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Measuring the digital society to advance digital inclusion in the Caribbean

Lika Døhl Diouf
Dale Alexander

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This document was prepared by Lika Døhl Diouf, Associate Programme Management Officer, and Dale Alexander, Chief, both of the Caribbean Knowledge Management Centre of the Economic Commission for Latin America and the Caribbean (ECLAC) subregional headquarters for the Caribbean.

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Abstract

Caribbean policymakers and regulators are grappling with the challenges and opportunities associated with the digital transformation, and seeking to develop inclusive, evidence-based policies suited to Caribbean realities. Realizing the need for data related to the digital transformation, efforts are ongoing across the subregion to improve measurement systems and agree on common indicators to enable national and subregional action. One of the outcomes of a 2023 subregional workshop on the measurement of the digital society to advance digital inclusion was a draft list of subregional priorities and indicators. As discussions on the list are set to continue, these areas and indicators warrant a closer examination, with the support of relevant data. This study seeks to contribute to the advancement of the discussions by providing an analysis of the current availability of data for the proposed priorities and associated indicators. The analysis is supplemented by information provided by Caribbean experts working with ICT policymaking and regulation regarding the strengths and weaknesses of their systems for measurement of ICT indicators, their related capacity-building needs, and their priorities for measurement. Finally, the study outlines some possible approaches to continuing the work of defining and refining the indicators in the future.

Introduction

The digital transformation invites both opportunities and threats to the societies undergoing change, and to the people living in them. Digital technologies have the potential to support the achievement of all 17 Sustainable Development Goals, and can enable greater resilience during times of crisis, as demonstrated during the height of the COVID-19 pandemic. However, as the impact of digital technologies increases, so does the cost of being excluded from their use, and this cost is typically not evenly distributed. At the same time, the expansion of digital access and services can have disproportionately negative effects on marginalized populations, as inequalities and biases are built into digital systems and spaces. Marginalized populations are at greater risk of online harm and may also have less access to resources that can ensure their safety online and the protection of their outputs, resulting in their exploitation in digital spaces (Heeks, 2022). As noted in the United Nations Secretary-General's Roadmap for Digital Cooperation, "digital divides reflect and amplify existing social, cultural and economic inequalities" (United Nations, 2020b). This means that the ones left behind in the digital transformation are typically those that are already the most marginalized within a society. It also means that digital exclusion can increase societal inequality and socioeconomic differences among people and communities. This reality is non-compliant with the ambition of the 2030 Agenda to "leave no one behind" and "reach the furthest behind first", as well as Sustainable Development Goal (SDG) 10, which aims to "Reduce inequality within and among countries" (United Nations, 2015).

Digital inclusion is a framework that recognizes that social and digital inequalities are strongly interlinked and influence each other, and that the level of digital inclusion within a society is influenced by both socioeconomic and cultural variables (Alexander and others, 2023). It is a framework that enables thoughtful action to reduce inequities related to the access to, use of and benefit from digital technologies. While there is no agreed definition, one approach (UNHCR, 2022) states that:

> Digital Inclusion means providing, through intersectional, human rights-based, and whole-of-society policies and programmes, equal, meaningful, and safe access to and use of digital technologies and opportunities in the digital space for everyone, everywhere,

without leaving behind those in vulnerable positions or traditionally marginalised and equity-seeking groups....

Advancing digital inclusion will thus require a deep understanding of each society, its societal dynamics, and the impact that the digital transformation is having on individuals and communities within that society. As noted in the Roadmap, "A set of metrics to measure digital inclusion will be essential for evidence-based policymaking". The Roadmap also asserts that in developing these metrics, the fundamental premise must be that "everyone should have an equal opportunity to become empowered through ICT", and that access, skills, accessibility, intersectionality, social norms, language barriers, and structural barriers and risks, among others must be addressed. It also stresses the importance of public-private cooperation to collect disaggregated and anonymized data across demographic groups, within ethical, privacy protection frameworks and in accordance with data protection laws (United Nations, 2020b).

A recent ECLAC study by Alexander and others (2023) underscores the importance of ensuring that the metrics and processes envisaged to acquire the data and information, are suited to the Caribbean context. The study also proposes a review of existing metrics in light of Caribbean circumstances, and the development of methodologically sound and contextually appropriate metrics to facilitate action on digital inclusion as possible future steps. This study builds on the findings of that study and on previous efforts in the Caribbean related to the measurement of the digital society and digital inclusion.[1] It will examine the priorities, challenges and capacity-building needs related to the collection and analysis of data on the digital society and digital inclusion in the Caribbean. It seeks to contribute to the advancement of digital inclusion in the subregion, and thus to the achievement of the 2030 Agenda. Improving measurement of the digital society for digital inclusion will also contribute to the achievement of the Digital Agenda for Latin America and the Caribbean (eLAC2024), and its Goal 10, which seeks to improve the measurement of the adoption of digital technologies in the economy and society, as well as strengthen the production and harmonization of official statistics (ECLAC, 2022a).

Context

This study builds on the outcomes of the "ICT Indicators workshop on measuring the digital society for digital inclusion" (Workshop), which was jointly organized by the Caribbean Telecommunications Union (CTU) and ECLAC Caribbean from 27 to 28 March 2023. The Workshop sought to outline a process for Caribbean States to identify ICT indicators and targets that align with the goals and objectives of their national ICT strategic plans. The workshop built on existing international indices and indicators, and considered how these should be adapted to the data realities, special circumstances and needs of the Caribbean. Key outcomes for follow up included:

- A draft list of 10 priority areas for measurement, some of which included sub-areas, sub-sub-areas and/or specific indicators.
- An agreement to partner with national statistical offices to identify, for the indicators related to meaningful and universal connectivity, the appropriate dimensions of disaggregation and frequency of data collection for each indicator.

The ten priority areas identified for measurement were as follows:

[1] See CTU Workshop on the Monitoring and Evaluation Framework for ICT Indicators (25 March 2022)https://ctu.int/wp-content/uploads/2021/12/Overview-AND-Agenda-Workshop-on-the-M-and-EF-for-ICT-Indicators-25th-March-2022-F.pdf; ECLAC Caribbean Seminar on measuring digital inclusion (15-16 December 2022)https://repositorio.cepal.org/handle/11362/48697; and ECLAC, 2023, "Report of the workshop on measuring the digital society for digital inclusion", LC/CAR/2023/11 https://repositorio.cepal.org/handle/11362/49028.

(i) Pricing/affordability of services

(ii) [service monitoring (verifying the delivery of advertised services)]

(iii) Meaningful and universal connectivity

(iv) Inclusivity, including gender equality, age, PWDs, indigenous groups etc.

(v) Digital skills, industry training and capacity building, e-literacy

(vi) Cybersecurity incl. trust

(vii) Governance/Legal and regulatory frameworks, incl. markets, human rights etc.

(viii) Digital economy (e-business/commerce)

(ix) [Type of ICT usage/ Local content]

(x) Sustainability.

These priority areas, for the purpose of this research, are identified as follows: "Affordability"; "Quality of Service"; "Connectivity"; "Inclusivity"; "Digital skills"; "Cybersecurity and trust"; "Governance"; "Digital economy"; "Usage and local content"; and "Sustainability", respectively.[2]

It is to be noted that the discussions and outcomes of the Workshop stimulated this study and informed the analysis undertaken. Where reference is made in this study to indicators or categories of indicators being proposed, or questions or concerns being raised regarding a topic, it is an indirect reference to the Workshop, unless otherwise stated.

Structure

The study comprises two main sections. The first elaborates the Priority Areas identified above, their sub-areas (if any) and indicators, analyses the availability and recency of data[3] for the Caribbean, and discusses various approaches and possible ways forward. The second section reviews the responses of experts surveyed through a questionnaire. The questions relate to their respective countries' current systems for measurement, challenges related to measurement, capacity-building needs, and priorities. The study offers conclusions at the end.

Methodology

This study seeks to provide recommendations on how best to advance the work on the Caribbean ICT Indicators on the digital society for digital inclusion, including how priority areas should be defined and refined. In particular, the study evaluates the extent to which data for the indicators are available, recent and, where possible, disaggregated, in relevant international databases. The methodology for this analysis is further elaborated in annex 4. Where gaps or potential challenges were identified, additional indicators or alternative measurement approaches may have been suggested.

Based on the findings regarding data availability and recency, each priority area is discussed, bearing in mind guidance provided during the Workshop. This includes ensuring that the indicators are suited to Caribbean realities; minimizing duplication with existing frameworks; ensuring that there is clarity of purpose before collecting specific data; and considering the capacity available to collect reliable,

[2] While the priority areas were captured in a numbered list at the Workshop, they are not ranked by importance, as the discussions at the workshop did not reach that stage. Therefore, the numbers are omitted from the discussions below. In addition, bracketed Priority Areas #2 and #9 were so designated in the Workshop, indicating the need for further deliberation on their scope of coverage.

[3] In this study, concept of recency of data is predicated on the most current data for each country among a selected cohort of countries.

relevant, and timely data for a specific indicator. One way in which the study contributes to minimizing duplication is by cross-referencing the indicators with the Core List of ICT Indicators (Core List) (Partnership, 2022), and the Thematic List of ICT Indicators for the SDGs (SDG List) (Partnership, 2019).

Resources from several key measurement frameworks were tapped during preparation of this study.[4] The discussion on the Priority Areas is further supported by primary data gathered through a questionnaire submitted to policymakers and telecommunications regulators in 23 of the 29 member States[5] and Associate Member Countries (AMCs)[6] of the Caribbean Development and Cooperation Committee.[7] The questionnaire, which was developed jointly with the Caribbean Telecommunications Union, is reproduced in annex 1. The survey was open from 6 to 26 June 2023.[8] The methodology for the analysis of this data is further elaborated on in annex 4.

[4] The 2021 National Digital Inclusion Survey of Trinidad and Tobago (TATT, 2022); the United Nations E-Government Survey 2022 (United Nations, 2022); the "Zero draft" of the revised ITU ICT Development Index (IDI Zero Draft); The UNESCO Internet Universality Indicators (IUI) (UNESCO 2019); ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT 2020 (ITU Handbook) (ITU, 2020a); ITU Manual for Measuring ICT Access and Use by Households and Individuals (ITU Manual) (ITU, 2020b); UNCTAD Manual for the Production of Statistics on the Digital Economy (UNCTAD Manual) (UNCTAD, 2020); UNESCO Institute of Statistics Guide to measuring ICT in education (UNESCO Guide) (UIS, 2009).

[5] Antigua and Barbuda, The Bahamas, Barbados, Belize, Cuba, Dominica, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

[6] The Associate Member Countries of the Caribbean and Development Cooperation Committee are Non-Self-Governing Territories and other non-independent Territories in the Caribbean. The participating Territories in this study are: Anguilla, Aruba, British Virgin Islands, Cayman Islands, Curaçao, Montserrat, Sint Maarten, and Turks and Caicos Islands.

[7] Caribbean Development and Cooperation Committee membership (https://www.cepal.org/en/headquarters-and-offices/eclac-caribbean/committees).

[8] Experts participating in the survey are listed in annex 2.

I. Analysis of priority areas and indicators

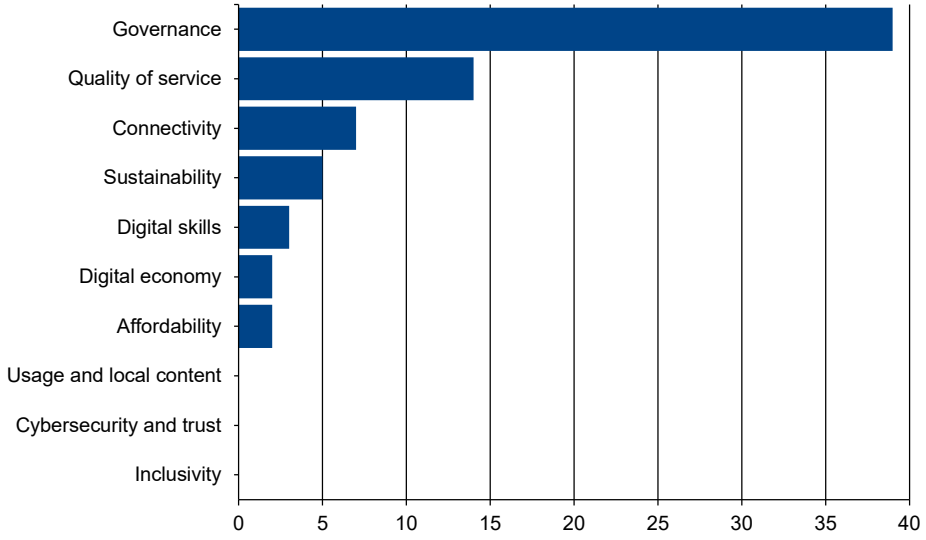
To identify possible measurement challenges from a subregional perspective, each of the priority areas, their associated sub-areas and indicators are discussed in turn, and an analysis of data availability and recency for the 29 Caribbean States and territories provided. This analysis does not highlight individual countries; it instead focuses on overall numbers and medians for the subregion as a whole.

The indicators discussed in this Section were identified by Workshop participants for most of the priority areas (see ECLAC, 2023). Where specific indicators were identified, the analysis of data availability and recency is for the most part limited to those specific indicators. Where Workshop participants suggested a specific source for indicators for a priority area or sub-area, all the indicators that met the criteria were included in the analysis. The methodology is further elaborated in annex 4.

This method led to the identification of 74 indicators, or an average of 7.4 indicators per priority area. However, as illustrated in figure 1, the indicators are not evenly distributed among the priority areas. The indicator count ranges from 39 for Governance to zero for three priority areas: Inclusivity; Cybersecurity and Trust; and Usage and Local Content. In these three cases for which no indicators were identified, possible indicators were discussed but not included in the indicator count, and the review of available data is more limited.

The data availability and recency for the indicators under each priority area is presented in figures throughout this Section. Given the large variance in available data for each indicator, the figures on data availability and recency should be read together to give the most complete picture.

Figure 1
Number of indicators per priority area
(Number)



Source: Authors' elaboration.

In the subsections below, the availability and recency of data on each priority area are reviewed by priority area, in order from largest to smallest number of indicators. These data are supplemented by information derived from the survey of experts regarding the strengths and weaknesses of their measurement systems, and the challenges they experience related to the measurement of ICT indicators.

