining efforts to provide sufficient resources for systematic training at the specialization level that should aim at 1) increasing training, capacity, and knowledge development on procedures and understanding the science behind digital evidence and methods in presenting cybercrime cases in court; 2) enhancing the capacity of police officers and investigators to collect, search, seize, and preserve digital evidence and ensure correct attribution and qualification of digital crimes.	MSET Ministry of Justice, law enforcement agencies, Prosecutor's Office, MOCA, and judicial branch	Short term	No

Table 7.6. Trust Environment: Policy Recommendations (4 of 4)

Reform Area	Recommendation	Responsible Entities	Timing	Is Legal Change Required?
Capacity building and skills and knowledge development	Subjects of the training: digital forensics, communications, data and analysis; how to associate data and communications in the context of the trial; proper chain of custody and attribution; best practices in collecting digital evidence. **PRIORITY**	MSET Ministry of Justice, law enforcement agencies, Prosecutor's Office, MOCA, and judicial branch	Short term	No
	Improve employment conditions to tackle issues around the high attrition rate and modest remuneration of prosecutors.	Ministry of Justice	Midterm	No
	Build networks between law enforcement agencies to strengthen synergies and knowledge sharing between them.	Law enforcement agencies and Prosecutor's Office	Midterm	No
	Enhance the cybersecurity education offering at the tertiary level and create more affordable cybersecurity professional training opportunities by expanding enrollment capacity and degree programs. Also, consider creating more affordable professional training opportunities and industry certifications and developing a robust cadre of cybersecurity professionals and academics. Expediting the integration of cybersecurity-related courses into primary and secondary school curricula is also essential to improving the skills and knowledge of future generations.	MOEY	Midterm	No

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16. Gagnier and Gore (2021).
17. DPA, Sec. 12 (2)
18. DPA, Sec 6.2 (c)
19. Note: GDPR art 20. Data portability. In exercising his or her right to data portability pursuant to paragraph 1, the data subject shall have the right to have the personal data transmitted directly from one controller to another, where technically feasible.
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24. The Data Protection Oversight Committee is composed of seven members, appointed for a term of three years with the mandate 'to hold the Information Commissioner accountable to the public for the performance of the functions mandated under the Act. DPA of 2020, First Schedule, Part II, Sec.1.
25. Note: Eight Standards of Data Privacy and Protection: 1) Fair and Lawful Processing; 2) Obtained Only for Specified Lawful Purposes; 3) Data Quality; 4) Accurate and Up to Date; 5) Limited Retention; 6) Processed in Accordance with the Rights of Data Subjects; 7) Protected by Appropriate Technical and Organizational Measures; 8) International Transfers
26. DPA, Sec. 28.
27. DPA, Sec 20 (1)
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29. WDR 2021, CH.6, p. 191. – this statement is also referenced in the WDR
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32. Arroyo (2022)
33. See https://id4d.worldbank.org/global-dataset/visualization
34. World Bank (2022b).
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47. ITU (2020).
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69. Video series launched in partnership with the Office of the Director of Public Prosecution, particularly with the Cybercrimes and Digital Forensic Unit, and the United States Embassy (Police Report 2022; p.11)
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ANNEXES

Annex 1. Vision 2030 and DE4LAC Alignment

Vision 2030 (Outcome 11, A Technology-Enabled Society) and DE4LAC alignment.[1]

	Vision 2030 National Strategies (Under outcome 11)	DE4LAC
Integrate Science and Technology into All Areas of Development	» Build capacity for effective science and technology education in primary and secondary schools; » Use ICT to enhance learning in the formal education system; » Promote lifelong learning in ICTs	Digital Skills
	» Build strong links and create a two-way transfer of knowledge between research in tertiary institutions and the market place	Digital Skills; Digital Businesses
	» Create and improve strategic public private sector partnerships in building science and technology skills and competencies and improving infrastructure	Digital Skills; Digital Infrastructure
	» Create and maintain a coordinated and creative funding mechanism for R&D and innovation such as venture capital, foreign direct investment, revolving loan scheme for MSMEs, tax concessions on R&D equipment, and a national R&D fund; » Review and define roles of R&D institutions to gain maximum output of ST&I investments; » Commercialize research and innovation	Digital Businesses
	» Make available and accessible geospatial data, products and services to all users, to facilitate planning, sustainable use, management and development of the island's resources	Digital Infrastructure
	» Create an effective policy and legislative framework to support and advance ST&I including strengthening the Intellectual Property Rights (IPR) System » Strengthen and modify the policy, legislative and regulatory framework governing the ICT sector in a transparent, effective and efficient way » Integrate ICT in the administration of justice and law enforcement	Trust Environment
	» Encourage innovative use and application of ICT by Jamaican private enterprise and Government; » Align ST&I investments to solve national problems in industry, environment and society	Digital Businesses; Digital Public Platforms
	» Entrench a dynamic national and local decision-making process based on reliable scientific and other relevant information	Digital Public Platforms
	» Develop a viable and robust ST&I policy, which is aligned with other policies (including biotechnology, energy, agriculture, environment, industrial, science education, health, mining and ICT)	General
Establish a Dynamic and Responsive National Innovation System	» Align investment in ST&I infrastructure with national development goals; » Identify priorities for ST&I infrastructure development consistent with state development objectives and the ST&I vision to deliver joint investment by industry, research institutions and Government	Digital Infrastructure

