Chapter 6

Special feature: The Caribbean

This chapter explores the main challenges Caribbean countries face in promoting the digital transformation and summarises the impact of the coronavirus (Covid-19) crisis on these economies. In particular, it analyses regional and national digital strategies, focusing on key dimensions, including communication infrastructure, digital government and digital security, and highlighting disparities across and within countries. To make the most of the digital transformation, countries must implement national digital strategies effectively and increase sub-regional co-operation and co-ordination in information and communications policy, broadband infrastructure, e-government systems and policies aimed at using technology-based tools to manage and prevent natural disasters.

Digital transformation: an opportunity for the Caribbean to overcome various challenges

Border closures and other actions taken during the Covid-19 outbreak greatly affected several sources of income in the Caribbean

The Caribbean economy heavily depends on travel and tourism

Tourism accounted for **13.9%** of the GDP and **15.2%** of total employment in 2019

The slump in remittance flows severely affects households

Remittances as % of GDP

30% Haiti

10% Jamaica

Over 80% of remittances are used for basic needs

Caribbean countries face specific long-term vulnerabilities, including natural hazards and extreme weather events

During the 2020 Atlantic hurricane season, Caribbean countries may face overlapping health, climate and hurricane-related crises

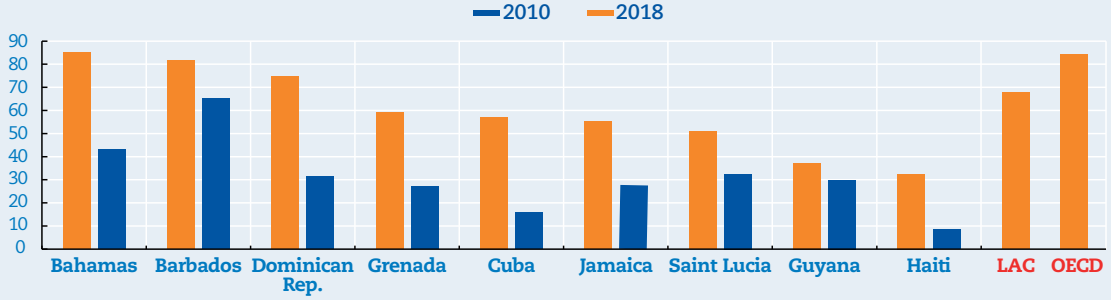
New technologies should support natural disaster preparedness and emergency response

To benefit from the digital transformation, Caribbean countries must develop digital agendas aligned with national development strategies

Given the sub-region's structural vulnerabilities, diversification of the production structure is critical ...

... accompanied by the digitalisation of the economy in areas such as e-government, telemedicine and e-learning.

The number of Internet users in the Caribbean increased, but remains relatively low in most countries



Introduction

Despite high heterogeneity in its impacts, the coronavirus (Covid-19) pandemic does and will affect all Caribbean countries. This owes in part to the sub-region's high economic dependence on travel and tourism, which virtually collapsed owing to border closures and other actions to stem the spread. Tourism services accounted for 13.9% of the Caribbean's gross domestic product (GDP) and 15.2% of total employment in 2019, making it the sub-region with the highest economic contribution from tourism in the world, followed by Southeast Asia and Oceania. Tourism's contribution to GDP and employment is much higher for some Caribbean countries. For the Eastern Caribbean States, in addition to the Bahamas, Belize and Jamaica, tourism and travel represent over one-quarter of GDP and over 30% of employment (reaching over 85% for Antigua and Barbuda) (ECLAC, 2020a).

Decreased remittance flows, which could contract between 10% and 15% in 2020 and take two to three years to resume 2019 levels, will severely affect individuals and households. In several Caribbean countries, remittances' contribution to economic activity is significant: they represented over 30% of GDP in Haiti and over 10% in Jamaica. Between 80% and 90% of remittances are used to cover receiving households' basic needs, so their contraction will have strong effects on consumption and the incidence of poverty (ECLAC, 2020a).

In addition to the short- and medium-term impact of the Covid-19 crisis, Caribbean countries face longer-term vulnerabilities, including the adverse impacts of climate change, natural hazards and extreme weather events. In the past few decades, the Caribbean has been the second most hazard-prone region in the world, owing to its location and the concentration of its population in exposed coastal areas. With an above-average forecast for the 2020 Atlantic hurricane season, Caribbean countries may face overlapping health, climate and hurricane-related crises (Phillips et al., 2020; Taylor, 2020). Given the sub-region's structural vulnerabilities, diversification of the production structure is critical (OECD et al., 2019), accompanied by the digitalisation of the economy in areas such as e-government, telemedicine and e-learning.

New technologies should contribute to natural disaster preparedness and emergency response. Continuity of digital services depends heavily on adequate digital and physical infrastructure planning, including data centres, to avoid loss of data after natural disasters. The Caribbean must also create an appropriate and sustainable digital ecosystem to accelerate the digital transformation, increase economic resilience and improve responsiveness to natural disasters (Giraldo, 2018). Building financial and technical capacity is key to this endeavour, since outdated information and communications technology (ICT) infrastructure prevents many Caribbean countries from quickly and efficiently adopting digital technologies. Optimal strategies for creating durable digital ecosystems address multiple vulnerabilities.

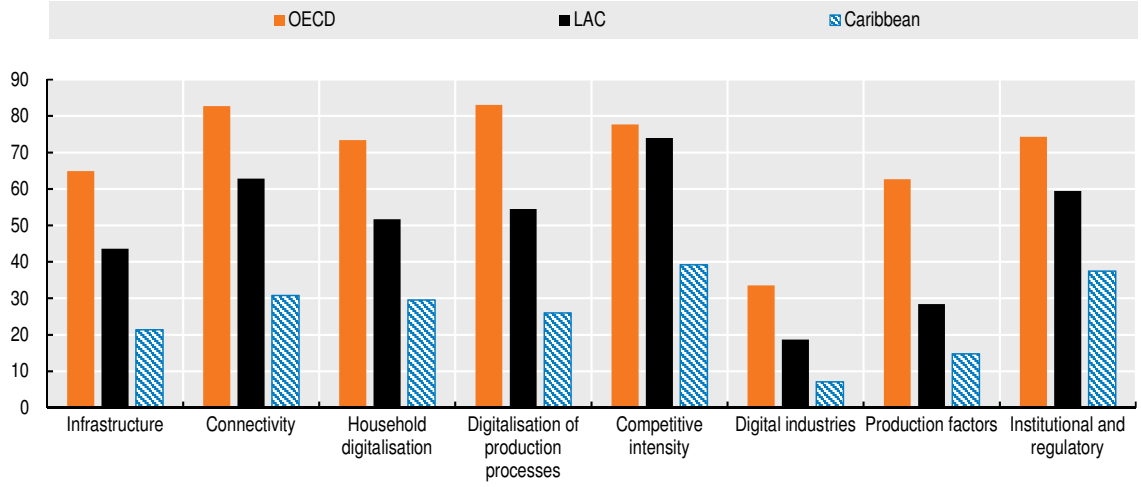
This chapter first describes the digital ecosystem in the Caribbean, compared with other sub-regions. Second, it briefly presents the main regional digital strategies. Third, it analyses national digital strategies. Fourth, it studies two key components of national digital agendas (DAs): digital government and digital security challenges. It finally concludes with policy recommendations.