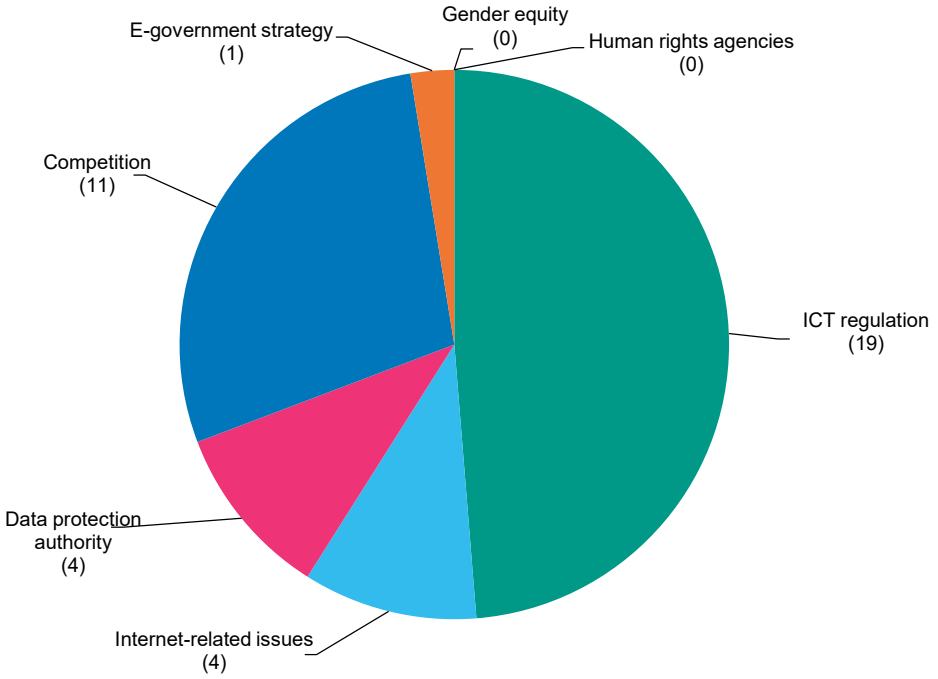
A. Governance

To measure Governance at a subregional level, four sub-areas were identified: "ICT regulatory agencies", "gender equity", "markets and competition" and "human rights agencies". Sub-areas for measurement and/or specific indicators were identified for "ICT regulatory agencies" and "markets and competition", and ITU DataHub was suggested as a possible source of indicators for these areas. No indicators or sources of indicators were proposed for "gender equity" and "human rights agencies".

A review of ITU DataHub noted many possible indicators related to "Governance". The 39 indicators used in this study constitute a subset of the available indicators, and were selected based on the proposed sub-areas, except for "Presence of national e-government strategy or equivalent", where there was a reference to the United Nations E-Government Survey. None of the 39 indicators are on the Core List (Partnership, 2022) or the SDG List (Partnership, 2019).

The selected governance indicators can be distributed across seven sub-areas, namely "ICT regulation", which covers 19 indicators on the regulatory authority, ICT Ministry, and the regulatory roadmap; "Data protection", which covers 4 indicators on mandates and jurisdiction related to data protection issues; "Internet-related issues", covering 4 indicators on mandates and jurisdiction related to that topic; "Competition", covering 11 indicators on mandates and jurisdiction related to competition and the competition framework for the ICT sector; "E-government strategy", referring to the sole indicator derived from the United Nations E-Government Survey; and two sub-areas with no indicators, namely "gender equity" and "human rights agencies" (figure 2).

Figure 2
Distribution of indicators under priority area "Governance"
(Number of indicators per sub-area)



Source: Authors' elaboration.

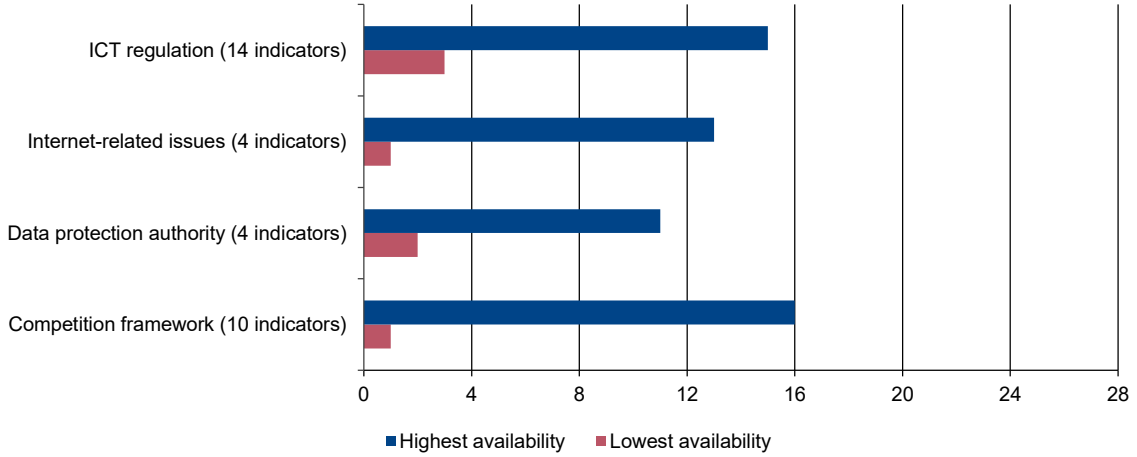
No publicly available data are published for seven of these indicators,[9] which have therefore been excluded from the analysis, leaving four sub-areas and 32 indicators for analysis.

The median data availability for this Priority Area is 38 per cent, meaning that typically, for an indicator under the Governance priority area, data are available for 38 per cent of the 29 Caribbean States and territories assessed, or approximately 11 countries. A review of the data available for the 32 indicators for which data are published demonstrates large disparities among countries and indicators regarding the data collected. Most of the data collected for the indicators are quantitative, typically collected using closed questions regarding a country's laws, procedures or institutions (e.g. yes/no questions regarding the existence of legislation or an institution, or the number of members of a body, etc.). While some qualitative data are included, these were typically limited to responses to multiple choice questions, and open-ended questions on the legal and institutional framework.

Further, it is noted that no data are available on the ITU DataHub for the AMCs related to Governance, which reduces median data availability. The number of countries reporting data for the indicators range from one, to all 16 Caribbean member States, with the median number of countries being 10 across the Governance indicators. There are significant gaps across several indicators, and discernible gaps in what is reported even within the responses of each country. This is indicative of multi-faceted reporting challenges. As figure 3 demonstrates, across each of the four sub-areas, there is at least one indicator where very little data are available, ranging from data on one to three countries.

[9] Five indicators on the characteristics of the regulatory roadmap; one indicator on the general competition policy; and one indicator on the e-government strategy.

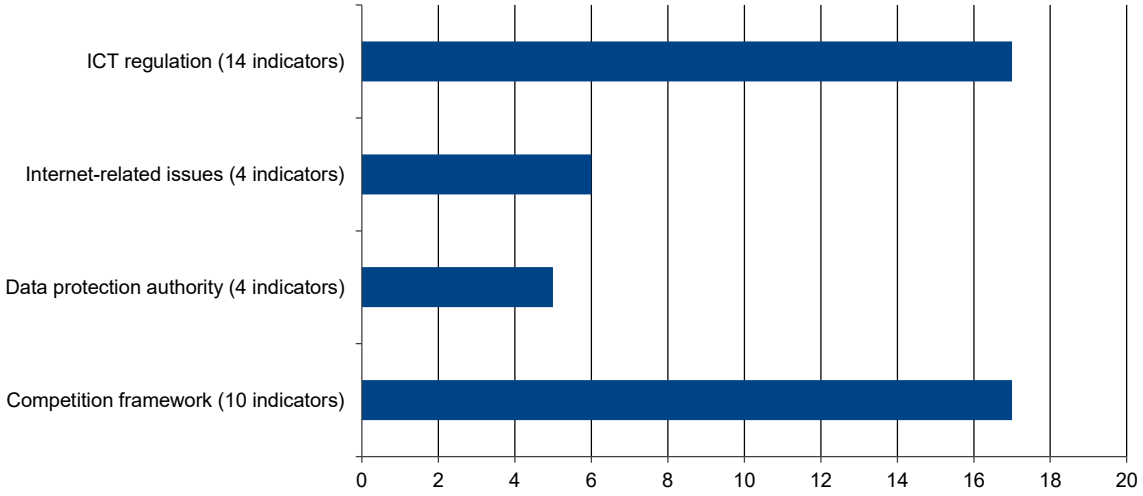
Figure 3
Availability of data on Governance indicators by sub-area
(Number of countries)



Source: Authors' elaboration.

As for the recency of data, this is also highly variable. The median recency of the data for the Governance priority area is low, at just 6 months, indicating that most countries report data regularly. While for some countries, reporting on these indicators is regular and recent, most recent data for some countries is as far back as 2005. As shown in figure 4, the recency of data is highly variable among the four sub-areas, with ICT regulation and Competition framework having a 17-year span.

Figure 4
Difference in recency of data (range), by sub-area
(Years)



Source: Authors' elaboration.

The review of the availability and recency of the data suggests that at present, either there are significant challenges related to the reporting of data on Governance, or reporting in this area is not a current priority for Caribbean States. Since the data itself is on the existence and features of laws,

institutions, processes and procedures, and as such do not require collection from outside governments, the challenges more likely relate to either the coordination of responses from various ministries and agencies, or to overall capacity and competing demands.

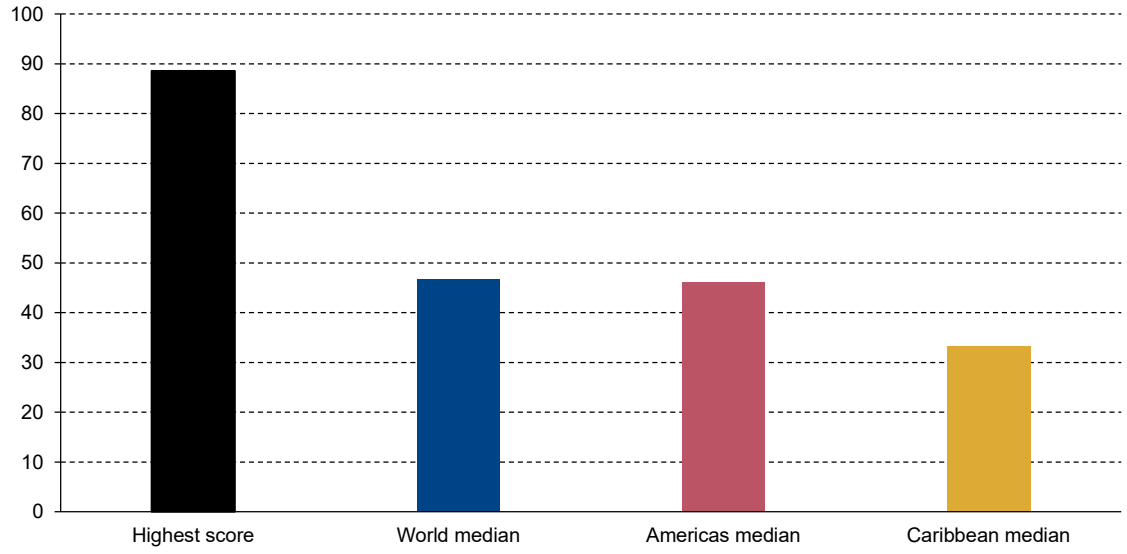
This finding is supported by information provided by the experts in the survey. Six countries identified challenges related to measuring governance and legal or regulatory frameworks. General challenges cited by the surveyed experts related to the lack of data, collaboration, and personnel and other resource constraints. Specific challenges cited included identifying and locating current legislation and regulations. A lack of general understanding of the role and importance of regulators and regulation in shaping the ICT landscape was also noted. Deciding on appropriate indicators to assess the national context was also noted as a challenge. As regards ICT governance in general, challenges associated with antiquated legislation, timeliness in enacting legal and regulatory frameworks, and in future-proofing legal frameworks in the face of fast-paced technological change were identified.

In view of these challenges, it was suggested that a more structured framework to measure ICT governance to support data collection, collaboration and coordination is required. The data available for the 39 indicators are largely collected by ITU from its Member States through questionnaires including the ITU World Telecommunication/ICT Regulatory Survey (ITU, 2022e). The ITU publishes this data in various outputs, including the Global Digital Regulatory Outlook (ITU, 2023c), and the Benchmark for Fifth Generation Digital Collaborative Regulation (G5 Benchmark) (ITU, 2023b).

The G5 Benchmark, which was launched in 2020, was developed through a consultative, iterative process with ITU Member States,[10] and allows countries to score themselves against 70 indicators across four pillars. The G5 Benchmark provides insight into where a country is in terms of digital regulation and is intended to help countries establish roadmaps to achieve collaborative, cross-sectoral digital regulation.

The most recent data for the G5 Benchmark is from 2021. Figure 5 shows how the Caribbean overall is positioned relative to the world and the Americas as a whole.

Figure 5
G5 Benchmark scores[a] for World, Americas and Caribbean, 2021
(Number)



Source: Authors' elaboration based on G5 Benchmark data.
[a] Out of 100 total possible points.

[10] See list of the ITU Membership at https://www.itu.int/hub/membership/our-members/.

While the G5 Benchmark contains many indicators, the capacity constraint challenges, including limited personnel and resources, could impact the fulsome participation of Caribbean countries. Notwithstanding, there are significant potential advantages in adopting such an approach. The data for the G5 Benchmark is primarily based on self-reported information from member States. Therefore, countries can self-score using the methodology provided in the Global Digital Regulatory Outlook 2023. The results are then immediately available and categorized, providing some indication and clarity on where the challenges are and thereby facilitate targeted action. It also opens the possibility for AMCs to evaluate the features of their own systems, and to compare their results with those of other Caribbean countries. This comparative aspect could also enable Caribbean countries to identify their relative strengths and weaknesses, and to identify opportunities to learn from each other. The use of the G5 Benchmark could therefore be a viable solution to measuring Governance in relation to the digital society in the Caribbean.

B. Quality of service

A review of the ITU DataHub for indicators related to service monitoring and quality of service identified 14 relevant indicators. These can be divided into four main categories: Indicators that relate to the regulatory framework, indicators that measure the quality of calls, indicators that measure mobile or fixed broadband quality, and indicators relating to the service provider. None of these indicators are on the Core List (Partnership, 2022) or the SDG List (Partnership 2019).

Except the four indicators relating to the regulatory framework, all the indicators on Quality of Service (QoS) are collected by the ITU from national governments and regulators through the ITU World Telecommunication/ICT Indicators Long Questionnaire (WTI questionnaire) (ITU, 2022d). Three of those indicators are defined in the ITU Handbook. The ITU Handbook also contains other QoS indicators that could be measured, though these are not considered here.