	Vision 2030 National Strategies (Under outcome 11)	DE4LAC
Establish a Dynamic and Responsive National Innovation System	» Create financing and incentive mechanisms aimed at attracting more research intensive activity in Jamaica » Increase commercial funding and grants for ICT research and innovation	Digital Businesses
	» Promote formation of and nurture STI professional organizations as vehicles for STI capacity formation and conduits for the flow of STI knowledge and skills into the country's innovation system » Develop and organize world-class research teams across all disciplines	Digital Skills
	» Create knowledge parks and centers of excellence to facilitate R&D and innovation, with emphasis on indigenous technology; » Create a national research and development agenda and establish appropriate mechanisms to encourage the private sector to become a dominant player in STI and R&D activities	Digital Skills; Digital Businesses

Notes

1. PIOJ (2009).

Annex 2. DigComp 2.0 Proficiency Levels and Skill Examples

4 OVERALL LEVELS			Basic		Intermediate		Advanced		Highly specialized	
8 GRANULAR LEVELS			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
COMPLEXITY OF TASKS			Simple task	Simple task	Well-defined and routine tasks; straightforward problems	Tasks, and well-defined and non-routine problems	Different tasks and problems	Most appropriate tasks	Resolve complex problems with limited solutions	Resolve complex problems with many interacting factors
AUTONOMY			With guidance	With autonomy and guidance when needed	With autonomy	With autonomy and according to on own needs	Guide others	Able to adapt to others in a complex context	Integrate to contribute to the professio-nal practice and to guide others	Propose new ideas and processes to the field
COGNITIVE DOMAIN			Remembering	Remembering	Understanding	Understanding	Applying	Evaluating	Creating	Creating
DIGITAL SKILL DOMAINS AND COMPETENCES										
EXAMPLES	**1 - Information and data literacy**	**Competence:** Managing data, information and digital content	With guidance, identifies how to organize, store and retrieve data, information and content in a simple way in digital envirionments.	With autonomy and some guidance, identifies how to organise, store and retrieve data, information and content in a simple way in digital environments.	Selects data, information and content to oganize, store and retreive them in a routine way in digital environments.	Organizes information, data and content to be easily stored and retreived.	Manipulates information, data and content for their easier organization, storage and retrieval.	Adapts the management of information, data and content for the most appropriate easy retrieval and storage.	Creates solutions to complex problems with limited definition that are related to managing data, information, and content for their organisation, storage and retrieval in a structured digital environment.	Creates solutions to solve complex problems with many interacting factors that are related to managing data, information, and content for their organisation, storage and retrieval in a structured digital environment. Proposes new ideas and processes to the field.