The digital ecosystem in the Caribbean

The digital ecosystem is fundamental to accelerating the benefits of digital technologies. The Digital Ecosystem Development Index is based on eight multi-component pillars: infrastructure, connectivity, household digitalisation, digitalisation of production, competitive intensity, digital industries, factors of production, and regulatory

frameworks (see Chapter 2). In 2018, the index was 70.4 for the Organisation for Economic Co-operation and Development (OECD) area, 49.9 for Latin America and the Caribbean (LAC) and 24.3 for the Caribbean sub-region (Figure 6.1).

Figure 6.1. **Digital Ecosystem Development Index, OECD, Latin America and the Caribbean, and the Caribbean, 2018**



Note: Data were available for six Caribbean countries (Barbados, Cuba, the Dominican Republic, Haiti, Jamaica, and Trinidad and Tobago), representing about 93% of the population in the sub-region. Index points, index goes from 0 to 100, with 100 being the highest score.

Source: CAF (2020), "CAF: The Observatory of the Digital Ecosystem of Latin America and the Caribbean"; ECLAC (2020b), *Regional Observatory on Planning for Development in Latin America and the Caribbean*, https://observatorioplanificacion.cepal.org/en/opengov.

StatLink https://doi.org/10.1787/888934172806

The Caribbean's overall index hides disparities across countries: Trinidad and Tobago had a high score (64.1); Cuba (12.7) and Haiti (12.9) had the lowest. Since Cuba and Haiti represent 55% of the Caribbean population, the sub-region population weighted average is much lower.[1]

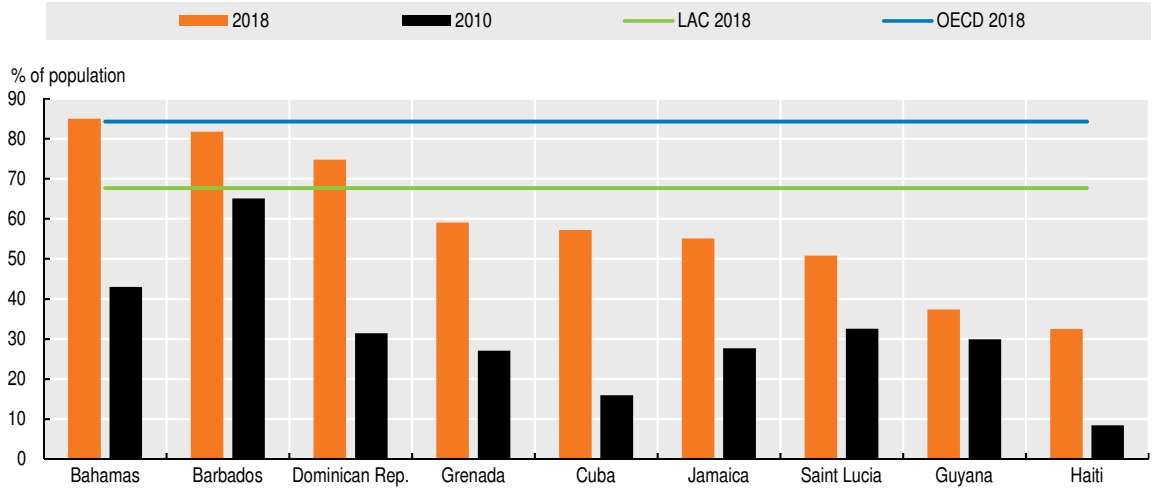
As reflected by the index, the Caribbean's infrastructure and connectivity is, on average, low but varies widely across countries. The proportion of Internet users (Figure 6.2) in the majority of Caribbean countries is still relatively low, compared with LAC and OECD averages, although rates increased significantly between 2010 and 2018, e.g. from 16% to 57% in Cuba, and 8% to 32% in Haiti. The Bahamas, Barbados and the Dominican Republic reached over 70%. Connectivity and usage costs also vary, aggravating inequality by country, island and type of household. At the national level, Internet penetration and connection quality are poorer in rural than in urban areas, and rich households are more likely to have Internet access than those in the poorest quintile of the income distribution (ECLAC, 2017). Countries have reported that limited access to broadband Internet, and other technological challenges, have hampered remote learning in the context of the pandemic (see, for instance, Young, 2020).

Unequal ICT access and service occur within countries, since many Caribbean Small Island Developing States (SIDS) have multiple islands spread over large distances, each with varying levels of access and service based on population size and governance arrangements (Bleeker, 2019a). Tobago has poorer ICT access than larger, more populous Trinidad. In the Turks and Caicos Islands, only some islands receive fixed broadband services, and the speed and reliability of broadband connections vary across islands.

The increase in Internet users is the result of a significant evolution in connectivity technology and quality in the last decades. In 2018, penetration of mobile broadband

was higher than penetration of fixed broadband (Figure 6.3). However, the gap with the rest of the region can particularly be seen in the share of mobile broadband penetration (Figure 6.4). With the exception of Haiti, this may also reflect the compactness of some countries relative to others. For instance, a number of countries have rural or low-population areas where connectivity is poor. Ten Caribbean countries are multi-island states with populations spread across separate landmasses, each with varying levels of connectivity (Bleeker, 2019b).

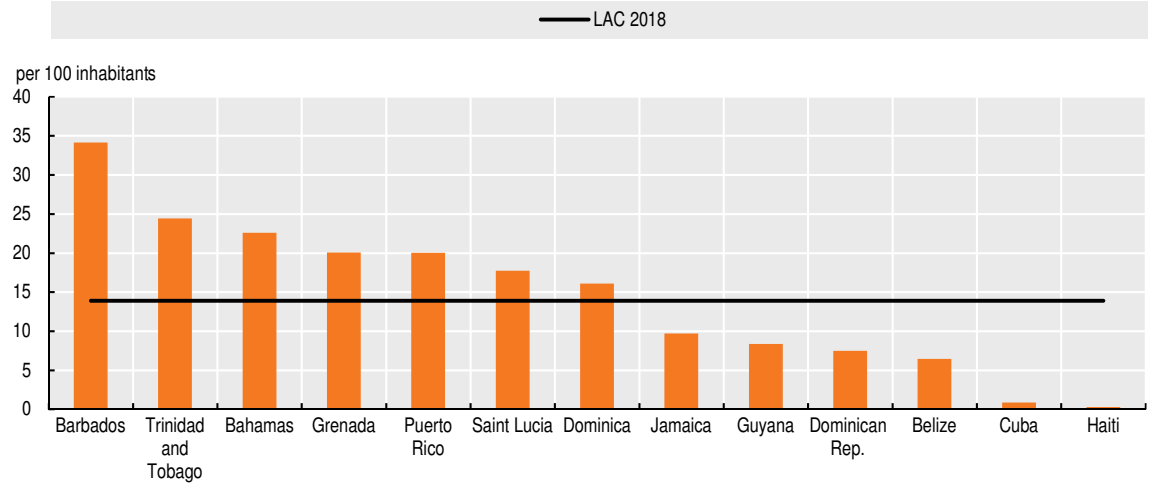
Figure 6.2. **Internet users, selected Caribbean countries, 2010-18 (or latest available year)**



Source: Own calculations based on data from ITU (2020a), *World Telecommunication/ICT Indicators Database 2020* (database), International Telecommunication Union, Geneva, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 21 August 2020).