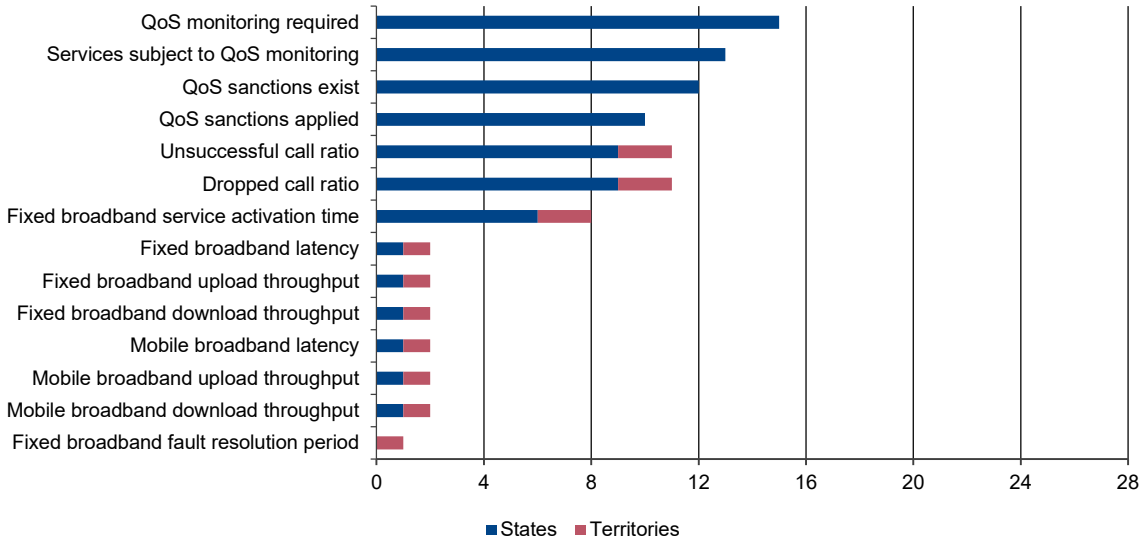
The median availability of data for the QoS indicators is relatively low, at 17.24 per cent, or approximately 5 countries. Data from 2021 or 2022 are available for some countries for all 14 indicators on QoS, however, the most recent data available for other countries date to 2006. Some data exist for some AMCs for these indicators.

While the four indicators on the QoS regulatory framework have the most country data available, the recency of the data varies significantly across indicators. Figures 6 and 7 illustrate the differences in data availability and data recency for these 14 indicators.

For the 16 CDCC member States, data availability varies from 0 to 15 countries, depending on the indicator. In the case of the 13 AMCs, data availability varies from 0 to 2. As with the Governance indicators discussed above, the indicators relating to the governance framework for QoS monitoring do not include data on the AMCs. However, in the case of the administrative indicators, data for which likely originates from a telecommunications regulator or similar agency, there are data for a mix of States and territories.

Figure 7 illustrates the recency of data for the 14 indicators on Quality of Service by showing the number of years from 2022 (the year of publication) to the most recent data available for any country (max), to the most recent data for the country with the least recent data (min), and the median recency of the data for all countries for a specific indicator. For example, for fixed broadband service activation time, data are available for 8 countries (figure 6). The most recent data available for the countries within this cohort range from 2021 (1 year before 2022) to 2012 (10 years before 2022), while the median recency is 2.5 years before 2022. These figures are referred to as the "data age".

Figure 6
Availability of data on quality of service indicators, by indicator
(Number of States and territories)



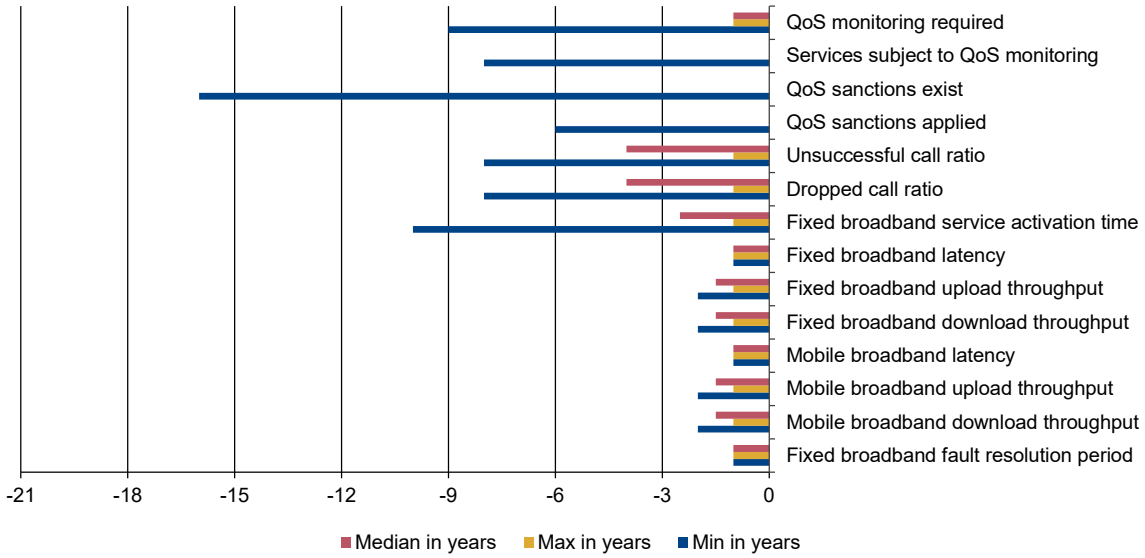
Source: Authors' elaboration.

The analysis of figure 7 produces some interesting results. For some of the indicators for which new data have not been reported for several years for some countries, the median recency is close to zero, indicating that most of the countries sampled have reported that recent data are similarly dated. This is the case for the four indicators on the QoS governance framework. However, for others, such as the indicators on the dropped and unsuccessful call ratios, the median recency is further away from zero, indicating that the lack of recent reporting on the indicators is common across several countries. It is noted that for the seven indicators for which data is available for two or less countries, the median is less significant, as the sample size is very limited. Overall, however, the differences in data availability and recency across the various indicators suggest that there are challenges in reporting.

The lack of data on the AMCs can most likely be attributed to the fact that several of these indicators relate to governance, data for which ITU collects through a survey sent only to its member States and Observers, which does not include any of the AMCs. However, the limited data on calls and broadband quality, which would usually be collected nationally by a regulator from the telecommunications operators, suggest that either these are not included in relevant government mandates, or prioritized by the regulator or government.

The study highlights several challenges specific to the measurement of this priority area that support these findings. These include the lack of a legal mandate to request data relevant to service monitoring, the cost to install and maintain independent equipment for monitoring, not having a system in place to monitor the quality of services provided, and the lack of access to service fault logs. Indeed, the assessment of this area comprises many dimensions, including quality, availability, and reliability. Altogether, the findings illustrate the challenges inherent in assessing an area in which governments generally have little insight, since the services themselves are provided by private entities. Without a legal mandate to ensure that data are captured and an enforcement policy to ensure the transfer of data, access to data to support decision-making in this area is inevitably dependent upon the goodwill of the private sector entities that provide services in each country.

Figure 7
Recency of data on quality of service indicators, by indicator
(Years since 2022)



Source: Authors' elaboration.

C. Connectivity

The Connectivity priority area draws its indicators from the "zero draft" of the revised ITU ICT Development Index (IDI Zero Draft).[11] Four of the seven indicators are administrative indicators defined in the ITU Handbook, and two of the indicators are defined in the ITU Manual. Six of the indicators are on the SDG List, and five are also on the Core List.

Connectivity is the priority area with the highest availability of data. Data on Connectivity are available for a median of 90 per cent of all 29 Caribbean countries across all the indicators. This is the equivalent of approximately 26 countries . In general, the data are also quite recent, with a median data age of one year. The availability and recency of the data is presented by indicator in figures 8 and 9 below.

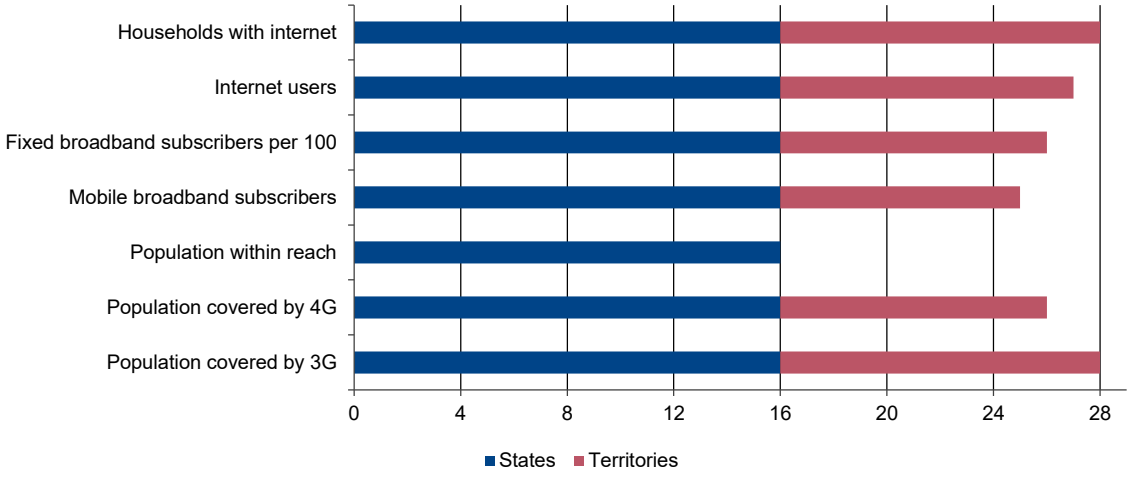
For all indicators except "Population within reach" ("Percentage of the population within [x] kilometres reach of transmission networks"), for which only member State data is available, data on Connectivity is available for most countries, in some cases as high as 28 of the 29 CDCC member States and territories. The difference in data availability can be explained by the different sources of data used. The data on "Population within reach" derive from an ITU map that does not include data on any Caribbean AMCs (ITU, 2023d), while the rest is from the ITU WTI Database (ITU, 2022c), for which some indicators include data on the AMCs.

While the availability of data for the Connectivity indicators is consistently high, the recency varies greatly, as illustrated in figure 9. For "Population within reach", all the data is from 2020.[12] For the remaining six indicators, the data age varies in one case by as much as 20 years. The largest gaps exist for the two indicators that derive from surveys of households or individuals, namely "households with internet" and "internet users". Such surveys are both costly and technically challenging to complete on a

[11] This document is not publicly available.
[12] ITU, Indicator 7: a. Percentage of population within reach of transmission networks; b. Percentage of area within reach of transmission networks, 2020.

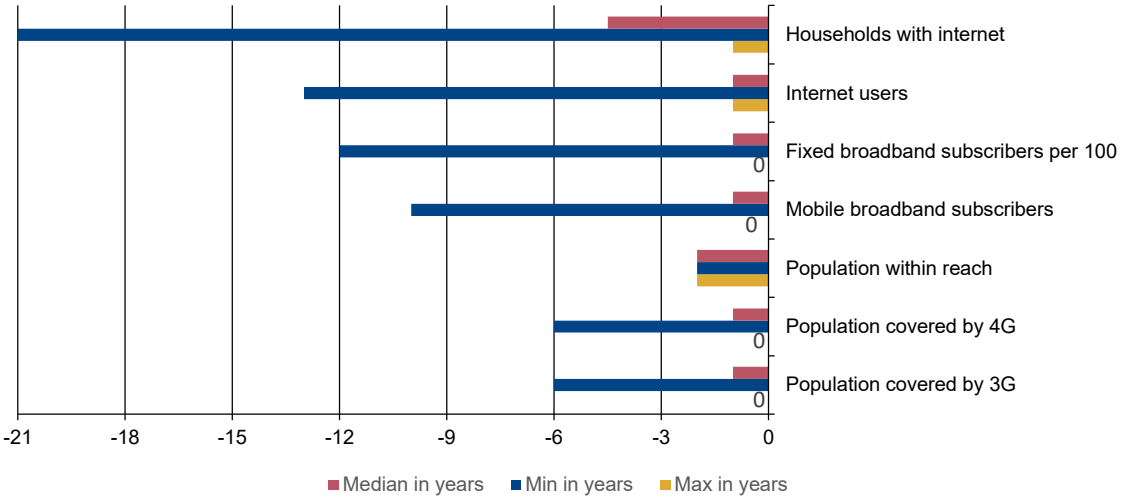
regular basis, particularly in countries with capacity constraints, such as those with smaller or more dispersed populations. The degree of variability in recency for the remaining four indicators suggests challenges in receiving or reporting data from the private sector, such as telecommunications operators.

Figure 8
Availability of data on Connectivity indicators, by indicator
(Number of States and territories)



Source: Authors' elaboration.

Figure 9
Recency of data on Connectivity indicators, by indicator



Source: Authors' elaboration.

Most of the connectivity indicators discussed in this Section are well-established internationally, as they already formed part of the ITU Internet Development Index (IDI), which was used to measure internet development at the global level until 2017.[13] New to the IDI zero draft are 3G and 4G coverage and "Population within reach". As proposed in the IDI Zero Draft, the "Population within reach" indicator included several distance options, some of which could not be applied to some Caribbean countries, due to their smaller landmass. For multi-island countries, the separation of the various islands by water may also pose a greater challenge to infrastructure development than the distance itself. It may therefore be difficult to reach agreement on a single distance option applicable to all Caribbean countries.

Challenges to achieving connectivity were highlighted by the experts consulted for this study, including the cost of connectivity, ensuring consistent service and that universal connectivity may not be easily achieved in some areas of a country. This would be particularly true for countries consisting of several islands or that have large areas of dense forest. A lack of resources, both human and financial was identified as a challenge to effective measurement. Challenges were also noted in defining "universal and meaningful connectivity". Cooperation and time delays with stakeholders and measuring the unserved and underserved areas were also highlighted as challenges.

D. Sustainability

Emergency telecommunications was the only element of sustainability discussed. It was proposed that the indicators be drawn from the ITU DataHub, which contains five indicators on emergency telecommunications, all of which relate to the regulatory and planning frameworks.

The indicators include questions on the ICT regulator's mandate, the mandate of other Government Ministries or agencies, and regulatory or legislative frameworks on emergency telecommunications, as well as two indicators on the adoption and implementation of a National Emergency Telecommunications Plan (NETP). None of these indicators are on the Core List or the SDG List.