4 OVERALL LEVELS			Basic		Intermediate		Advanced		Highly specialized	
8 GRANULAR LEVELS			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
EXAMPLES	**2 - Communication and Collaboration**	**Competence:** Netiquette	With guidance, differentiates simple behavioural norms while interacting in digital environments, chooses simple communication modes and strategies adapted to an audience, differentiates simple diversity aspects to consider in digital environments.	With autonomy and some guidance, differentiates simple behavioural norms while interacting in digital environments, chooses simple communication modes and strategies adapted to an audience, differentiates simple diversity aspects to consider in digital environments.	"Clarifies well-defined and routine behavioural norms while interacting in digital environments, expresses well-defined and routine communication strategies adapted to an audience, describes well-defined and routine diversity aspects to consider in digital environments."	Discusses behavioural norms while interacting in digital environments, discusses communication strategies adapted to an audience, and discusses diversity aspects to consider in digital environments.	Applies different behavioural norms how while interacting in digital environments, applies different communication strategies in digital environments adapted to an audience, and applies different diversity aspects to consider in digital environments.	Adapts the most appropriate behavioural norms while interacting in digital environments, adapts the most appropriate communication strategies in digital environments to an audience, and applies apply different diversity aspects in digital environments.	Creates solutions to complex problems with limited definition that are related to digital etiquettes, integrates knowledge to contribute to professional practice and knowledge and guide others in digital etiquette.	Creates solutions to solve complex problems with many interacting factors that are related to digital etiquettes and proposes new ideas and processes to the field.
	3 - Digital Content Creation	**Competence:** Programming	With guidance, lists simple instructions for a computing system to solve a simple problem or perform a simple task.	With autonomy and some guidance, lists simple instructions for a computing system to solve a simple problem or perform a simple task.	Lists well-defined and routine instructions for a computing system to solve straightforward routine problems or perform routine tasks.	Lists instructions for a computing system to solve non-routine problems or specific tasks.	Operates with instructions for a computing system to solve different problems or perform different tasks.	Determines the most appropriate instructions for a computing system to solve a given problem and perform specific tasks.	Creates solutions to complex problems with limited definition that are related to planning and developing instructions for a computing system and performing a task using a computing system. Integrates own knowledge and guides others in programming.	Creates solutions to solve complex problems with many interacting factors that are related to planning and developing instructions for a computing system and performing a task using a computing system. Proposes new ideas and processes to the field.

Annex 3. Summary of Goals and Strategies in the 2019 Science, Technology, and Innovation Policy

Goal	Summary of strategies
A dynamic and responsive national system of innovation	» To establish a system of innovation » To promote collaboration among all the key components of the national innovation system
A culture of innovation	» To raise awareness of the benefits of ST&I to national development in order to fully engage and empower people, communities and sectors in public and private spheres » To increase knowledge, technology outputs and innovative potential within industry to expand production, enhance productivity and service quality, firm profitability, international competitiveness, and sustainability. » To improve the local quality infrastructure in support of Jamaica's innovation system, technology transfer and enhancing Jamaica's competitiveness.
A Development Agenda Advanced by ST&I	» To optimize the use of ST&I in key economic, social and environmental priority areas. » To position the national science, technology and innovation system to respond to future crises, through emergency preparedness, and disaster management and response.
An Excellent Research and Development Capability	» To create sustainable mechanisms for financial support of R&D programmes targeting a GERD of at least 1.5 percent by 2029. » To strengthen and establish state of the art ST&I infrastructure (laboratories, libraries, museums, electronic platforms, etc.). » To increase and improve the human resource capital for ST&I, increasing representation of women and persons with disabilities.
An Enabling ST&I Policy Environment	» To ensure legislation and policies remain relevant and impactful » To strengthen the National Commission on Science and Technology (NCST). » To comprehensively monitor Jamaica's ST&I inputs, outputs, challenges and opportunities using globally accepted standards and against national policies and legislation.

Source: Author, with data from MSET's 2022 ST&I Policy.

Annex 4. Goals and Strategies in the 2022 ICT in the Education Policy

Goal	Summary of strategies
Transforming the teaching and learning process	» Increase access to ICT resources » Promote the use of digital materials » Establish a framework for mindset change » Create teacher knowledge-sharing networks » Support the development of digital resources » Use ICT to foster effective governance and strengthen professional competence.
Learning opportunities for all	» Create an ICT-based education system that is inclusive » Enhance the collection, analysis, and reporting of data through the MIS. » Build the capacity of educators to use technologies and facilitate continuous learning » Build the capacity of parents and other stakeholders to navigate ICT learning environments
Efficient management and administration of the education system	» Implement an Education Management Information System (EMIS) » Build capacity to incorporate ICT in the administration of education » Upgrade schools' ICT infrastructure
Promoting the development of ICT innovations	» Promote research and innovation in the application of ICTs » Facilitate creative expressions through ICT » Provide entrepreneurship training in ICT

Source: Author, with data from MOEY's 2022 ICT in Education Policy.