StatLink https://doi.org/10.1787/888934172825

Figure 6.3. **Fixed broadband penetration, selected Caribbean countries, 2018 or latest available year**



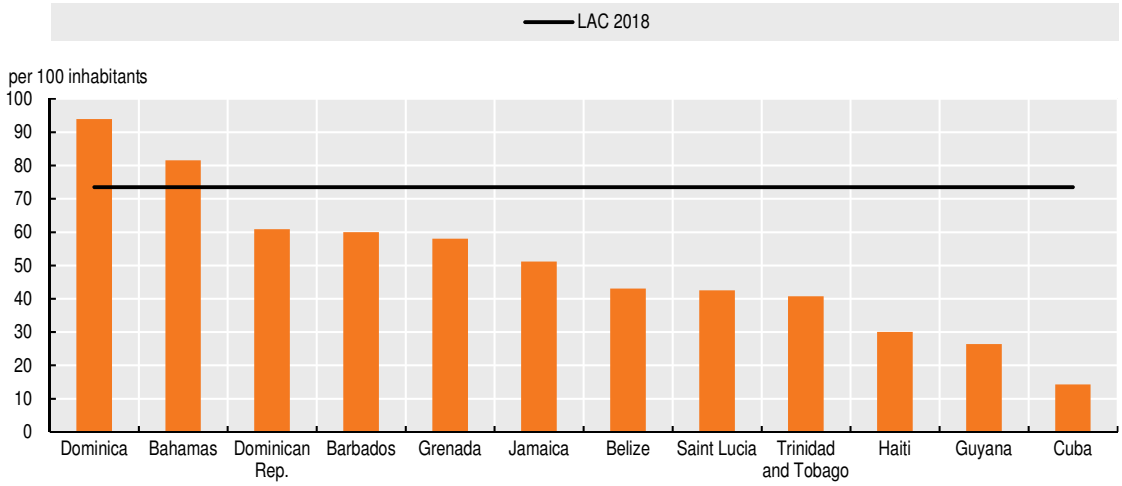
Source: Own calculations based on data from ITU (2020a), *World Telecommunication/ICT Indicators Database 2020* (database), International Telecommunication Union, Geneva, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 21 August 2020).

StatLink https://doi.org/10.1787/888934172844

Connection speed is widely used to compare connectivity quality across countries. Low connection speed prevents simultaneous apps, a critical issue during the coronavirus

(Covid-19) pandemic. Between March and July 2020, gaps with the rest of the world have been important, and variation across Caribbean countries has been sizeable (Figure 6.5). The evolution of Internet connection has been particularly slow in Cuba, with the introduction of third-generation services only beginning in 2018. Connection speed also varies significantly across islands within Caribbean SIDS. In the Turks and Caicos Islands, Providenciales has the fastest mobile broadband (15-20 Mbps) via fibre-optic cable; North Caicos and South Caicos islands have the slowest (6-10 Mbps) owing to bandwidth limitations on microwave transmission to these islands (Bleeker, 2020).

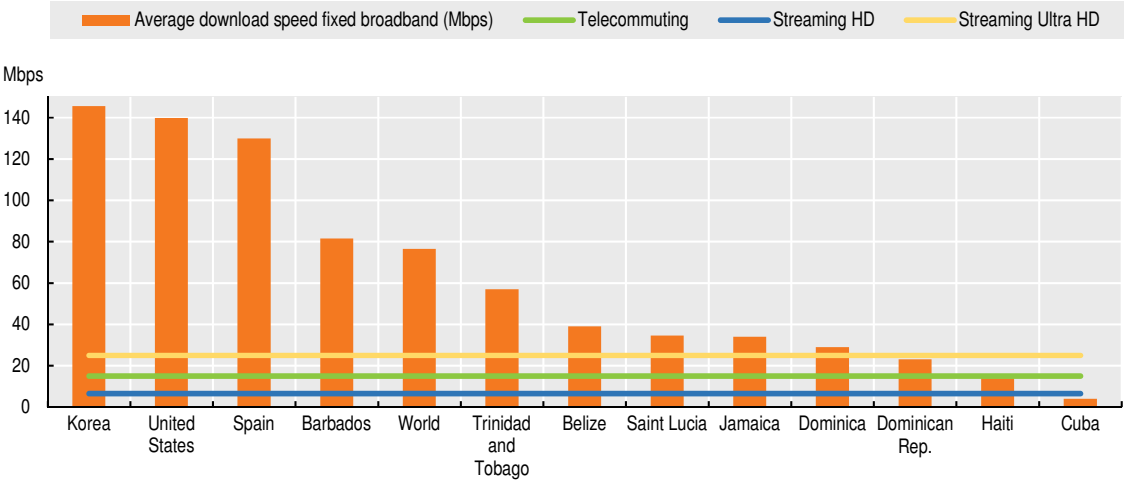
Figure 6.4. **Active mobile-broadband subscriptions, selected Caribbean countries, 2018 or latest available year**



Source: Own calculations based on data from ITU (2020a), *World Telecommunication/ICT Indicators Database 2020* (database), International Telecommunication Union, Geneva, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 21 August 2020).

StatLink https://doi.org/10.1787/888934172863

Figure 6.5. **Fixed broadband download speed, selected countries, and reference bandwidth requirements (March-July 2020)**



Note: HD = High definition. Mbps = Megabytes per second. The indicator reflects wired broadband speed achievable "on-net". It does not fully represent the overall Internet experience and it provides only a partial view on Internet speed. Nevertheless, it provides a useful partial indicator available for both OECD and non-OECD countries (OECD, 2019). Fixed broadband download speed data are a monthly average from March to July 2020.

Source: ECLAC (2020b), *Regional Observatory on Planning for Development in Latin America and the Caribbean*, https://observatorioplanificacion.cepal.org/en/opengov, own calculations based on data from the Federal Communications Commission and Ookla Global Speed Test Index.