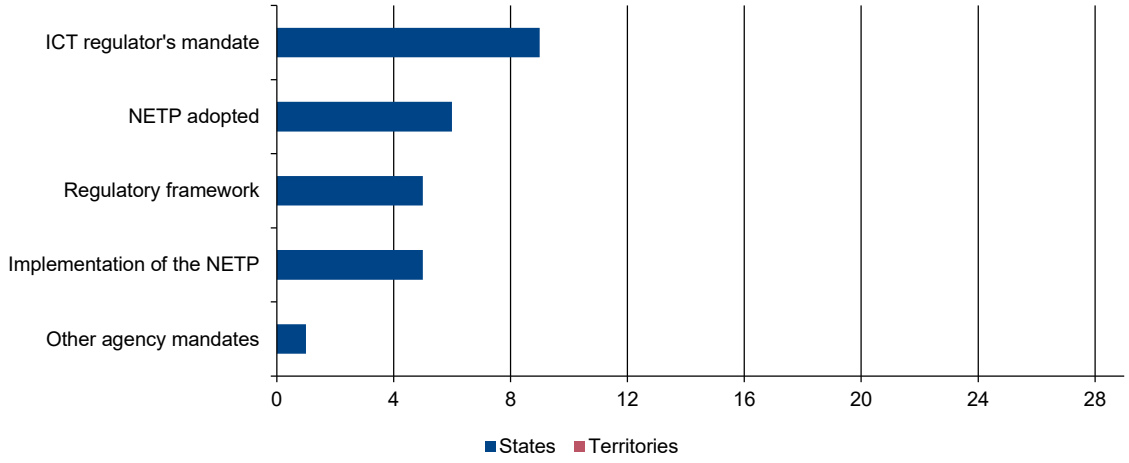
The median data availability on Sustainability is 17.24 per cent, the equivalent of approximately 5 countries. Like other areas with low overall data availability, this is in part because no data are available for any territory. For the data that are available, the level of recency is current, with the median age of the data being zero years.

Data availability across the five indicators varies from one to nine States, which is only just over half the Caribbean member States (see figure 10). The five Sustainability indicators, which all relate to emergency telecommunications, are essentially governance indicators, and exclusively address mandates, laws, and frameworks. The lack of data on the territories could possibly be tied to the same data collection practices related to issues of governance that were discussed previously.

While there are very limited data available for some of the indicators, it is noteworthy that the available data are generally recent, with the oldest data available for any country being two years old (see figure 11). It is possible that the limited data reflect either differing priorities as regards emergency telecommunications in different countries or may signal that other agencies might be involved in the reporting process in this area, given the possibility of overlapping mandates. It may be worthwhile to examine the ways in which reporting in this area differs from other areas with lower data availability or recency, to identify possible strategies to enhance reporting.

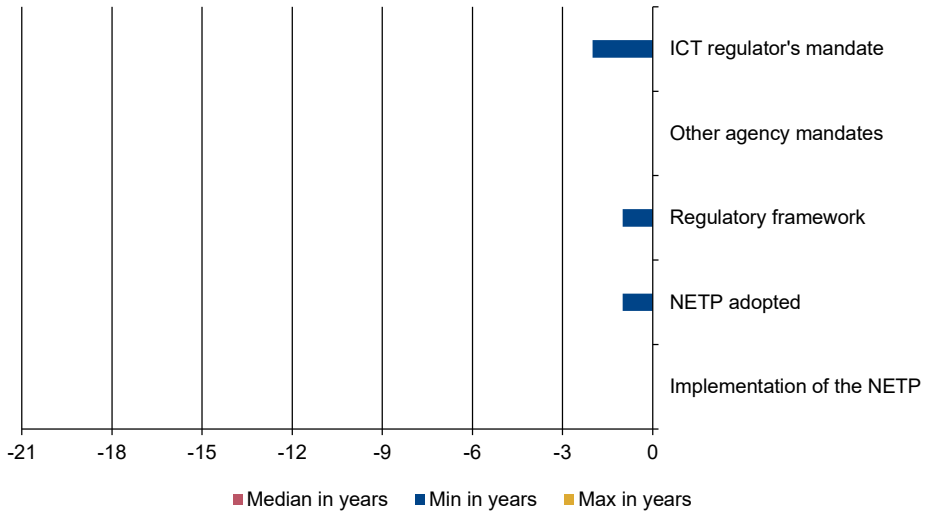
[13] ITU, Indicator 7: a. Percentage of population within reach of transmission networks; b. Percentage of area within reach of transmission networks, 2020.

Figure 10
Availability of data on Sustainability indicators, by indicator
(Number of States and territories)



Source: Authors' elaboration.

Figure 11
Recency of data on Sustainability indicators, by indicator
(Years since 2022)



Source: Authors' elaboration.

There was some confusion expressed regarding the way sustainability could be measured and the identification of meaningful metrics for collecting data for this priority area. Several logistical challenges were also highlighted, including the lack of resources, including human resources, cost, and infrastructure. Challenges with acquiring information on business continuity plans, national emergency plans and national ICT development plans were also identified, as were challenges with the ability to forecast changes and the agility to capture and measure them in a timely manner.

While the governance of emergency telecommunications is an important aspect of the sustainability of communications systems, particularly in a disaster-prone region like the Caribbean, other aspects of sustainability related to digital technologies could also be captured under this Priority Area. The environmental impacts of the digital transformation, such as electronic waste, is one area that could be measured and for which some indicators are included on the Core List. The UNESCO Internet Universality Indicators (UNESCO, 2019) also contains a cross-cutting set of indicators on sustainable development that could be reviewed. Given different possible understandings of the word "sustainability", this priority area may also benefit from further refinement, for example through agreement on relevant sub-areas to be measured. Overall, this area provides some room for discussion as regards the whole-of-society and people-centred aspects of the measurement of the digital society. This could include elements relating to resilience or the impact of newer technologies, such as artificial intelligence.

E. Digital skills

Only three indicators were proposed for the measurement of digital skills at a subregional level. Two of the indicators derive from the IDI Zero Draft, and relate to educational enrolment ratios, which are frequently used as proxies for measuring digital skills, as educational attainment is strongly linked to digital skills. An example of this is available in the Trinidad and Tobago National Digital Inclusion Survey, which computed the ICT skills sub-index of their ICT Development Index according to the methodology used by the 2017 ITU ICT Development Index. The third indicator was drawn from the Core List and measures the proportion of learners enrolled in ICT-related fields at the post-secondary level. This indicator is defined in the 2009 UNESCO Guide to Measuring ICT in Education (UIS, 2009). While this indicator appears more directly relevant to the measurement of digital skills, a review of international databases and relevant reports suggests that no data is collected for this indicator for any country. As such, it has been excluded from the analysis and figures below, and the remaining two indicators have been renamed as "education indicators" in the figures, to maintain the distinction.

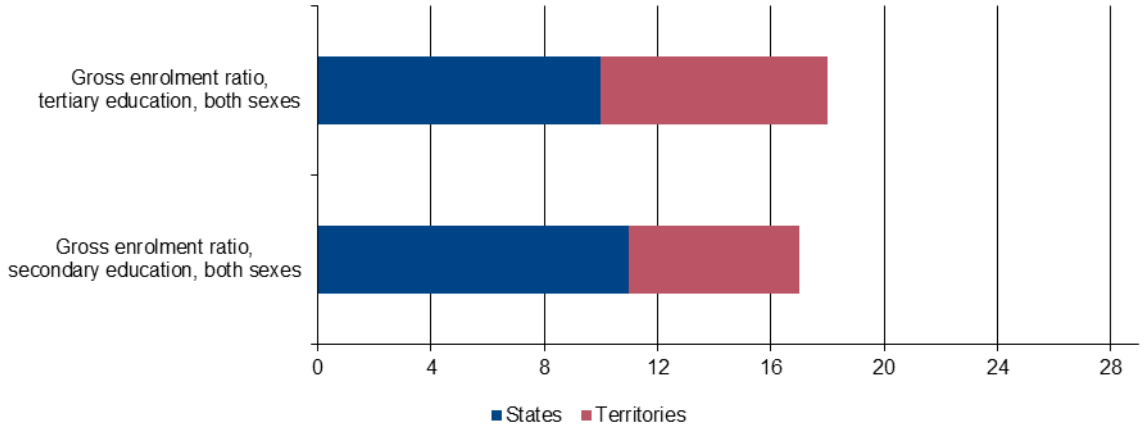
The data on the education indicators are available in the database of the UNESCO Institute for Statistics. Overall, the median data availability for the two indicators is comparatively high, with a median data availability of 60.34 per cent of countries. The median data age is also low, at just one year.

Data are available for more than half of all member States, and close to or more than half of all territories (see figure 12). This likely reflects the high priority ascribed to education in most countries. However, the gaps in reporting on these education indicators may also suggest challenges associated with reporting in Ministries of Education and related entities.

The data available are also, typically, recent. For tertiary education, the median age of the data is zero years, while for secondary education, it is two years. This suggests that the reporting on these indicators is regular for most countries. However, there are some outliers, as some of the most recent data are as old as 10 years (see figure 13).

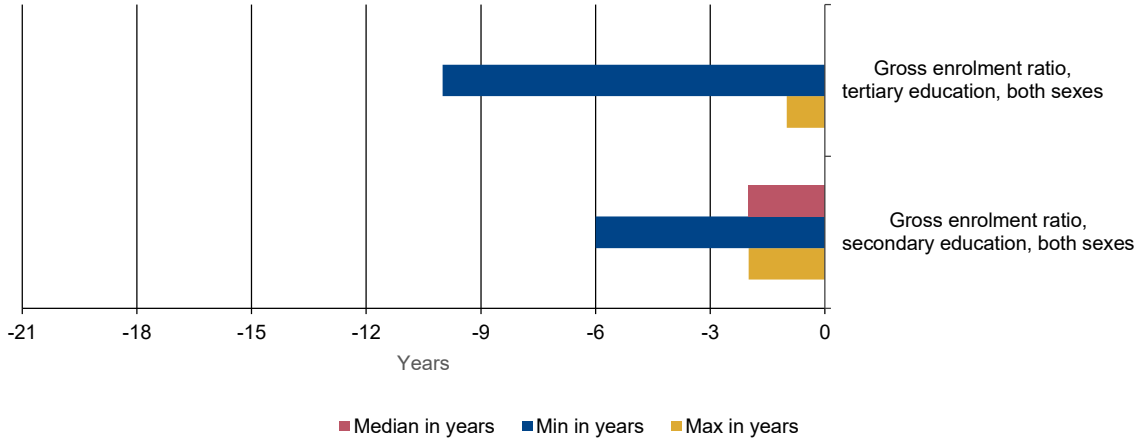
While the data availability for the education indicators is comparatively high, and the data are recent, a potential challenge in using these indicators to measure the digital society lies in the fact that they are very general proxies. Bearing in mind the concerns raised regarding keeping the purpose of data collection in mind, it might be useful to consider indicators that more closely approximate levels of digital skills. This is particularly important in a region like the Caribbean, where educational attainment is generally high, which reduces the potential relevance of these indicators. Additionally, data collection and reporting challenges observed with the measurement of these indicators would likely not be addressed in the ICT context, but rather in the context of education. As such, the data collected would not be actionable by regulators and other stakeholders interested in the digital society and digital inclusion and would likely have little impact on the choices to be made by them.

Figure 12
Availability of data on Education indicators, by indicator
(Number of States and territories)



Source: Authors' elaboration.

Figure 13
Recency of data on Education indicators, by indicator
(Years since 2022)



Source: Authors' elaboration.

The challenges identified suggest that a more direct approach to measuring digital skills is desired. Some of the challenges related to the measurement of digital skills include measuring the gaps that exist between people of different demographic groups, regions, and socioeconomic status; the establishment of a baseline for the measurement of digital skills; defining digital skills; and creating objective assessment tools to ensure accuracy. Relevant to the conduct of household surveys, it was also noted that people may not be aware if their family members have digital skills. The lack of collation of information from multiple organizations was also noted as a challenge. The views shared go beyond what the education indicators would measure, and as such indicate that additional indicators should be identified for this priority area.

While resource-intensive, the most straightforward option could be to measure self-reported digital skills directly through a survey, as was done by the Telecommunications Authority of Trinidad and Tobago in their National Digital Inclusion Survey 2021 (TATT, 2022). The Core List and SDG List both contain an indicator on "Individuals with ICT skills, by type of skill". The skills that could be measured under this indicator include moving items, using copy and paste tools, sending e-mails with attachments, using formulas in spreadsheets, connecting devices, installing software, creating digital presentations, transferring files and coding. The use of this standardized measure of self-reported skills could also address the concerns raised by the experts regarding the definition of digital skills and be a more objective assessment tool of digital skills.

In particular, using a direct measure of self-reported skills like this in combination with disaggregated data, can provide insight into gaps in ICT skills, and into where targeted capacity-building efforts could have the greatest impact. Data on individuals with ICT skills are available in the ITU WTI database for three Caribbean member States and one AMC, with a median data age of 5 years.

Other indicators that could provide insight into the level of digital skills in a population include measuring the percentage of graduates from tertiary education in ICT-related fields, which is on the SDG list, and quite similar to the indicator from the Core List, for which no data appear to be collected. Data for this indicator are available in the UIS database and are available for four member States and six AMCs, with a median data age of 3 years.

F. Digital economy

For digital economy, only two indicators were tentatively proposed in the draft list, namely "Proportion of businesses with a web presence" and "Proportion of businesses receiving orders over the internet". Both were drawn from the Core List and are defined in the UNCTAD Manual. This data is available in the UNCTADstat database and is disaggregated (where available) by business size, industry, type of activity, and urban/rural location.

The data available on the digital economy are limited, and largely out of date. For "Businesses receiving orders over the internet", some data from 2007 is available for one country. For "Businesses with a web presence" some data from 2006 for one country is available, and some data from 2006, 2007 and 2020 for another.

The country for which 2020 data are available also measures other indicators relating to ICT access and use by businesses, which are included on the Core List. This includes indicators relating to the proportion of businesses using the internet or computers, the purposes for which they use the internet, how they access the internet, and the extent to which employees of businesses routinely use computers or the internet.

The measurement of the full impact of ICT on the national economy and defining the scope of the digital economy were among the challenges noted by surveyed experts on the measurement of this area. Specifically, identified challenges were related to the measurement of e-commerce and digital payments.