Annex 5. Digital Skills Attainment Targets for Grades 1 through 9, according to the National Standards Curriculum

Launched in 2016, the **National Standards Curriculum (NSC)** focuses on integrating ICT as a pedagogic tool for grades 1 through 9. It does not provide standards for stand-alone ICT classes, but it does establish four attainment targets for digital skills that students must develop using ICT across subjects.[1]

- **Communication and collaboration:** Use of technology to communicate ideas and information, and work collaboratively to support individual needs and contribution to the learning of others.
- **Research, critical thinking, problem solving and decision making:** Use of appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems, and make informed decisions.
- **Designing and producing:** Use of digital tools to design and develop creative products to demonstrate learning and understanding of basic technology operations.
- **Digital citizenship:** Recognize the human, ethical, social, cultural, and legal issues and implications surrounding the use of technology, and practice online safety and ethical behavior.

Annex 6. Jamaican National Qualifications Framework

Levels	Jamaican Tertiary Education Sectors				
	General Education	Technical & Vocational	Occupational Degrees	Tertiary Education	Lifelong Learning
8		C/NVQ 8	Applied Doctorate	Doctoral Degree	Prior Learning Assessment and Recocgnition (PLAR)
7		C/NVQ 7		Masters Degree	
6		C/NVQ 6	Occupational Masters	Post Graduate Certificate/ Diploma	
5		C/NVQ 5	Occupational Bachelors	Bachelors Degree	
4		C/NVQ 4	Occupational Associates	Associates Degree / Advanced Diploma	
3	Certificate (Upper Secondary)	C/NVQ 3		Diploma	
2	Certificate (Upper Secondary Leaving)	C/NVQ 2			
1	Certificate (Lower secondary)	C/NVQ 1			
----	Access Point 2				
	Access Point 1				

Source: Jamaica Tertiary Education Commission (https://jtec.gov.jm/the-national-qualifications-framework/). Last retrieved on December 2022.

Notes

1. Summarized from the review of curricula for multiple grades and subjects.

Annex 7. Short Digital Skills Training Programs in Jamaica

Leading organization	Partners	Program name	Target population				Program components							Training delivey modality			Status
			Age	Educational attainment	Employment status	Estimated beneficiaries	Device distribution	Internet access subsidy	Digital skills training	On-the -job learning	Foundational skills training	Program duration	Certification	In-person	On-line	Hybrid	
Amber Group	HEART	Institute of Coding	18-29	Certified highschool (min 5 CXCs)	Unemployed	500	X	X	X	X	X	1 year	X	X			Active
	» Jamaica Teachers' Association » MOEY	Coding in Schools	-	Tertiary education completed	Employed as teacher (for public schools)	600			X			~3 weeks	-			X	On hold
Chamber of Commerce	» Sameer Younis Foundation (JCC-SYF) » Caribbean School of Data » US Embassy	Digital Skills and Advocacy Training Program	-	-	-	~60			X		X	3 months	-			X	Unknown
Flow Foundation	Caribbean School of Data	Skills for the Future	-	-	-	~4,000			X			Self-paced	X		X		Active
	» One-on-One Education Services » Jamaica Teachers' Association	Training for Professionals	-	Likely minimum: certified highschool graduates	Not specified. Teachers have been super users. 1,000 completed training.	~5,000			X		X	Self-paced	X		X		Active
	» MLSS » One-on-One Education Services	Jump Program	-	-	Not specified. Targeted to vulnerable households.	~1,500	X	X	X			Self-paced	-		X		Active
HEART/NSTA	Digicel	-	-	Likely minimum: certified highschool graduates	Employed by Digicel	2.000			X	X		-	X			X	Unknown
Inter-American Development Bank	Government of Finland	Online Teacher Training for the Caribbean		Likely minimum: undergraduate degree	Employed as a teacher	-			X	X		1.5 months	X		X		Active
JAMPRO	» IADB (funder) » 50 GSS Firms » Global Services Association of Jamaica » Private training institutions » HEART » MOEY	Global Services Sector - Apprenticeship program	-	Certified highschool (min 5 CXCs)	Employed in GSS sector	~12,000			X	X	X	1 year	X			X	Active
		Global Services Sector - Internship program	-	Tertiary education students	Unemployed	-			X	X		-	-	X			Active
		Global Services Sector - High School Immersion Bootcamp	16-20	Highschool students or recent graduates	Unemployed	~20,000			X		X	3 months	X		X		Active
Microsoft	MOEY	Digital Skills Program	Youth	-	-	31.000			X		X	-	-		X		Unknown
NCB Foundation	» Trust for the Americas » MICO University College	ICON and Level Up	16-30	-	-	315	X		X		X	-	-			X	Active