StatLink https://doi.org/10.1787/888934172882

Regional digital strategies in the Caribbean

In 2017, Caribbean Community (CARICOM) Heads of Government approved the Single ICT Space Project, which seeks to create a borderless ICT-enabled space that fosters economic, social and cultural integration for the betterment of Caribbean citizens in the grouping's 15 Member States and 5 Associate Members (CTU, 2017a). Envisioned as the digital layer of the Caribbean Single Market Economy, the project has four pillars: 1) regionally harmonised ICT policy, legal and regulatory regimes; 2) robust national and regional broadband infrastructure; 3) common frameworks for governments, ICT service providers and consumers; and 4) effective, secure technology and management systems.

The aim of the project is ubiquity and consistency of ICT services across CARICOM at affordable prices. The initial focus has been on creating an enabling environment for regional infrastructure projects and systems through regionally harmonised ICT policy, legal and regulatory regimes, since this is a necessary precursor to strong regional partnerships. According to the Caribbean Telecommunications Union (CTU), renewed collaboration is needed to meet many of the Single ICT Space Project's implementation milestones and deliver on its ambitious aims (Bleeker, 2019b).

As an aspect of the project, the CTU has been promoting the need for governments in the sub-region to become 21st Century Governments. Such governments use "citizen-centric, seamless, open, interactive and efficient processes and will make effective use of information and communication technologies to deliver services to its citizens, internal and external clients" (CTU, 2017b). The focus of the project, which has seven workstreams, is to accelerate e-government service delivery and transform the public service of Caribbean governments.

National digital strategies in the Caribbean

Caribbean governments have been developing national strategies to promote ICT adoption for several years (Table 6.1). Their effectiveness has been mixed. The unique characteristics of some Caribbean states create several challenges. Multi-island territories made up of small islands, some spread over large distances, tend to have high fixed overhead and transport costs. They also have small domestic markets and are vulnerable to external shocks, such as the coronavirus (Covid-19) crisis, and natural disasters. These factors lend themselves to difficulties in building economies of scale. Nevertheless, there are considerable opportunities for Caribbean countries to promote the adoption of digital technologies, especially those for building resilience and extending access to information and public services for people in geographically isolated islands (Bleeker, 2020).

In light of the coronavirus (Covid-19) crisis, new digital tools are critical in providing education and health services, social security access and e-government. Caribbean countries have rushed to bring digital services on line and increase ICT access during the pandemic, although they have been limited in their ability to provide for all population groups owing to financial and technical constraints. Enhanced digital services provision has mainly emerged in the areas of education, health care and other public sectors, with new e-learning and telemedicine tools, online payment systems and other e-government portals. However, such services have not benefitted all groups equally: governments are restricted in their ability to provide special digital inclusion programmes for the Caribbean's 1.3 million persons with disabilities and other marginalised groups, including the older population. The pandemic has also widened the digital divide for those whose financial circumstances deteriorated and who could no longer afford access to the Internet and digital devices.

Although some Caribbean countries have adopted some type of ICT strategy, many of these plans have not been renewed beyond their initial period, suggesting that countries are experiencing challenges in keeping plans up-to-date. Of the seven countries analysed, three have ICT strategies whose original period remains in force, while Jamaica opted for a long-term strategy, and Saint Vincent and the Grenadines, and Trinidad and Tobago have strategies in force until 2020. Some countries, including the Bahamas, have incorporated ICT policy objectives into their national development plans (NDPs). In the case of Barbados, despite not having a specific updated ICT strategy, they have incorporated several objectives related to the promotion of ICTs and the development of an information economy as part of their 2013-20 growth and development strategy.

Table 6.1. **National digital strategies, selected Caribbean countries**

	National DA/ICT plan	Objectives	Institution
Barbados	National Information and Communication Technologies Strategic Plan of Barbados 2010-2015	6 goals: develop an ICT-literate society; develop a culture of innovation and entrepreneurship; make ICTs available to all; ensure competitive jurisdiction; transform public and business sectors to an e-environment; facilitate continuity of governance in national disasters	Ministry of Economic Affairs, Empowerment, Innovation, Trade, Industry and Commerce
	Barbados Growth and Development Strategy 2013-2020	Develop a science and information economy, and strategies that aim to improve efficiency in Internet traffic management, early warning and mitigation of cyber-attacks, improve the Privacy & Data Protection Act, the Computer Misuse Act, and the Telecommunications Act B282	Ministry of Finance, Economic Affairs and Investment
Jamaica	Vision 2030 Jamaica: Information and Communications Technology (ICT) Sector Plan 2009-2030	2 main goals: strong and competitive ICT sector; Jamaica's national development advanced through widespread adoption and application of ICT	Cabinet
Saint Lucia	National ICT Strategy of St. Lucia 2010-2015	4 outcomes: effective governance and extensive e-service delivery; significant economic growth with the creation of new job opportunities; improved citizen health and well-being; enhanced citizen information literacy and innovation	Ministry for Social Transformation, Public Service, Human Resource Development, Youth and Sports
Saint Vincent and the Grenadines	National Broadband Plan 2015-2020	6 goals: promote the development of local and relevant broadband services; provide teachers with proper training in necessary skills; ensure sufficient broadband connection for all schools, health centres, community centres and government buildings; promote digital literacy; promote adoption of relevant IT and ICT courses in schools; ensure necessary support for aspiring ICT entrepreneurs	National Telecommunications Regulatory Commission
Trinidad and Tobago	Trinidad and Tobago's National ICT Plan: ICT Blueprint 2018-2022	5 strategic thrusts: improving connectivity; increasing human capacity; advancing digital government; fostering economic development; advancing the digital environment for social benefit	Minister of Public Administration and Communications
Grenada	Information and Communication Technology (ICT) 2006-2010: A strategy and action plan for Grenada	7 strategic thrusts: capacity building; legal framework; e-Commerce; IT and Internet education; e-government; high-quality, affordable telecommunications infrastructure; information society and information economy	Office of the Prime Minister
Saint Kitts and Nevis	National Information and Communications Technology (ICT) Strategic Plan 2006	5 main branches: building information infrastructure; enabling the policy and legal environment; developing ICT human resources and building capacity (information society); modernising government and delivering citizen services electronically; leveraging ICT for economic and social development through public-private partnerships	Not specified

Source: Based on public sources and country NDAs.