Related to the definition of the digital economy, it is noted that the Core List includes indicators on the ICT sector and trade in ICT goods and services (see annex 3) that may be considered for use. The SDG List also includes an indicator on international trade in digitally deliverable services. The UNESCO Internet Universality Indicators (IUI)[14] evaluates the proportion of businesses that make use of the internet and e-commerce, and measures perceptions of the value of internet use by small and

[14] UNESCO (United Nations Educational, Scientific and Cultural Organization) (2019), "UNESCO's Internet universality indicators: A framework for assessing Internet development".

medium-sized enterprises. This measurement of perceived value is unique and may provide insight into potential barriers to the adoption of ICT.

Regarding the measurement of e-commerce, this is an emerging area of measurement. A 2023 report by UNCTAD provides an overview of approaches to measuring the value of e-commerce around the world (UNCTAD, 2023). This includes the use of surveys on the use of ICT in businesses. These surveys cover different types of industries, which vary from country to country. The report notes that due to the COVID-19 pandemic, which is likely to have vastly increased the uptake of e-commerce across industries in many economies, it may be useful to have a broad coverage of different industries for this field. For a region like the Caribbean, that is as dependent on imports, these new indicators, which are in the process of development, could be particularly important. As noted in the report:

> For development purposes, it is important to know whether e-commerce complements or just replaces offline-commerce. Beyond estimating total e-commerce, the distinction between domestic and cross-border e-commerce would allow the contribution of e-commerce to international trade to be understood. [...] When e-commerce drives a greater increase in imports than of exports, it may not contribute positively to economic development.[15]

Given its potential importance for the Caribbean, engaging with the ongoing efforts to define and measure the value of e-commerce could be an opportunity to build capacity in this area, learn from the various approaches used in other countries, and identify possible ways forward for the Caribbean.

G. Affordability

Regarding affordability, two indicators were identified to measure this area, namely "Data-only mobile-broadband price (as % of GNI per capita)" and "Fixed-broadband Internet basket price (as % of GNI per capita)". Both indicators are on the Core List and SDG List and derive from the ITU ICT Price Baskets (IPB) dataset. The IPB dataset (ITU, 2022a) measures the affordability of ICT services around the world. The methodology to measure the indicators is set out in the ICT price data collection rules (ITU, 2022b).

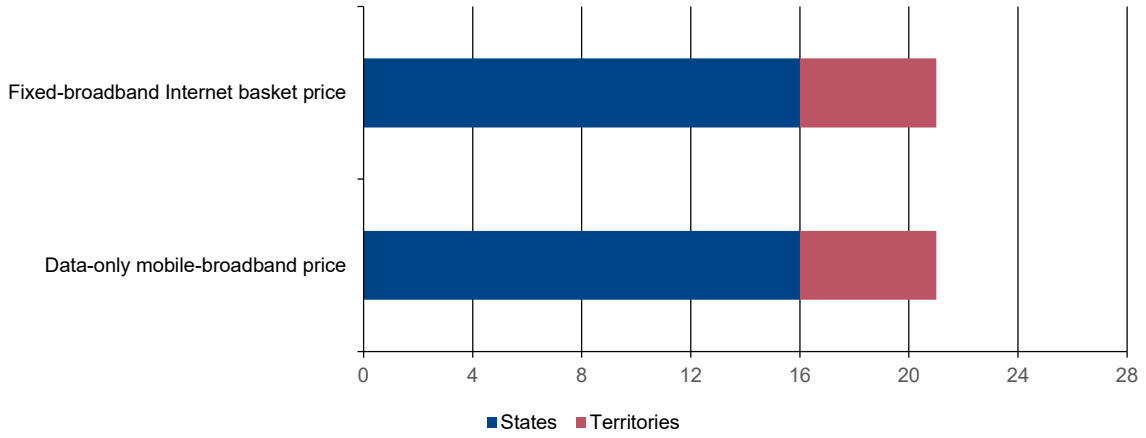
The overall data availability on Affordability is comparatively high, with a median data availability of 72.41 per cent, or 21 countries (see figure 14). For both indicators, data are available for all 16 member countries and for 5 AMCs. The data are also very recent, as the median data age is zero (see figure 15).

While most of the data are recent, the range is six years, indicating some differences in the frequency of data collection, or in the availability of public pricing data.

IPB data are collected directly by ITU. The database measures the cost of five types of "baskets": Fixed broadband basket (Minimum 5GB data); Data-only mobile broadband basket (Minimum 2GB data); Mobile cellular low-usage basket (Minimum 70 voice minutes, 20 SMS); Mobile data and voice low-consumption basket (Minimum 70 voice minutes, 20 SMS, 500MB data); and Mobile data and voice high-consumption basket (Minimum 140 voice minutes, 70 SMS, 2GB data). The baskets are internationally comparable units of ICT services developed by the ITU Expert Group on ICT/Telecommunications Indicators. They reflect the plans and services that meet the minimum standard for each basket.

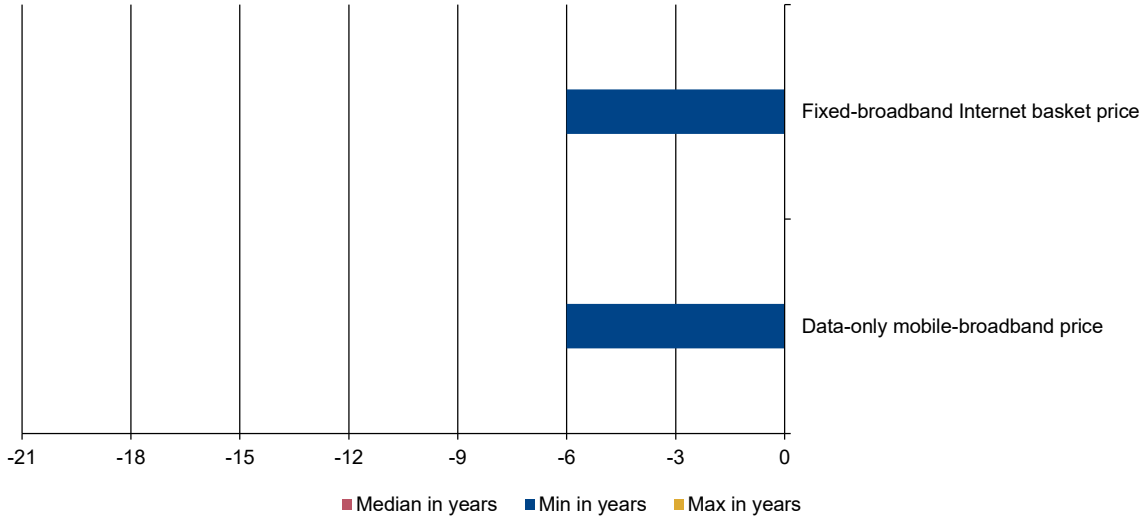
[15] UNCTAD (2023), page 39.

Figure 14
Availability of data on Affordability indicators, by indicator
(States and territories)



Source: Authors' elaboration.

Figure 15
Recency of data on Affordability indicators, by indicator
(Years since 2022)



Source: Authors' elaboration.

The complexity of the methodology developed to measure the affordability of ICT services is reflective of the complexity of the pricing structures for such services, which was identified by surveyed experts as an obstacle to accurate pricing or affordability measurement. For measurement at the subregional level, another challenge was identified during the discussions on these indicators, namely the choice of measurement unit. The proposed indicators measure affordability in GNI per capita, which was said to potentially distort perceptions of affordability, noting that the high GNIs of most Caribbean countries do not necessarily reflect how affordable ICT services are for people living in those countries. With these considerations in mind, it may be useful to consider different units of measurement for use in the Caribbean.

Within that context, it is noted that IPB data are provided in three units of measurement: As a percentage of Gross National Income per capita (GNIpc), in United States Dollars (USD), and in International Dollars (PPP$), where the price is adjusted to purchasing power, using Purchasing Power Parity.

A cursory review of the IPB time series data for the Caribbean paints two very different pictures of affordability in the Caribbean. While an in-depth analysis is outside of the scope of this study, it can be noted that the use of GNI per capita produces significantly different results for certain Caribbean countries compared to, for example, the use of PPP$. For one country, when GNI per capita was used, it appeared that the country had the second most affordable prices of ICT services among the seven Caribbean countries for which time series data was available. However, when adjusted for purchasing power, the cost of ICT services in the same country were the second least affordable in the Caribbean. As such, it may be useful to add indicators measuring affordability adjusted to cost of living. Since these indicators are already measured by the ITU, their measurement would not require additional efforts from Caribbean countries. Countries could also apply their own measures of affordability, for example cost as compared to their national poverty line or similar measure, by using the cost in USD as their starting point.

H. Other priority areas

No indicators were identified for the three priority areas on Usage and local content, Cybersecurity and trust, and Inclusivity. In part, this reflects the order in which the Priority Areas were discussed, as some benefited from a more in-depth review and discussion than others. No discussion was held on indicators for the priority area on Usage and local content during the Workshop. Regarding Inclusivity, this Priority Area was considered as cross-cutting, and discussions centred around the need to get disaggregated data for other Priority Areas, and the marginalized groups to be considered.

1. Possible indicators and data availability on usage and local content

Usage indicators

The Core List contains several indicators related to ICT usage by individuals. Five of these indicators are "Proportion of individuals using the internet", and disaggregated versions of it, such as "by location", "by type of activity", "by frequency", "by type of portable device and network used to access the internet". There is also an indicator on "Proportion of individuals not using the internet, by type of reason". Two indicators relate to the usage of a computer or mobile phone, and there is also an indicator on the ownership of a mobile phone. In addition, there are four indicators relating to the purchase of goods or services online, disaggregated "by type of good and service purchased", "by type of payment channel", "by method of delivery", and for those that did not purchase goods or services online, "by type of reason" (see annex 3). These types of indicators were also included in the National Digital Inclusion Survey 2021 of Trinidad and Tobago, as part of the Digital Inclusion Index.

There are also several indicators relating to household access to ICTs, which might be relevant to consider. In particular, the indicators on barriers to household internet access, and household expenditure on ICT may be particularly relevant to identify challenges related to usage and digital inclusion (see annex 3).

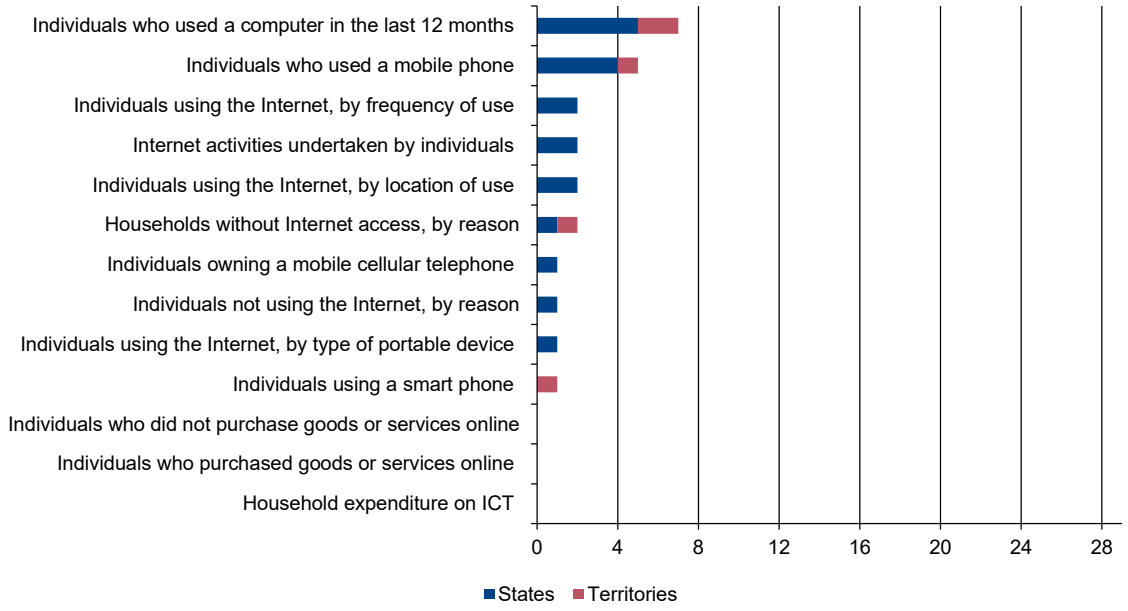
Related to usage, one of the surveyed experts noted as a challenge that people did not always know what technology they used to access the internet, which is relevant to the questions on the network used. This is particularly relevant for countries that might wish to use alternatives to household surveys to measure this area, as they may then have less ability to provide clarifications or support to those surveyed, which may in turn affect response rates or the accuracy of responses.

A review of the data available for the above-mentioned indicators shows that there are no Caribbean data available on the purchase of goods and services online in the ITU database, and these indicators have therefore been condensed into those that did, and did not purchase, to avoid the disaggregated indicators skewing the overall medians. There are also no data on household expenditure on ICT.

The data available on Usage are extremely low, with a median of 3.45%, the equivalent of 1 out of 29 countries. The limited data that is available is fairly recent, with an average age of 2 years.

The highest availability is for the indicator on "Individuals who used a computer in the last 12 months (%)", at five member States and two AMCs (see figure 16). For four indicators, there is only data available for one member State or territory. This is likely due to these indicators requiring data collection through surveys of households or individuals, for which associated challenges have previously been noted.

Figure 16
Availability of data on Usage indicators, by indicator
(Percentages)

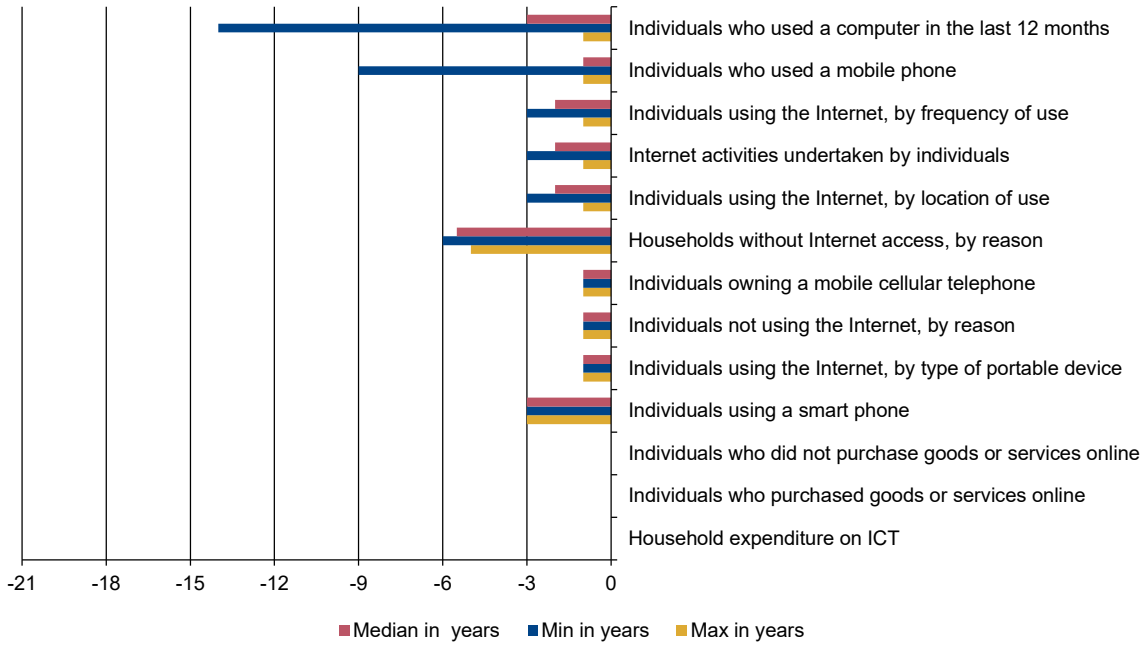


Source: Authors' elaboration.