Leading organization	Partners	Program name	Target population				Program components							Training delivey modality			Status
			Age	Educational attainment	Employment status	Estimated beneficiaries	Device distribution	Internet access subsidy	Digital skills training	On-the -job learning	Foundational skills training	Program duration	Certification	In-person	On-line	Hybrid	
Seprod Foundation	Halls of Learning	Hour of Code	<11	NA	Unemployed	~250			X			1 hour	-	X			Unknown
		Scratch workshops	<11	NA	Unemployed	-			X			-	-	X			Unknown
		Virtual Robotics Jamaica	<20	NA	Unemployed	-			X			-	-		X		Unknown
	UBISOFT	UBISOFT Game Creators' Odyssey	>18	-	-	-			X			90 hours	X		X		Unknown
SheCodes Foundation		SheCodes Workshops	-	-	-	1.000			X			6 months	-		X		Active
Trust for the Americas	» IADB Lab » NCB Foundation » Citi Foundation » Microsoft Foundation » Jamaica Chamber of Commerce » PSOJ » Caribbean School of Data » MOEY » Private training institutions	JET Program	17-34	-	Unemployed Underemployed	1.200			X		X					X	Active
UNESCO	University of the West Indies	Distance Learning and Teacher Training Strategies in the Caribbean	-	Likely minimum: undergraduate degree	Employed as a teacher	2.000			X	X		-	-		X		Unknown
UNICEF	National College for Educational Leadership	Virtual Instructional Leadership Programme	-	Likely minimum: undergraduate degree	Employed as a teacher	2.428			X	X		Self-paced	-		X		Completed
Universal Service Fund	» Caribbean Maritime University » Amber Group	Technology Advancement Program	18-29	-	Unemployed	1.600		X	X	X		1 year	X	X			Active
	Jamaica Technology and Digital Alliance	Highschool ICT Clubs	<18	Middle school	Unemployed	-			X			-	-	X			Active
World Bank	University of the West Indies	Caribbean Mobile Innovation Project	-	-	Entrepreneur	464			X			-	X				Unknown
	Office of the Prime Minister	Youth Employment in the Digital and Animation Industries	-	-	-	1.534			X		X	-	X				Unknown

Source: Author's compilation from multiple sources and interviews.
Note: This list is indicative of the engagement of multiple stakeholders in digital skills development in Jamaica. It includes initiatives that have been implemented in the last five years and have publicly available information on the internet, but it is not exhaustive. Sources of information vary in terms of quality and detail; the author has made informed assumptions whenever possible but they can be mistaken. Programs are constantly evolving and updated information is usually unavailable, which may make some of the information in this table outdated, imprecise, or mistaken.

Annex 8. Main Skills Demands in the Jamaican Economy

- 3-D Printing
- Application Development
- Application of GIS
- Artificial Intelligence
- Augmented and Virtual Reality
- Bitcoin
- Blockchain
- Building Information Modelling
- Business Analytics
- Cloud Computing
- Content Writing
- Cryptocurrency
- Customer Service
- Data Mining and Analytics
- Digital Literacy
- Digital Marketing
- Drone Technology
- Engineering
- Entrepreneurship
- Foreign Language
- Green Manufacturing
- Hydrologic Management and Monitoring
- Hyperbaric Welding
- Industrial Maintenance
- Information/Network Security
- Innovation/Product Development
- Internet of Things
- Legal Research
- Machining and Fabricating
- Market Research
- Nanotechnology
- Precision Farming
- Programming
- Project Management
- Quality Auditing
- Renewable Energy
- Research and Development
- Risk Identification and Management
- Robotic Process Automation
- Smart Farming
- Social Media Management
- Software Development
- Soil Fertility Management
- Systems/Networks Administration
- Wastewater Management
- Web Development Application
- Writing and Understanding Codes

Source: HEART, 2021. "Skills Demand Survey."

Annex 9. Occupations with Growing Demand that Require Advanced and Highly Specialized Digital Skills

Growing or emerging (sub)sectors	Examples of ICT-dependent occupations	Skill level	
		Basic / Intermediate	Advanced / Specialized
Cybersecurity	Security, malware, data, threat intelligence, system security configuration, and forensic analysts	●	
	Security engineers		●
	Technology risk, security software development managers		●
Knowledge Process Outsourcing (formerly known as BPO[1])	Data entry clerks. Business support (legal, financial, HR, and managers)	●	
	Technical support specialists, IT Technicians		●
	Software engineers		●
Tourism	Customer service staff	●	
	Marketing staff	●	
	Business managers	●	
Health	General and specialist medical practitioners	●	
	Nurses	●	
	Medical technicians	●	
	Pharmacy professionals	●	
	Administrative staff	●	
Creative industries	Graphic, web, and video game designers		●
	Animators		●
	Video and film editors		●
	Digital marketers		●
Construction	Project managers	●	
	Civil, structural engineers		●
	Architects		●