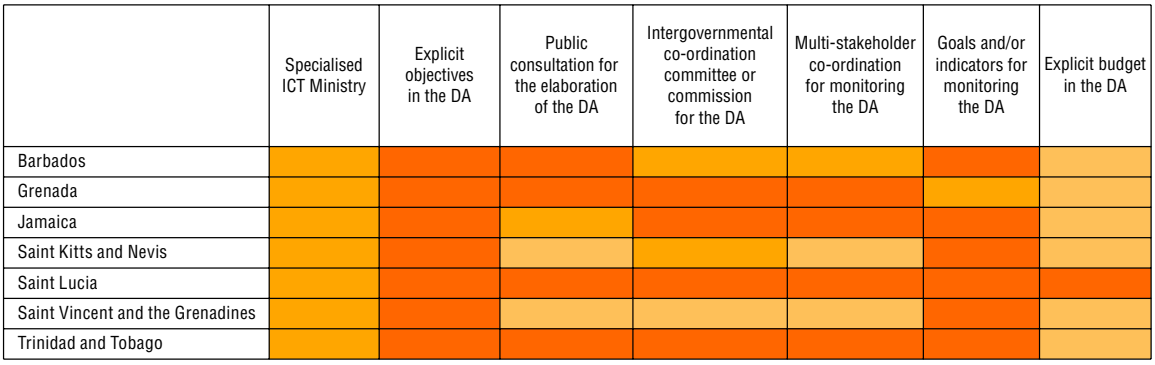
Caribbean countries' national digital strategies share several policy objectives regarding the use of digital technologies for sustainable development. All countries seek to expand infrastructure as the primary objective and to foster deployment of e-government services, promote innovation and economic development using digital technologies, improve technological adoption and digital literacy in schools, and update

regulatory frameworks. Recognising the importance of an enabling environment for deploying digital services and infrastructure projects, strategies usually include as a pillar, modern, appropriate legislative and regulatory frameworks for digital security, data protection, privacy, information sharing and e-transactions.

A central issue has been ICT resilience in the context of natural disasters, which disproportionately affect Caribbean countries. These countries face the challenge of creating digital ecosystems that will accelerate the digital transformation in order to prevent, mitigate and improve responsiveness to natural disasters. ICT is essential to improve the efficiency and effectiveness of disaster risk management (DRM) in Caribbean SIDS (Phillips, 2014). Following disasters, reliable and resilient ICT infrastructure can also be an important facilitator of recovery of government operations and socio-economic sectors, and play a critical role in post-disaster recovery efforts. Given the restraints on individual Caribbean SIDS' investment in ICT infrastructure, a regional digital strategy could enable procurement of technology-enabled DRM tools and foster information sharing and knowledge management. A regional approach could not only save lives but also reduce the toll on the sub-region's economic assets following extreme weather events.

Digital strategies in Caribbean countries show common institutional characteristics (Figure 6.6). Most have not established specialised ministries in the area of ICT; in almost all, ministries in charge of leading the digital policy have broader economic, social or government service provision mandates, as is the case in Barbados, Saint Lucia, and Trinidad and Tobago. The Prime Minister's Office is responsible in Grenada; the Cabinet in Jamaica; a regulatory agency in Saint Vincent and the Grenadines. Caribbean digital plans show an adequate level of maturity in their design, with clear principles and objectives. In most cases, strategies have been linked with a broader NDP.

Figure 6.6. **Institutional characteristics of national Digital Agendas (DAs), selected Caribbean countries**



Note: Colour intensity indicates the intensity with which the DA includes the characteristic in its institutional design.
Source: Based on the latest national Digital Agenda (DA).
StatLink https://doi.org/10.1787/888934172901

Digital transformation, driven by government, business and non-government stakeholders, is a process that demands participation by both single actors and society as a whole. It is therefore essential to involve a range of government, private and civil society actors in digital strategy design, implementation and monitoring. Multi-stakeholder dialogue is key to identifying and overcoming obstacles, and opening opportunities for partnerships. This is especially true in the Caribbean, where poor access to low-cost development finance has limited capacity to build ICT infrastructure capable of delivering high-speed connectivity (Bleeker, 2019b). Various Caribbean countries have established multistakeholder engagement in the digital plan elaboration process, but

this is not universal. The use of Universal Service Funds (USFs) in the sub-region to fund telecommunications infrastructure and ICT projects is an example of multi-stakeholder engagement that can support the realisation of DAs (Bleeker, 2019b). While several USFs have large amounts of undisbursed funds, some funds are being used to improve access to digital services in the context of the coronavirus (Covid-19) crisis (see, for instance, Jamaica Information Service, 2020a and 2020b).

Few ICT strategies in the Caribbean have an institutional design that seeks co-ordination with the private sector and civil society for DA implementation and monitoring. Nonetheless, Caribbean governments have sought to form sub-regional blocs to deliver ICT infrastructure projects. Grenada, Saint Lucia and Saint Vincent and the Grenadines recently partnered with private telecommunications provider Digicel and the CTU to build an undersea fibre cable system and government-wide area networks in and between the countries. This public-private partnership, the Caribbean Regional Communications Infrastructure Program (CARCIP), was financed by loans from the World Bank. The project could have accommodated more countries, but the mode of financing was out of reach for many because of already high levels of indebtedness. Intergovernmental co-ordination mechanisms for the implementation of national digital strategies should also be strengthened to support Caribbean countries' digital transformations. In this respect, renewed collaboration is needed to ensure that sub-regional initiatives, such as CARICOM's Single ICT Space Project and the CTU's 21st Century Governments initiative, can deliver on their aims.

Less present in Caribbean national digital transformation strategies are provisions detailing the policy implementation budget. Saint Lucia's policy does define a budget for each of its programmes. The general absence of such provisions is in part because Caribbean countries often rely on development financing from regional and international organisations to build ICT capacity and e-government, which is usually secured after the elaboration of a DA. Given high levels of public indebtedness in the region and even more limited fiscal space following the coronavirus (Covid-19) pandemic, Caribbean countries may need to increase their reliance on private-sector telecommunications providers and international development financing to realise their DAs.

Tracking key performance indicators is important for assessing progress and comprehensively monitoring the strategy. It can be especially important for adjusting plans and communicating expected outcomes. Some countries have begun to include monitoring indicators to follow up on DA implementation. Trinidad and Tobago's strategy defines metrics to measure levels of expected technology adoption and economic impact. It also includes goals for progress in global indexes, such as the World Economic Forum's Network Readiness Index and the International Telecommunication Union's ICT Development Index.