As regards the recency of data, this is highly variable by indicator, in one case by as much as 13 years (see figure 17). Given the low availability of data, the recency largely depends on the few countries for which data is available, which makes the medians less meaningful. For the three indicators for which data is only available for two countries, the median is naturally a simple average of the two values.

It is noted that there is some overlap between the Connectivity and Usage indicators. For example, both areas measure "Individuals using the internet", although the Usage indicators presented here are concerned with how individuals use the internet. There are also some indicators that could be considered under Connectivity due to their connection to the question of access, such as proportions of people that used a computer, mobile phone, or smart phone. It is noted that the Universal and Meaningful Connectivity Dashboard on the ITU DataHub (ITU, 2023e) considers mobile phone ownership, as well as gender parity measures on mobile phone and internet use among their indicators.

Figure 17
Recency of data on Usage indicators, by indicator
(Percentages)



Source: Authors' elaboration.

Local content

There are no indicators on the ITU DataHub, nor the Core List or SDG List related to local content. However, among the UNESCO Internet Universality Indicators, Theme E focuses on local content and language. As the IUI is made for individual national assessments, no data is collected for its indicators in general. As such data availability and recency cannot be considered here. However, the indicators are referenced in annex 3.

The IUI recognizes both the value of, and the challenges associated with measuring local online content:

> Relevant content, including content which is generated locally and concerned with local issues, is necessary if people are to use the Internet to improve their quality of life or livelihoods, and to contribute to national development. Defining and assessing local content is, however, problematic.[16]

This view is echoed by the surveyed experts, who noted the limited availability of local content and the measurement of local content, including plays, music, movies, etc., among the challenges for this priority area. While some local content, such as that published via national governments or other public institutions, or using a national top-level domain, may be easier to measure, local content accessible to the public through international streaming platforms, discussion forums or other websites will be significantly more difficult to access statistics on. One exception may be the IUI indicator on the "Number of articles/words concerning the country in Wikipedia or an equivalent source, compared with other countries, including source (proportion generated in-country)". As the IUI explains,[17] Wikipedia

[16] UNESCO (2019), p.76.
[17] UNESCO (2019), p. 76, footnote 13.

data is freely available, which facilitates monitoring and assessment, though Wikipedia access and use vary between countries, and between economic and language groups within countries.

The IUI also advances language as one of several potential indicators of local content, noting that user-generated content, such as on social media, may differ from content on websites. This is an interesting point, in view of the diverse linguistic profile of the Caribbean.

According to one statistic, 98 per cent of the world's languages are "digitally disadvantaged", and gaps in language access are one facet of the digital divide (Zaugg and others, 2022). Most countries in the Caribbean only have languages of European origin among their official languages, such as Dutch, English, French or Spanish.[18] Official Government websites and the sites of organizations and businesses sites are thus likely to only appear in these official languages.

However, when considering user-generated content, a greater variety of languages is used in the Caribbean, including variations of Creole or Patois languages, different Indigenous languages, and Arabic, Caribbean Hindustani, Chinese and Yoruba. Tracking such linguistic content originating from the Caribbean could potentially provide valuable insights on how various groups use the internet. These insights could then be used to reduce the digital disadvantage of these languages over time, and potentially support the digital inclusion of associated minority groups.

2. Possible indicators and data availability on Cybersecurity and trust

The experts surveyed for this study highlighted several challenges related to the measurement of cybersecurity and trust. Deciding on the indicators of focus to accurately capture a country's cybersecurity landscape was listed among those challenges, as well as some challenges related to potential respondents, in particular, their unwillingness to provide information on their security profile, or their general understanding of cybersecurity. The lack of systems in place to capture any cybersecurity issues was also noted.

Related to the identification of possible indicators of focus, it is noted that there are no indicators directly related to Cybersecurity and trust on the Core List or SDG List. A review of the Indicator Catalogue on the ITU DataHub identified five possible indicators, all of which relate to the governance of cybersecurity:

- Cybersecurity framework and mandates (3 sub-indicators)
- Digital identity framework and mandates (5 sub-indicators)
- Consumer protection framework and mandates
- Counterfeit framework and mandates
- ICT accessibility policies

Data related to these indicators are available for up to 15 Member States for most of the indicators. No data are available for the AMCs, a common circumstance for most indicators relating to governance.

In the IUI, Cybersecurity is an integrated aspect of the instrument, which contains explicit references to cybersecurity across both Theme A on the Policy, Legal and Regulatory Framework and Theme D on Trust and Security (see annex 3). This includes questions on the existence of legal frameworks to protect individuals against violations of rights which arise from use or abuse of the Internet; whether government websites/apps are available that enable individuals to undertake a wide range of e-government activities securely online as well as offline; and how extensively developments

[18] Except Haitian Creole (Haiti) and Papiamento/Papiamentu (Aruba and Curaçao).

in Internet protocols and standards are implemented within the country. However, as no data are collected for the IUI, data availability and recency are not discussed here.

The Trinidad and Tobago National Digital Inclusion Survey 2021 also included some questions related to security and trust. In general, these questions related to user perceptions of the safety of their personal information online, or trust in online services and information received from social networking sites. Indicators along these lines may also be considered, though it may be worth clarifying the extent to which trust in online services and information received is a positive or negative trait in the context of cybersecurity.

Another approach to measuring cybersecurity is the ITU Global Cybersecurity Index (GCI) (ITU, 2021a). The GCI is a composite index of indicators. According to the ITU, the GCI measures the commitment of countries to cybersecurity at a global level. As cybersecurity has a broad field of application, each country's level of development or engagement is assessed along five pillars: Legal Measures, Technical Measures, Organizational Measures, Capacity Development, and Cooperation. The mandate for the GCI derives from ITU Plenipotentiary Resolution 130 (Rev. Dubai, 2018) on strengthening the role of ITU in building confidence and security in the use of ICTs (ITU, 2018).

The questionnaire upon which the GCI is based is submitted to ITU Member States and the State of Palestine. Questions change between editions of the GCI to reflect changes in cybersecurity practices and priorities (ITU, 2021b). Examples of questions asked include: whether there are laws on online identity and data theft; whether there is a national computer incident response team; whether there are measures for assessing the level of cybersecurity development at a national level; if there are public awareness campaigns about safe online behaviour targeting specific groups; and whether there are bilateral agreements on cybersecurity cooperation in place with other countries.

Given the sensitivity of this topic, discussions on the adoption of indicators in this area would need to consider the extent to which countries are comfortable sharing data on Cybersecurity and trust among themselves, and potentially with the public. Filtering the data through the ITU and the GCI may address potential concerns in this regard. The natural trade-off to this is reduced transparency, given that the ITU aggregates the answers received into composite scores along the five pillars. As such, if there is an interest in data sharing on Cybersecurity and trust in the Caribbean, it may be necessary to agree on the release of data for certain indicators. If such indicators were identified, it would also provide an opportunity for the AMCs to participate.

3. Possible indicators and data availability on Inclusivity

Digital inclusion was addressed through agreement to disaggregate the data on Connectivity, and by embracing Inclusivity as one of the ten Priority Areas. The Priority Area encompassed "Inclusivity, including gender equality, age, [persons with disabilities], indigenous groups etc". No indicators were identified for this area, but the description of the Priority Area suggests a focus on the inclusion of marginalized groups.

Defining inclusivity was identified as a challenge for this priority area. Ensuring that communities and vulnerable groups are connected and reaching all those excluded were also seen as challenges to measurement. Measuring the usage gaps between various groups within the population was further noted as a challenge, which could be further complicated by reticence in response by those unwilling to admit to being less fortunate. This might be a particular challenge in countries where ensuring anonymity in the survey process is not trusted, particularly in countries with smaller populations, or in situations where an interviewer may originate from the community, for example, due to language needs.

Some potential indicators and approaches to measuring Inclusivity can be identified (see annex 3) using the definition of digital inclusion from the introduction, which emphasizes intersectionality, human rights, whole-of-society policies and programmes, and equal, meaningful, and safe access to and use of digital technologies and opportunities in the digital space, while taking care to embrace marginalized groups.

Intersectional approaches enable the deep understanding of a society's dynamics that is necessary to understand who might be most negatively affected by the digital transformation and in what ways. One way of addressing the need for intersectionality includes ensuring that any data captured related to the digital transformation is disaggregated as much as possible. The disaggregation of collected data by demographic characteristics (e.g., age, gender, disability status, ethnicity, income level, etc.) and by geographic characteristics (e.g., urban/rural/remote, district/county/parish, population density, coastal/interior, multiple islands, etc.) is especially important for digital inclusion, identifying underserved persons, communities, or areas, and revealing previously unseen patterns of inequality. This would then allow for the development of evidence-based policies and programmes to address the observed inequalities. Some examples of types of indicators can be found in the IUI, particularly in the category of "Accessibility to All". The SDG List also contains a list of possible dimensions of disaggregation for categories of indicators on individuals, households, businesses, education, technology, and e-waste. These could be compared to any existing dimensions used by national agencies collecting statistics related to the measurement of the digital society and digital inclusion.

The experts surveyed for this study were asked to identify demographic and geographic characteristics that are high priority for each country (see table 1).

Table 1
Disaggregation of data

Important Demographic characteristics		Important Geographic characteristics	
Demographic characteristic	Percentage of selection *(Percentages)*	Geographic characteristic	Frequency of selection *(Percentages)*
Gender	21.1	Urban/rural/remote	28.1
Age	19.3	Population density	25.0
Income level	17.5	District/county/parish	21.9
Disability	15.8	Multiple islands	12.5
Ethnicity	14.0	Coastal/interior	9.4
Education level	7.0	Terrain	3.1
Family size	3.5		
Sector	1.8		

Source: ECLAC and CTU based on results of the Measuring the digital society through ICT indicators survey.

Respondents also noted five key challenges associated with data disaggregation at the subregional level:

(i) Resource constraints, both human and financial.

(ii) Cooperation and time delays with the various stakeholders.

(iii) The age of citizens and their understanding of the need for data collection and measurement.

(iv) Impact of terrain on the ability to collect data, particularly from remote and rural areas.

(v) Methodological issues associated with small sample sizes that may result from data disaggregation.

Regarding methodological issues, it is acknowledged that the smaller the population of a country or territory, the greater the challenges related to disaggregation, as a smaller overall population would require larger sample sizes to ensure representativeness of all groups. However, the use of alternative

methods to gather the necessary information may be more useful where securing the requisite sample sizes would be too burdensome.

Human rights are an important consideration in the development of indicators. As affirmed by the United Nations Human Rights Council, "the same rights that people have offline must also be protected online" (UNHRC, 2019). Possible indicators relating to this could therefore include the extent to which legal frameworks, policies and programmes related to digital technologies and the internet are in line with applicable human rights conventions, whether there is explicit protection for human rights online, whether there are specific protections for marginalized groups, or mechanisms to address online human rights violations. Adopting a human-rights-based approach to the digital transformation would also support the goals of intersectionality, equality and leaving no one behind. In the IUI, rights is a separate category containing six distinct themes, and human rights are considered across multiple indicators. This includes cross-cutting indicators on gender equality, and on children, which considers their specific needs. Addressing this aspect could thus also fill the gaps in the sub-areas under Governance on gender equity and human rights.

The digital transformation is affecting all aspects of society, and as such, having whole-of-society policies and programmes relating to the digital transformation is useful, so that any challenges can be addressed. The inclusion of considerations related to digital technologies in national development policies and sectoral policies, as well as ensuring coordination on digital issues across sectoral boundaries would be one way of approaching this. The IUI cross-cutting theme on sustainable development incorporates some of these aspects. These could also potentially be addressed in the section on sustainability.

Ensuring multi-stakeholder participation in the development of policies and programmes and ensuring that the results of those processes consider intersectionality and human rights would also be important. The IUI includes multi-stakeholder participation as one of its categories, the indicators of which primarily relate to governance (see annex 3). As such there may be some overlap with the Priority Area on Governance, and in particular the G5 Benchmark, which aims to fast-track collaborative, cross-sector regulation of digital technologies.

II. Caribbean systems for measuring ICT, the digital society and digital inclusion

Based on the responses received through the survey of experts, this Section discusses the perceived strengths and weaknesses of the measurement systems currently in place across the Caribbean, their capacity-building needs, as well as priorities related to measurement.

A. Current systems for measurement

Most States and territories indicated that systems for collecting and analysing ICT indicators related to the digital society and inclusion existed, though most also indicated that those systems were not fully implemented, in one or several ways.

The responses describing the strengths and weaknesses of the various measurement systems illustrate how each country's context is unique, though many share similarities. It was underscored that there is no perfect system, that there are many possible approaches to measurement, and that systems do not need to be uniform to produce valuable results. The design of the various systems likely reflects each country's unique history and characteristics, including the maturity of their data collection systems.

The systems and processes used to capture data on the digital society and digital inclusion vary greatly. Some respondents report that their country had no dedicated entity to capture data on ICT indicators; some have a single agency, typically either a statistics department or a national telecommunications regulator; some countries use both, and some receive relevant data from more than two departments or entities, including non-governmental actors, such as telecommunications providers and universities. Among those countries with the statistics department as the primary agency dedicated to data collection on ICTs, noted weaknesses included infrequent data collection, and a lack of focus on ICT, leading to limited data. Among the countries that shared the responsibility for data collection among various departments or stakeholders, some cited this as a strength, one noting for example the way in which they develop measurement instruments through collaborative and iterative

approaches. Others experienced the collection by multiple agencies as challenging, either due to siloed work, leading to fragmentation, a lack of focus, or challenges with collaboration. A clear mandate that ensures collaboration and information sharing across departments therefore appears to be essential.