Growing or emerging (sub)sectors	Examples of ICT-dependent occupations	Skill level	
		Basic / Intermediate	Advanced / Specialized
Manufacturing	Mechanical, civil, mechatronics, electronic, industrial engineers		●
	Data, environmental, food, computer scientists		●
	Software developers, programmers, robotics technicians		●
Agriculture	Chemists and biotechnologists		●
	Production technology engineers and managers		●

Source: Author, with data from labor market trends reports compiled and published by the Ministry of Labor and Social Services between 2018 and 2021.

Annex 10. Primary Laws and Regulations Governing the Data Protection Framework in Jamaica

In addition to the Data Protection Act of 2020 (Act No. 7), the Jamaican legal and regulatory framework covers the following data management, privacy and data protection provisions:

General Laws and Regulations

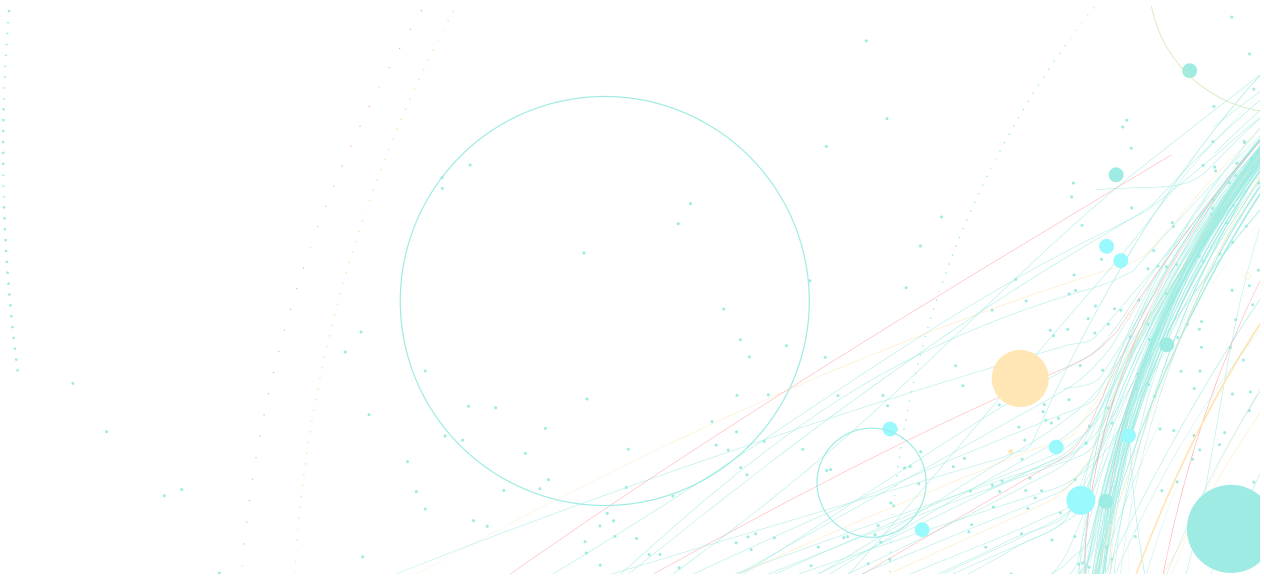
- The Constitution of Jamaica (1962, amendments through 2015), in article 13(3)(j), safeguards the right to privacy.
- The Electronic Transactions Act of 2006 (Act No. 15 of 2006) regulates data messages, electronic commerce, electronic signature, and electronic evidence, among others.
- The Interception of Communications Act of 2002.
- Access to Information Act (ATI) of 2002
- Official Secrets Act of 1920
- ATI Regulations of 2003
- National Identification and Registration Act 2021 (Act No. 25 of 2021).
- The Cybercrimes Act of 2015
- The Law Reform (Fraudulent Transactions) (Special Provisions) Act of 2013

Sectoral Laws and Regulations

- The Telecommunications Act of 2000 protects privacy of customers' information.
- The Banking Services Act of 2014

Case Law

- The Supreme Court of Judicature of Jamaica issued, on April 12 2019, a ruling (Claim No. 2018HCV01788) which found the National Identification System in violation of the constitutional privacy safeguards and unanimously declared the entire National Identification and Registration Act of 2017 void. The Supreme Court found that the mandatory requirement of biometric identification abrogated the right to privacy.[2]