Digital government in the Caribbean

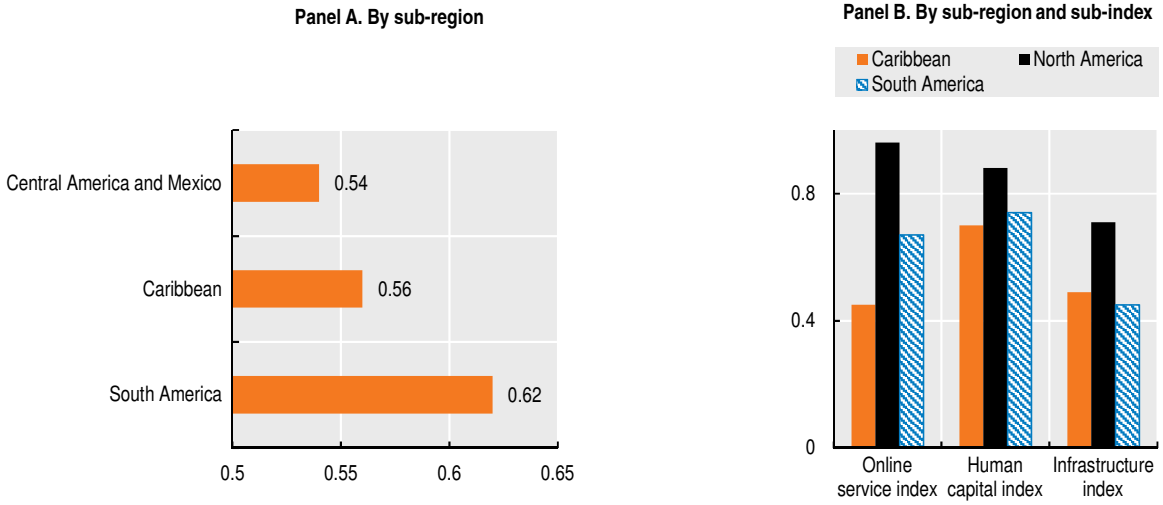
Caribbean governments have begun modernising government services, although effectiveness has been mixed. Government transactions take, on average, four hours, and over 30% require three or more visits to public offices (Roseth Reyes and Santiso, 2018). The need to digitalise transactions with user experience in mind is clear, but advances have been slow, partly because e-government app development and support are resource-intensive, usually requiring deployment of ICT infrastructure and investment in information technology solutions and human capabilities (Marius and Williams, 2016). These challenges are amplified in some Caribbean SIDS by small populations spread across islands, which prevents the economies of scale needed to justify investment.

According to the United Nations (UN) E-Government Development Index (EGDI), one of the most comprehensive measures of e-government development worldwide and an internationally recognised benchmark for comparing countries' efforts, some Caribbean countries, such as Haiti (ranked 163), appear among the worst performers of the 193 countries surveyed (UN, 2019). However, most Caribbean countries have reached "high" or "middle" ranking, and all improved their scores in 2018 from 2016 (Bleeker, 2020). There is a disparity between Latin American and Caribbean countries (see Chapter 4). South American countries have a higher level of development, according to the index (Figure 6.7, Panel A). Furthermore, only South America is above the world average; Central America and the Caribbean are below the world average and only above regions like Africa and Oceania.

According to the EGDI, the greatest challenges for the Caribbean compared with South America are in online service development; there are less significant gaps in telecommunications infrastructure and human capital (Figure 6.7, Panel B). The online service index, gathered by examining several websites in each country, measures the maturity of e-government services according to four stages of development: emerging information service, enhanced information service, transactional services and connected services.

One of the main factors that has allowed South American countries to advance in online service provision has been the design and implementation of e-government strategies (see Chapter 4). Following Uruguay's successful e-government strategy, countries, including Barbados and Jamaica, developed detailed and ambitious e-government plans. Barbados now has the highest EGDI ranking among Caribbean countries and is one of the few with a stand-alone e-government policy. Jamaica, another e-government leader in the Caribbean, recently committed to 90% of government services integrated and available on line (*Gleaner*, 2020). Since the beginning of the coronavirus (Covid-19) crisis, the Jamaican government has been implementing an e-signature project to enable individuals and entities to transact business digitally with all state agencies safely (*Jamaica Observer*, 2020).

Figure 6.7. **E-Government in the Caribbean, United Nations E-Government Development Index, 2018**



Note: The Caribbean is a simple average of 11 countries, excluding Cuba and the Dominican Republic. North America is a simple average of Canada and the United States. The E-Government Development Index is a composite indicator that consists of three indexes (Online Service Index, Telecommunication Infrastructure Index and Human Capital Index), which are equally weighted. It ranges from 0 to 1, with 1 being the most developed.

Source: UN (2019), *UN e-Government Knowledgebase Database* (database), https://publicadministration.un.org/egovkb/en-us/Data-Center.

StatLink https://doi.org/10.1787/888934172920

Although Caribbean countries are at various stages of e-government development, their most pressing and common issue is a comprehensive regional framework, encompassing common standards, protocols and clear processes for the entire public sector (Marius and Williams, 2016). Many Caribbean countries have no legislative or regulatory frameworks in place for digital security, data protection, information sharing and e-transactions, among other areas. Existing frameworks require updating in light of technological developments and the massive data processing capacities of governments and companies. On the contrary, some countries have no relevant data protection legislation in place, and only a handful have aligned legislation with international and regional best practice in order to address technological developments in data profiling, automated processing and government surveillance. The absence of modern, appropriate data-protection and data-sharing frameworks prevents Caribbean countries from ensuring the free flow of information and digital trade within and beyond the sub-region.

Caribbean countries may benefit from a regional approach to e-government apps and services procurement, since an incoherent approach among individual ministries, departments and agencies can lead to duplication of efforts and lack of interoperability. CARCIP is a recent example of a successful joint ICT infrastructure project. Through joint negotiation, countries improved their bargaining power and procured broadband infrastructure, leading to significant cost reduction (Bleeker, 2019b). Other potential benefits include knowledge sharing, improved app quality, reduced redundancy and standardisation of systems and outputs.

If national standards can be aligned as regional standards, there is potential to benefit from economies of scale through procurement, capacity building and industrial policy. Caribbean countries are already adopting similar software projects, e.g. the Automated Systems for Customs Data, and moving towards Open Source Software. However, there is still redundancy in implementation and misalignment in choice of technology; many initiatives could benefit from tighter harmonisation. The Caribbean Harmonization Project (HIPCAR), which concluded in 2013, was a Caribbean-wide effort to create common ICT policies and legislation. Broadband Infrastructure Inventory and Public Awareness in the Caribbean aimed "to identify an inventory of the existing broadband infrastructure in the participating countries, and practical guidelines for the ubiquitous implementation of broadband access technologies in an efficient manner that is consistent with globally adopted standards and international best practices" (Canto, 2015). The Secretariat of the Organisation of Eastern Caribbean States' Electronic Government for Regional Integration Project is another regional initiative.

There are enormous opportunities to improve regional co-ordination, but there are significant challenges, from differing national policies and priorities to procurement process issues, change-management concerns and difficulty escaping vendor lock-in. However, the challenges can be solved, and regional initiatives can play an important role in developing e-government in the Caribbean. Projects most likely to succeed are those that target common problems, have sufficient commitment and build on existing legal and institutional frameworks for collaboration (Marius and Williams, 2016).

Digital security challenges in the Caribbean

Addressing digital security risks must be a key component of any digital strategy, especially as cyberattacks worsen in frequency and sophistication, disrupting critical infrastructure and compromising key information. Although several Caribbean nations

have started to implement laws and policy frameworks dealing with digital security, few could be said to have a national strategy for digital security or have a national agency responsible for digital security and the critical information infrastructure protection needed to deal with the nuances of cybercrime. Where laws are in place, Caribbean countries do not yet have robust systems to deal with the sophisticated nature of cybercrime (McKendrick, 2020). The ineffectiveness of governments' responses to cyberattacks reveals their lack of institutional and governance capacity.