Related to mandate, several respondents noted policy and legislative gaps, including the lack of a proper legislative framework to support the regulation of the ICT sector, as a weakness of their measurement systems. Non-compliance by service providers leading to insufficient data, was cited as a specific implementation challenge in this context. Among those with a fully implemented system, one noted that collected data are used for policy formulation and regulation, likely leading to a continuous strengthening of the mandate. Some weaknesses were noted among those with fully implemented systems as well. Data collection frequency was adjudged insufficient by some, and one noted insufficient capacity to analyse the large volume of data received through the wide range of indicators captured. Both cases illustrate that a fully implemented system is essential but not necessarily sufficient, as the system also needs to be fit for purpose and can be limited in its evolution by the available resources.

Because digital technologies and the digital transformation advance so quickly, collecting data along with a national census every 10 years would not be sufficient to assess their societal impact, nor adequately support evidence-based policymaking. For example, the Caribbean's first 4G LTE network was first launched in Antigua and Barbuda in 2014,[19] less than 10 years ago. Attempting to measure the digital society, which has changed so rapidly in the last 10 years, would be extremely challenging with such limited and outdated data. Those that receive a larger volume of data than they can analyse and treat with are in a relatively advantageous position, as increased resources and capacity could enable them to more fully take advantage of the available data. However, this would also require significant investment. As the concerned expert notes, one of the steps they are considering to further strengthen their measurement system is the implementation of a local data warehouse. However, this would come at a significant cost, both in terms of time and financial resources. Such a country may also be well-positioned to invest in artificial intelligence (AI) tools to support their data analysis efforts, but this would also require investment in dedicated AI models and training data, skills upgrading, processing power, cybersecurity, and other elements.

Resource constraints, including both human and financial resources, were frequently cited as a reason for systems not being fully implemented. Inadequate coordination, including between agencies, was also noted as a weakness in this context. It is noted that the countries that did not cite the lack of financial resources as a weakness, also presented their workforce, the involvement of government, and the coordination among stakeholders as important strengths of their systems. Involving the regulator as lead entity on the monitoring and evaluation of the measurement system was noted by one respondent as an important step that they had taken to strengthen their system. Another respondent noted capacity-building within the various institutions that participated in the collaborative work on developing their measurement framework as a step they had taken to strengthen their system. Adequate resourcing of the institutions responsible for measuring the digital society is essential both to implement monitoring and evaluation frameworks and conduct capacity building. The lack of awareness around the importance of the regulator, which was noted previously, may also be a cause of the lack of adequate resourcing in some countries. In such cases, awareness-raising activities may be helpful.

Several countries noted the lack of timely data collection and/or analysis as weaknesses of their systems. For some, this was noted in the context of resources, while for others it related to mandate, such as data collection being *ad hoc* or infrequent. Some countries also noted challenges related to their manual data collection processes, which were time and resource intensive, and prone to errors.

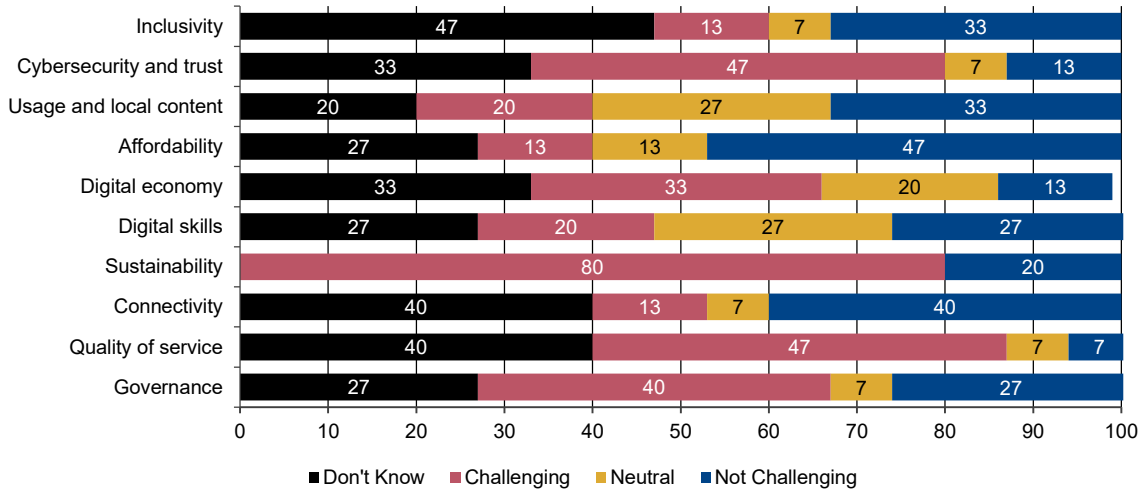
[19] Montserrat Reporter, 5 December 2014, "LIME Antigua & Barbuda launches the Caribbean's first mobile 4g LTE network" https://www.themontserratreporter.com/lime-antigua-barbuda-launches-the-caribbeans-first-mobile-4g-lte-network/.

Conversely, the countries that noted having implemented systems for electronic data collection saw this as a significant strength of their systems. However, access to the data collected was cited as a weakness for one such country, illustrating how systems need to be developed to consider the entire data life cycle. Other challenges noted related to the data collection process included limited sample sizes, and issues related to respondents' trust in providing information to the government.

B. Measurement challenges and capacity-building needs

In addition to questions regarding challenges related to measuring the priority areas and the strengths and weaknesses of their measurement systems, the surveyed experts were asked to assess how challenging it is for them to collect data on ICT indicators to measure each of the 10 priority areas. Figure 18 illustrates how each priority area was most frequently viewed and the percentage of respondents holding that view.

Figure 18
Perception of how challenging it is to collect data on ICT indicators to measure each priority area
(Percentage of respondents)



Source: ECLAC and CTU based on results of the Measuring the digital society through ICT indicators survey.

Given the varied challenges that were identified related to measuring Governance in Section I, it is not surprising that the priority area was most frequently considered challenging to measure by the surveyed experts. It is noted, however, that there were diverse views on the level of challenge associated with measuring Governance, as evidenced by the fact that 40 per cent of surveyed experts considered it challenging, while the remaining 60 per cent were split across the other possible responses. It is noted that the question narrowly inquired about the challenge level associated with the collection of data, and that the challenges described by experts above primarily relate to identifying and locating relevant legal frameworks. As such, it is possible that the overall challenge level might be considered higher if the question were phrased to also include access to data and information.

Quality of service was considered challenging to measure by nearly half of the respondents, though views did vary. The logistical issues associated with measuring this area, as described in Section I, involving either receiving data from outside sources or installing costly monitoring equipment, may be the reason why more experts consider it challenging to measure.

Surveyed experts most frequently either considered challenging connectivity to be not challenging to measure or were uncertain of how to measure this priority area, with another seven per cent being neutral on its measurement. Most of the indicators for this area are well-established, and quite a lot of data are available, though the recency varies greatly. The fact that data exist for most countries suggests that the challenges do not necessarily relate to the methodologies for measuring the indicators. Given that the challenges identified for this priority area were primarily tied to the unique geographies of countries and/or the availability of resources and personnel, which are needed to measure the indicators on households and individuals, the differences may relate more to practical and logistical issues associated with measurement.

Sustainability is the priority area for which views were the most uniform. Of the surveyed experts 80 per cent considered the collection of data on ICT indicators on sustainability challenging. This is congruent with the challenges that were described, which included identifying meaningful metrics for this priority area, and the need for further definition.

Digital skills is the area for which there was the greatest diversity of views, as evidenced by the fact that three cohorts of experts, each representing 27 per cent of responses, respectively, assessed data collection and measurement as not challenging; were neutral; and were uncertain. It is observed in this context that the challenges described by the experts related to the measurement of this priority area appear not to relate to the education indicators that were identified to measure this area. The variation in assessment describes more general concerns relating to the measurement of digital skills, such as definition, assessment, establishing a baseline, and disaggregation.

An equal number of surveyed experts were most frequently uncertain about how to measure the digital economy and considered data collection and measurement of this priority area to be challenging. The challenges identified for this priority area related primarily to defining the scope and measuring the impact of the digital economy, neither of which relate to the act of data collection. These broader concerns likely surface because data on the digital economy, such as transactions, are abundant, but largely inaccessible to those responsible for measurement. This could be due to the lack of defined indicators to measure this area, the lack of a legal mandate to compel this information from private sector actors and/or private individuals, or due to the international nature of many online transactions, creating issues related to jurisdiction.

Affordability was most frequently considered not challenging to measure, by 47 per cent of respondents. The main challenge identified related to the complex pricing structures for ICT services and related concerns regarding accuracy of measurement. Reviewing the ITU ICT Price Baskets methodology, it is clear that these complex pricing structures were taken into account when developing the IPBs, and the high availability and recency of country data suggests that the necessary information is largely accessible to the ITU when it conducts its assessments. However, the complex methodology developed, and the large amount of data that is collected from a multitude of providers across 165 countries is also evidence of the challenges inherent in measuring this priority area.

Usage and local content, as an area for which no indicators were identified, was most frequently considered not challenging to measure, by 33 per cent of experts. This is somewhat surprising, considering that the potential usage indicators that were identified would primarily derive from household surveys, which are resource intensive, and this study has identified several challenges associated with measuring local content. It is possible that the lack of discussion on this priority area may have led to an underestimation of the challenges associated with measuring it. However, it could also signal that local expertise is available or best practices have been identified in some countries to measure this priority area. As such, this is an area that warrants further investigation and discussion.

Cybersecurity and trust, for which no indicators were identified, was most frequently considered challenging to measure, and by 47 per cent of experts. The challenges described for this priority area were varied, ranging from the identification of indicators to respondents' digital skills or lack of trust, to logistical issues.

Uncertainty on how to collect data to measure Inclusivity was a challenge noted by the experts, including defining what inclusivity encompasses. The degree of uncertainty also became apparent in that the most frequently selected answer, by 47 per cent of respondents, was that they did not know how difficult it would be to collect data to measure this priority area. This is unique to this priority area and suggests that further discussion is needed on this area.

Figure 18 illustrates the diversity of views regarding the degree of challenge associated with collecting data to measure each priority area. This diversity suggests that further discussions to define and refine several of the areas may be fruitful and signals the potential for enhanced South-South cooperation among Caribbean countries under the relevant priority areas. For priority areas where the challenges described relate primarily to definition, further discussions are needed regarding the broader issues related to the area. Where the challenges described relate more to logistical issues or funding, technical cooperation may need to be sought to address the challenges described. Where legal mandates need to be established, the identification of best practices in the subregion could be helpful. Lastly, for areas that are considered challenging to measure, and an existing instrument exists, its use could be attempted to identify where challenges arise.

The survey also assessed the capacity-building needs relating to the measurement of the digital society and/or digital inclusion at the national and institutional levels. The most critical national capacity-building needs, as identified by the respondents, were "Identifying what data should be collected" and "Designing data collection instruments", both with 92 percent selection rate (see table 2). This is congruent with the challenges described in the previous section.

Table 2
National capacity-building needs

Capacity-building need	Frequency of selection *(Percentages)*
Identifying what data should be collected	92
Designing data collection instruments	92
Developing methodologies for indicators	83
Preparing data for sharing	83
Developing data collection procedures	75
Analysing collected data	75
Using analysed data to make decisions	75
Communicating analysed data effectively to stakeholders	75
Cleaning and processing collected data	67
Using analysed data for evidence-based policy development	67
Releasing data publicly online	58
Communicating analysed data effectively to the public	42

Source: ECLAC and CTU based on results of the Measuring the digital society through ICT indicators survey.

The most critical capacity-building need at the institutional level is for "Training programmes to deepen theoretical understanding of the digital society" with a 91 percent selection rate (see table 3). Such training programmes could support the work to define and refine the ICT indicators by engendering a shared understanding of the digital society and its impacts.

Table 3
Institutional capacity-building needs

Capacity-building need	Frequency of selection *(Percentages)*
Training programmes to deepen theoretical understanding of the digital society	91
Training programmes to deepen theoretical understanding of digital inclusion	75
Training programmes to deepen technical knowledge related to data collection or analysis	75
Collaborative workshops bringing together technical experts from different fields	75
Collaborative workshops bringing together technical experts from different countries	75
Specific training on the collection, processing, analysis or communication of disaggregated data on ICT indicators	75
Peer learning programmes between people in the same field, but in different countries	67
Mentorship programmes between people in the same field, but at different levels	58
Mentorship programmes between people in different fields, and at different levels	50
Peer learning programmes between people in different fields, but in the same country	50
Peer learning programmes between people in different fields, and in different countries	50

Source: ECLAC and CTU based on results of the Measuring the digital society through ICT indicators survey.

The prioritization of these areas for capacity-building is instructive and provides insights for international organizations and other institutions providing capacity-building regarding potential areas of focus for the Caribbean. A more in-depth capacity needs assessment for the Caribbean related to the measurement of the digital society and digital inclusion, taking account of the strengths and weaknesses across countries, and identifying possible areas of collaboration and mutual learning could be an important next step. A well-designed capacity-building programme for this purpose could support technical experts in the region in strengthening their skills, and ultimately contribute to an increase in the quality and quantity of ICT data in the Caribbean.

C. Priorities for measuring the digital society to advance digital inclusion

As discussions on the List of Priorities and the indicators are set to continue, the surveyed experts were also asked to select and rank their country's top five priorities relating to the measurement of the digital society from the 10 priority areas on the draft list. The distribution of the selected priorities varied among the countries, with some of the priority areas being more frequently selected (see table 4).