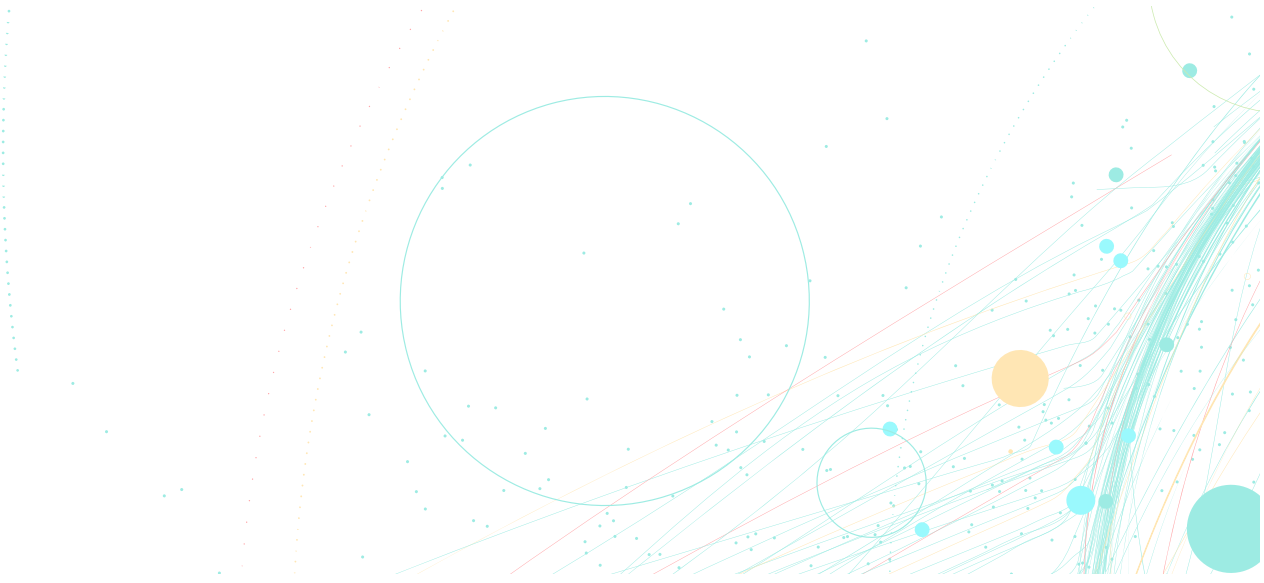
Annex 11. Main Provisions under the DPA

The DPA establishes the following legal bases on which personal data must be processed: *explicit consent, contractual necessity, legitimate interests, legal obligations, interests of data subjects and public interest.* Any processing of personal data must satisfy at least one of those legal bases to be deemed lawful. However, the data controller's obligations under the DPA are subject to certain exemptions, such as where the personal data is being processed in the interest of national security or for journalistic, literacy, artistic, and research purposes, among others. The data controller would be exempted from complying with specific data protection standards under the DPA and disclosure requirements.[3]

The DPA requires data controllers to comply with the following eight data protection standards: *(a) fair and lawful processing, (b) purpose limitation -specified and lawful purpose-, (c) data minimization -adequate, relevant and limited-, (d) data accuracy -accurate and up to date-, (e) data retention -not kept for longer than is necessary-, (f) always considering data subject's rights, (g) data security -implementing the appropriate technical and organizational measures- and (h) international transfers not allowed unless the destination ensures an adequate level of protection.* Contravention of those data protection standards shall be punishable by significant fines or imprisonment.

The DPA also outlines certain safeguards concerning cross-border data transfer aligned with the GDPR. The cross-border data transfer provision (Sec 31) contemplates that personal data shall not be transferred to a State or territory outside of Jamaica unless it ensures adequate protection for the rights and freedoms of the data subjects. In determining what is considered an 'adequate level of protection', the Commissioner would consider, among others, the following aspects: (a) the nature of the data; (b) the State or territory of the final destination; (c) the laws of the State or territory; (d) the international obligations of the State or territory; and (e) the security measures taken by the State or territory. Also, the DPA sets out certain limitations to this data protection standard, such as where the data subject has consented to the transfer or where the transfer is necessary for substantial public interest or the performance of a contract.[4] Furthermore, the DPA has no explicit restrictions concerning the cross-border data flow of non-personal data.