The UN Global Cybersecurity Index (ITU, 2020b) measures countries' commitment to cybersecurity in five dimensions: legal, technical, organisational, capacity building and international co-operation.[2] No Caribbean country has a "high" rating, and only Jamaica has a "medium" score (0.669-0.340). Other countries have a "low" score (0.339-0.000) (Table 6.2). Compared with the previous index, 7 in 11 countries fell in their ranking. Jamaica, the highest-scoring Caribbean country, ranks 94 of 193 countries.

With respect to South America and North America, the Caribbean's smallest gaps relate to legal aspects, such as the issuance of legislation or regulations on data protection and privacy, protocols for cybercrime response and containment of spam emails. Efforts have also been directed towards organisational aspects. Challenges remain in implementing technical aspects, such as developing computer security incident response teams and agencies to develop or adapt digital security standards, and technical measures for spam containment and child protection on line. The sub-region needs to strengthen efforts in capacity building associated with awareness campaigns, professional certification standards and research investment, and international co-operation (Figure 6.8).

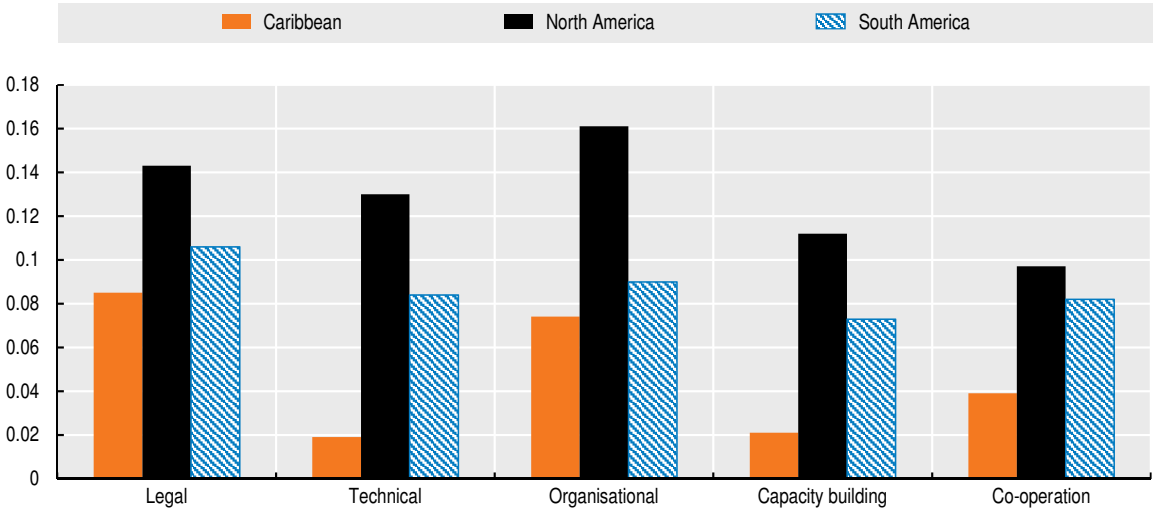
As with their other ICT-related legislation and policy frameworks, Caribbean countries could benefit from a harmonised regional approach to cybercrime laws and procedures. Significant variation exists among countries' substantive legal provisions and procedures, which likely leads to enforcement challenges. Given the borderless nature of the Internet and the many digital security incidents and limited capacity to respond to them, a harmonised approach would facilitate mutual assistance, reducing cybercriminals' ability to operate without repercussion in the Caribbean (McKendrick, 2020).

Table 6.2. **United Nations International Telecommunication Union Global Cybersecurity Index, selected Caribbean countries, 2018**

	Normalised score	2018 ranking	Ranking change (2017 to 2018)	2018 regional ranking
Jamaica	0.407	94	-10	11
Antigua and Barbuda	0.247	113	3	17
Trinidad and Tobago	0.199	119	21	19
Barbados	0.173	127	-33	20
Saint Vincent and the Grenadines	0.169	129	-16	21
Bahamas	0.147	133	-5	22
Grenada	0.143	134	2	23
Saint Lucia	0.096	149	6	29
Saint Kitts and Nevis	0.065	157	-7	30
Haiti	0.046	164	-4	31
Dominica	0.019	172	-10	33

Source: ITU (2020b), *Global Cybersecurity Index* (database), www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx.

Figure 6.8. **Five pillars of the United Nations International Telecommunication Union Global Cybersecurity Index, 2018**



Note: Caribbean data use a simple average of 11 countries, excluding Cuba and the Dominican Republic. North America is a simple average of Canada and the United States. The Global Cybersecurity Index measures countries' commitment to cybersecurity at a global level. It has five pillars: 1) legal measures; 2) technical measures; 3) organisational measures; 4) capacity building; and 5) co-operation. It ranges from 0 to 1, with 1 being the highest level of cybersecurity.

Source: ITU (2020b), *Global Cybersecurity Index* (database), www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx.

StatLink *https://doi.org/10.1787/888934172939*

Conclusion

The Covid-19 pandemic does and will strongly impact all Caribbean countries, which are highly dependent on travel and tourism. In addition, a strong decrease in remittance flows will severely bear upon individuals and households, affecting consumption and incidence of poverty.

Caribbean countries also face longer-term vulnerabilities, such as climate change, natural hazards and extreme weather events, potentially amounting to the perfect storm of overlapping health, climate and hurricane-related crises. To address short- and long-term challenges, the sub-region needs to diversify its economic structure. The digital transformation can play a critical role. This would entail the digitalisation of the economy and public services in areas including e-government, telemedicine and e-learning. Technology can be crucial for natural disaster preparedness and emergency response.

To benefit from the digital transformation, Caribbean countries must develop further DAs aligned with national development strategies, with resources allocated to implementation. The Caribbean must also create an appropriate and sustainable digital ecosystem to accelerate the digital transformation, increase economic resilience and improve responsiveness to natural hazards. Building financial and technical capacity is essential, as outdated ICT infrastructure prevents many countries from adopting digital technologies quickly and efficiently.

Multi-stakeholder dialogue is key to identifying and overcoming obstacles and opening opportunities for partnerships. This is especially evident in the Caribbean, where poor access to low-cost development finance has limited capacity to build ICT infrastructure capable of delivering high-speed connectivity.

Advancing sub-regional co-operation and co-ordination is fundamental to economies adopting digital transformation inclusively, effectively and efficiently. Several aspects benefit from such co-operation, including ICT policy, broadband infrastructure, e-government systems and policies aimed to use technology-based tools to manage and prevent natural disasters.