The DPA also sets out some legal requirements for the data controllers, including (a) the appointment of a qualified data protection officer when applies; (b) the registration with the OIC and payment of an annual registration fee; (c) processing of personal data following the data protection standards and principles of the DPA; (d) complying with the data subject's rights; (e) submitting an annual data protection impact assessment; (f) like GDPR, reporting any contravention of the data protection standards or security breach to the OIC within 72 hours after becoming aware of the situation; and (g) notifying every affected data subject of any contravention or security breach which is aware of. Although the DPA outlines certain rights, obligations and responsibilities of data controllers[5], such a legal framework is missing provisions on the status of data processors, their obligations and benchmarks of compliance.

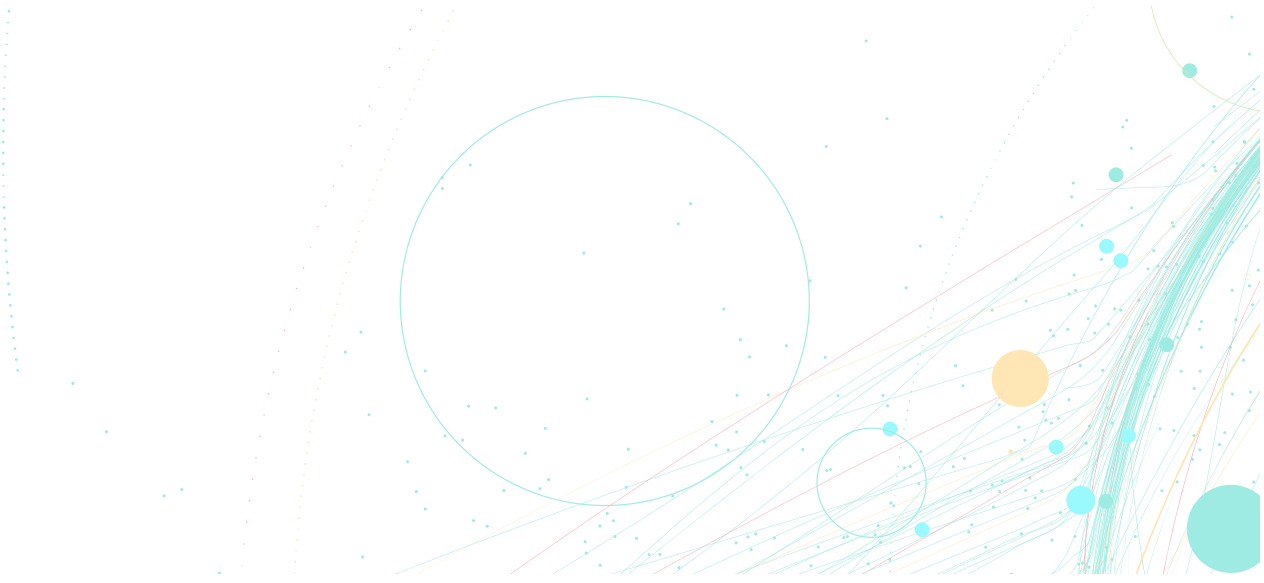


Annex 12. The OIC's Mandate

The OIC's legal mandate includes enforcing data subjects' rights, monitoring and enforcing the data protection standards, performing rulemaking and advocacy functions, and executing investigatory, advisory, watchdog, and corrective powers. Under the DPA, the OIC has powers to monitor and enforce data protection standards. The OIC also performs a '*rulemaking*' function to prepare data protection guidance and codes. Its mandate includes *investigatory powers*, including the assessment of compliance with data protection standards by data controllers and '*advisory powers*, including providing recommendations and opinions to Parliament and other government bodies on any matter relating to the application of the Act. The OIC's *"Watchdog" powers* include monitoring compliance with the DPA, and any regulations made under the statute. Additionally, the Commissioner may intervene as a party in any proceedings before a court, in any matter concerning the processing of personal data or the enforcement of any provision of the DPA, except those proceedings for the prosecution of an offense. *'Corrective powers'* such as issuing warnings, orders, and reprimands in cases of non-compliance are also attached to the Commissioner's mandate. *Advocacy functions* include promoting data protection requirements and good practices by data controllers, disseminating information to the public about the application of the law, and educating and advising representatives from specific industries and the general public on any data protection-related matters.

Notes

1. Business Process Outsourcing
2. DigWatch (2019).
3. Jamaica - Data Protection Overview | Guidance Note | DataGuidance
4. Jamaica - Data Protection Overview | Guidance Note | DataGuidance
5. DPA, Sec.



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