Notes

1. Despite scoring third and fourth in the region per population, the Dominican Republic (44.3) and Jamaica (40.0) scored just below the LAC average (49.9).
2. The index combines 25 indicators in a single measure, ranging from 0 to 1, with 0 being the total absence of cybersecurity efforts.

References

Bleeker, A. (2020), "Strengthening ICT and knowledge management capacity in support of the sustainable development of Multi-island Caribbean SIDS", *Studies and Perspectives Series – The Caribbean*, No. 81, Economic Commission for Latin America and the Caribbean, Santiago, http://caribbean.cepal.org/content/strengthening-ict-and-knowledge-management-capacity-support-sustainable-development.

Bleeker, A. (2019a), "Using Universal Service Funds to increase access to technology for persons with disabilities in the Caribbean", *Studies and Perspectives Series – The Caribbean*, No. 79, Economic Commission for Latin America and the Caribbean, Santiago, www.cepal.org/en/publications/44913-using-universal-service-funds-increase-access-technology-persons-disabilities.

Bleeker, A. (2019b), "Investing in public/private and regional partnerships to improve the availability of high-speed connections in the Caribbean", *Caribbean Technology Partnerships for the SDGs, FOCUS Magazine of the Caribbean Development and Cooperation Committee Series*, Vol. 2019, No. 4, Economic Commission for Latin America and the Caribbean, Santiago, pp. 6-7, https://repositorio.cepal.org/bitstream/handle/11362/45206/1/FOCUSIssue4Oct-Dec2019.pdf.

CAF (2020), "The Observatory of the Digital Ecosystem of Latin America and the Caribbean", https://www.caf.com/app_tic/#en/home.

Canto (2015), "RG-T2212, Contract for Individual Consulting Services, Annex A, Tranche A, Consultant Terms of Reference", *Broadband Infrastructure Inventory and Public Awareness in the Caribbean (BIIPAC) Project*.

CTU (2017a), *Vision and Roadmap for a CARICOM Single ICT Space*, Caribbean Telecommunications Union, Geneva, https://caricom.org/documents/15510-vision_and_roadmap_for_a_single_ict_space_-_final_version_updated.pdf.

CTU (2017b), *Towards 21st Century Government: Citizen-centric, Seamless Government*, No. 1.4, Caribbean Telecommunications Union, Geneva, https://events.idloom.com/files/events/1307/files/towards-21st-century-governments-issue-1-4.pdf.

ECLAC (2020a), "Measuring the impact of COVID-19 with a view to reactivation", *Special Report Covid-19*, No. 2, Economic Commission for Latin America and the Caribbean, Santiago, www.cepal.org/en/publications/45477-measuring-impact-covid-19-view-reactivation.

ECLAC (2020b), *Regional Observatory on Planning for Development in Latin America and the Caribbean*, Economic Commission for Latin America and the Caribbean, Santiago, https://observatorioplanificacion.cepal.org/en/opengov.

ECLAC (2017), *The Caribbean Outlook*, Economic Commission for Latin America and the Caribbean, Santiago.

Giraldo, C.M. (2018), "Could digital transformation help the Caribbean become more resilient to natural disasters?", Inter-American Development Bank, Washington, DC, https://blogs.iadb.org/caribbean-dev-trends/en/could-digital-transformation-help-the-caribbean-become-more-resilient-to-natural-disasters/.

Gleaner (2020), "Williams reports progress on digital Jamaica initiative", *The Gleaner*, Kingston, http://jamaica-gleaner.com/article/business/20200124/williams-reports-progress-digital-jamaica-initiative.

ITU (2020a), *World Telecommunication/ICT Indicators Database 2020* (database), International Telecommunication Union, Geneva, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 21 August 2020).

ITU (2020b), *Global Cybersecurity Index* (database), International Telecommunication Union, Geneva, www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx.

Jamaica Information Service (2020a), "Jamaica USF provides $17.5 million to upgrade bandwidth of health facilities", Jamaica Information Service, Government of Jamaica, Kingston, https://jis.gov.jm/usf-provides-17-5-million-to-upgrade-bandwidth-of-health-facilities/.

Jamaica Information Service (2020b), "USF to spend $1.13 billion on full implementation of tablets in schools project", Jamaica Information Service, Government of Jamaica, Kingston, https://jis.gov.jm/usf-to-spend-1-13-billion-on-full-implementation-of-tablets-in-schools-project/.

Jamaica Observer (2020), "Gov't implements e-government infrastructure", *The Jamaica Observer*, Kingston, www.jamaicaobserver.com/latestnews/Gov%26%238217;t_implements_e-signature_infrastructure.

Marius, M. and R.C. Williams (2016), "Regional approaches to e-government initiatives in the Caribbean", *Studies and Perspectives Series – The Caribbean*, No. 47, Economic Commission for Latin America and the Caribbean, Santiago, www.cepal.org/en/publications/39858-regional-approaches-government-initiatives-caribbean.

McKendrick, (2020), "Capacity development to combat cybercrime for CARIFORUM Member States", Caribbean Community (CARICOM) Implementing Agency for Crime and Security.

OECD (2019), "Speed", in *Measuring the Digital Transformation: A Roadmap for the Future*, OECD Publishing, Paris, https://doi.org/10.1787/094fe0ca-en.

OECD et al. (2019), *Latin American Economic Outlook: Development in Transition*, OECD Publishing, Paris, https://doi.org/10.1787/g2g9ff18-en

Phillips, C.A. et al. (2020), "Compound climate risks in the COVID-19 pandemic", *Nature Climate Change*, No. 10, *Nature Climate Change*, London, pp. 586-588, https://doi.org/10.1038/s41558-020-0804-2.

Roseth, B., A. Reyes and C. Santiso (2018), *Wait No More: Citizens, Red Tape and Digital Government (Executive Summary)*, Inter-American Development Bank, Washington, DC, www.publications.iadb.org/publications/english/document/Wait_No_More_Citizens_Red_Tape_and_Digital_Government_Caribbean_Edition_en.pdf.

Taylor, C. (2020), "Island nations facing a 'perfect storm' as the coronavirus intersects with hurricane season", Consumer News and Business Channel, Englewood Cliffs, NJ, www.cnbc.com/2020/06/12/island-nations-face-perfect-storm-as-coronavirus-meets-hurricane-season.html.

Phillips, A. and R.C. Williams (2014), "Information and communication technologies for disaster risk management in the Caribbean", *Studies and Perspectives Series – The Caribbean*, No. 32, Economic Commission for Latin America and the Caribbean, Santiago, https://repositorio.cepal.org/handle/11362/36735.

UN (2019), *United Nations e-Government Knowledge Database* (database), United Nations Department of Economic and Social Affairs, New York, https://publicadministration.un.org/egovkb/en-us/Data-Center.

Young, K. (2020), "Technological and social challenges complicate remote learning", Cayman Compass & Compass Media Ltd., www.caymancompass.com/2020/06/11/technological-and-social-challenges-complicate-remote-learning.