Table 4
Selected priority areas for Caribbean countries[a]

Priority area	AIA	ATG	ABW	BLZ	VGB	CUB	DMA	GRD	JAM	MSR	KNA	LCA	SUR	TTO	TCA	No of Countries
Governance	X	X		X	X		X	X	X	X	X		X	X	X	12
Quality of Service		X					X									2
Connectivity		X				X	X	X	X	X	X	X		X	X	10
Sustainability	X						X							X	X	4
Digital skills	X		X	X	X	X	X		X			X	X	X	X	11
Digital economy	X		X	X	X		X	X	X		X	X	X	X	X	12
Affordability	X	X	X	X		X	X	X	X	X		X	X	X	X	13
Usage and local content					X					X	X		X		X	5
Cybersecurity and trust	X	X	X	X	X	X	X		X	X	X	X	X	X	X	14
Inclusivity	X		X			X		X					X	X		6
No of Priority areas	7	5	5	5	5	5	8	5	6	5	5	5	7	8	8	

Source: ECLAC and CTU based on results of the Measuring the digital society through ICT indicators survey.
Note: As a result of multiple in-country responses, the total number of priority areas identified by some countries may be more than five.
[a] Country codes: AIA: Anguilla; ATG: Antigua and Barbuda; ABW: Aruba; BLZ: Belize; VGB: British Virgin Islands, CUB: Cuba; DMA: Dominica; GRD: Grenada; JAM: Jamaica; MSR: Montserrat; KNA: Saint Kitts and Nevis; LCA: Saint Lucia; SUR: Suriname; TTO: Trinidad and Tobago; TCA: Turks and Caicos Islands.

This preliminary analysis of the distribution of the selections made by the surveyed experts revealed the following top five most selected priorities by the countries:

(i) Cybersecurity and trust: 14 countries.

(ii) Affordability: 13 countries.

(iii) Digital economy: 12 countries.

(iv) Governance: 12 countries.

(v) Digital skills: 11 countries.

To explore the ranking of these top country-selected priorities more fully, an in-depth analysis of the data was conducted to reveal the interactions between the priorities. Table 5 presents the results of analysing these top five priorities by the frequency of selection by respondents. A more detailed table is also available in annex 4.

Overall, the results of the frequency analysis show great coherence among respondents in terms of what the top five priority areas are, though the internal ranking of these priority areas varies. Cybersecurity and trust was the most frequently selected priority, followed by Affordability, both when assessed according to number of countries, and according to overall number of respondents. While Cybersecurity and trust was the most frequently selected priority overall, Affordability was most frequently ranked as First Priority by respondents, followed by Cybersecurity and trust. Digital economy, Digital skills and Governance were selected the same number of times, though the first two were ranked slightly higher than Governance overall. However, Governance, like Digital Economy, was selected as First Priority twice, while Digital Skills was only selected as First Priority once. Nevertheless, the overall alignment in terms of top priorities suggests that work to define and refine these five priority areas could prove fruitful in future discussions and provide an opportunity for early agreement on some indicators.

Table 5
Frequency analysis of top selected priorities
(By frequency of selection)

Priority area	Frequency of selection	Mode Rank	Frequency as First Priority	Ratio of First Priority to selection frequency *(Percentages)*
Cybersecurity and trust	23	2	3	13.0
Affordability	19	1	6	31.6
Digital economy	16	3	2	12.5
Digital skills	16	3	1	6.3
Governance	16	4	2	12.5

Source: ECLAC and CTU based on results of the Measuring the digital society through ICT indicators survey.
Note: As a result of multiple in-country responses, the selection frequency totals to more than the number of participating countries.

It is noted that Governments and telecommunications regulators appear to prioritize the draft list of subregional priorities differently. When disaggregated by institutional type (i.e., Government ministries vs. telecommunications regulators), and prioritized by the frequency of selection as a First Priority, the evidence suggests that Connectivity is the most important Priority area for Government Ministries, while Inclusivity is the most important Priority area for telecommunications regulators. Interestingly, neither of these priority areas were among the top selected priority areas overall.

Quality of Service and Sustainability were the least frequently selected priority areas overall. However, respondents were also asked which of the 10 priority areas were not a priority for their jurisdictions. Most respondents reported that all 10 items on the List of Priorities were priorities for their countries. Two respondents, however, indicated that Inclusivity was not a priority for their jurisdictions. In light of this, further discussion may be needed on these three priority areas if agreement and eventually effective implementation is to be achieved.

III. Conclusions

This study has provided both an analysis of ICT-related data available in relevant international databases for Caribbean countries, and of expert perceptions regarding systemic strengths, weaknesses, challenges, capacity-building needs, and priorities related to the measurement of ICT indicators on the digital society for digital inclusion across the Caribbean.

Governance, as the area for which the largest number of relevant indicators was identified, is also among the top five priorities selected by the surveyed experts but is considered challenging to measure. As a high priority area that is also considered challenging, countries may wish to assess whether the adoption of an established measurement methodology, such as the G5 Benchmark, could serve their needs. It is noted in this regard that while no data is available for the AMCs on the indicators presented in this report, the self-scoring nature of the G5 Benchmark could provide an opportunity for AMCs to assess their governance frameworks alongside the Caribbean member States.

Quality of service is an area for which many potential indicators have been identified, but that is of low priority to most experts consulted in this study. Data availability is low for this indicator, and it is considered challenging to measure. In light of these considerations, countries may wish to reassess the inclusion of this indicator on the list of subregional priorities.

Connectivity is a high priority for Governments, that comprising several well-established indicators, and generally considered not challenging to measure by most countries. The high data availability for the indicators under this priority area is encouraging. While there is a data gap related to the population within reach of transmission networks, these data are likely available, but not reported in the relevant tool. AMCs may wish to consider reporting the relevant data to facilitate broader subregional analyses on this topic if they are not already doing so. Some additional challenges in this area relate to the indicators that are derived from surveys of households and individuals. While the methodologies for the relevant indicators are well established, the challenges relate largely to the financial and human resources required to implement large-scale surveys. This is an area in which technical assistance could be highly beneficial.

Sustainability is the area that was considered challenging by the largest number of experts. Some indicators were identified relating to emergency telecommunications, for which little data is available. These indicators relate primarily to governance, and as with the Governance and Cybersecurity and trust areas, no data are available for the AMCs. Identifying meaningful metrics for sustainability was one of the challenges noted by the experts. Some potential avenues for exploration include looking at indicators on the environmental impacts of the digital transformation, such as e-waste, or more broadly at sustainable development in relation to ICTs. The IUI includes some indicators related to this topic that could be considered. It would also be helpful to further refine this priority area, for example by agreeing on additional sub-areas to be measured.

Digital skills is an area currently consisting of a few broad indicators, and is among the top five priorities of the experts consulted. Overall, this area is considered neither challenging nor easy to measure by experts. However, a review of the available data shows that while education data is quite widely available, data for indicators that more directly measure digital skills is limited. The challenges described by the experts for this priority area primarily relate to these more direct measures. Further discussion on this area may therefore prove helpful. Recalling that no data appears to be collected for the indicator on enrolment in ICT programmes at the tertiary level, countries may wish to consider replacing it with another indicator, for example the similar indicator measuring graduation rates. If work were to be pursued regarding surveys of households or individuals, the measurement of self-reported digital skills may also be beneficial.

Digital economy is an area also among the top five priorities of the experts, but for which only a few potential indicators were identified. The priority area is generally considered challenging to measure, and the data currently available for the few potential indicators is very limited. The data collected for these indicators, and the larger set of which they form part, is collected largely through surveys of businesses. As such, data collection in this area may face similar constraints as the areas requiring surveys of households or individuals. It may also require additional legal mandates to collect information from the private sector. An area for potential engagement by Caribbean countries is in the development of indicators on the value of e-commerce, which is currently ongoing at the international level.

Affordability, for which a few indicators have already been proposed, is among the top five priorities of the surveyed experts, and most frequently ranked as top priority. However, it only consists of two narrowly defined indicators. While the data on Affordability is widely available, and generally recent, no data is available for more than half of AMCs. Most countries do not consider this area challenging to measure, though concerns have been raised regarding the use of GNI per capita as the comparative unit, and experts identified challenges related to complex pricing structures for ICT services. Furthermore, the use of multiple units when assessing affordability could be considered, such as by adjusting for cost of living. Regarding the AMCs for which no data is available, it may be useful to liaise with the ITU to identify possible avenues for data collection in the future.

Usage and local content is one of the priority areas for which no indicators were proposed. The survey of experts demonstrates that this area is considered low priority for most experts, and not challenging to measure. The data available on usage, for which some potential indicators were identified, are extremely limited. This could reflect the relatively low priority placed on this area, but the data is also derived primarily from surveys of households and individuals, related to which challenges have previously been noted. No data were identified on local content in any international database, though some potential approaches based on the IUI could be identified. However, that instrument also considers this area difficult to measure. Considering language could be a potential starting point, although this may be difficult to enact at the subregional level, given the diversity of languages spoken and written in the Caribbean.

Cybersecurity and trust is another area for which no indicators were proposed, though it was the most frequently selected priority by the surveyed experts, and is considered challenging to measure. Given the sensitivity of the topic, a more detailed discussion regarding the possible indicators for this area may be warranted. Member States and territories may also wish to consult the relevant sections of the IUI, the Trinidad and Tobago National Digital Inclusion Survey 2021, or examine the details of the Globel Cybersecurity Index to assess if any of these approaches can serve their needs.

Inclusivity as a priority area requires further definition. It currently contains no indicators, and experts note that it is an area where they are unable to assess the challenges associated with measuring the area. However, it is also a medium-priority area, and Inclusivity appears to be the area for which there is most division among experts, as it is among the top priorities of regulators, but also the only area that was considered not a priority by some experts. A first step to addressing Inclusivity could be to prioritize the disaggregation of data collected across the other priority areas and focus on intersectional analyses of data where possible. This area could also be measured with a focus on governance, for example the adherence of ICT-related policies and programmes to relevant human rights instruments, in particular those relating to specific groups, such as women, persons with disabilities, indigenous peoples, ethnic minorities and children. Inclusivity could also be considered from a more practical perspective, for example by measuring multi-stakeholder participation in various processes.

Regarding the systems for measurement, the countries using digital tools for data collection identified this as a strength, while those that are working on moving away from manual systems identified these methods as a challenge. Human and financial resources, coordination, and capacity, including necessary skills, were challenges common across most responding countries. Some also identified gaps in policy and legislation that prevented measurement systems from operating optimally. In some cases, insufficient indicators, or challenges related to compliance of telecommunications operators, also hinder data collection. The capacity-building needs identified, at both the national and institutional level, reflect the desire of the experts to better understand the digital society and its impacts. At the national level, the top needs selected were identifying what data should be collected, and designing data collection instruments, which are both foundational elements. At the institutional level, the top capacity-building need identified was training programmes to deepen theoretical understanding of the digital society.

The very practical challenges described, and the capacity-building needs identified deserve serious consideration as the development of the List of Indicators continues, to ensure that the indicators, once agreed, can be utilized across the Caribbean. To facilitate that process, countries may wish to consider developing the list in an iterative manner, beginning with the highest priority areas, and seeking resources and support where necessary to strengthen capacities to implement the agreed work. Other approaches that may be considered include addressing the "low-hanging fruit" first; those for which there is broad agreement on importance and that are not considered challenging; addressing gaps, for example by filling priority areas with no indicators first; or a more practical approach deciding first on the desired number and type of indicators and working to address the priorities incrementally.

To conclude, multiple possible approaches exist that could serve to define and refine the priority areas and their indicators. The capacity-building needs identified, in particular those relating to the identification of data to be collected and design of data collection instruments, could be addressed in the context of the discussions on the list of priorities. The analyses in this study will hopefully provide policymakers, regulators, and other relevant stakeholders with information useful to the further development of ICT indicators to measure the digital society and digital inclusion, and ultimately support them in ensuring an equitable digital future for all.

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Annexes

Annex A1
Survey Instrument

Measuring the digital society through ICT indicators to advance digital inclusion: A Caribbean assessment

The United Nations Economic Commission for Latin America and the Caribbean (ECLAC) Subregional Headquarters for the Caribbean in collaboration with the Caribbean Telecommunications Union (CTU) is undertaking a study entitled "Measurement of the digital society through ICT indicators to advance digital inclusion". The study aims to contribute to and advance the ongoing discussions regarding the use of ICT indicators to measure the digital society to advance digital inclusion in the Caribbean. The study is based on the draft list of subregional priorities on this topic and its associated indicators, which were developed at a joint ECLAC-CTU workshop held from 27-28 March 2023. Part of the study will use information collected from policymakers and telecommunications regulators from the subregion to discuss national priorities for and current approaches to the measurement of ICT indicators on the digital society and digital inclusion, identify strengths and weaknesses, as well as key challenges and any capacity-building needs. This information will be collected using this survey.

This survey is divided into four (4) sections. In total, you will be asked up to 21 questions. The researchers welcome multiple in-country perspectives on this topic. Therefore, please respond to this survey individually.

All responses will be kept strictly confidential and no individual response will be reported. Only summary statistics and anonymized responses to open-ended questions will be reported. However, by responding to the survey, you agree to be identified among the experts consulted in an annex to the study. You also agree that the information you provide can be analysed and used by ECLAC and CTU for research purposes.

If you have any questions about the survey, please contact us at nia.nanan@ctu.int

We appreciate your input and look forward to receiving your completed questionnaire.

Information about the respondent

Name: _____
Title: _____
Organization: _____
Email address: _____
Telephone number: _____

Country:

- ❍ Anguilla
- ❍ Antigua and Barbuda
- ❍ Aruba
- ❍ Barbados
- ❍ The Bahamas
- ❍ Belize
- ❍ British Virgin Islands
- ❍ Cayman Islands
- ❍ Cuba
- ❍ Curaçao
- ❍ Dominica
- ❍ Grenada
- ❍ Guyana
- ❍ Haiti
- ❍ Jamaica
- ❍ Montserrat
- ❍ Saint Kitts and Nevis
- ❍ Saint Lucia
- ❍ Saint Vincent and the Grenadines
- ❍ Sint Maarten
- ❍ Suriname
- ❍ Trinidad and Tobago
- ❍ Turks and Caicos Islands

Section 1: Priorities for ICT indicators to measure the digital society to advance digital inclusion in the Caribbean

The draft list of subregional priorities for ICT indicators to measure the digital society to advance digital inclusion in the Caribbean, as developed in the March 2023 workshop, includes:

1. Pricing / Affordability of services
2. Service monitoring
3. Meaningful and universal connectivity
4. Inclusivity
5. Digital skills, industry training and capacity building
6. Cybersecurity
7. Governance / Legal and regulatory frameworks
8. Digital economy
9. Type of ICT usage / Local content
10. Sustainability

1. Please select and rank your country's top five (5) priorities relating to the measurement of the digital society through ICT indicators for digital inclusion, where 1 is the most important.

	1	2	3	4	5
Pricing / Affordability of services	❍	❍	❍	❍	❍
Service monitoring	❍	❍	❍	❍	❍
Meaningful and universal connectivity	❍	❍	❍	❍	❍
Inclusivity	❍	❍	❍	❍	❍
Digital skills, industry training and capacity building	❍	❍	❍	❍	❍
Cybersecurity	❍	❍	❍	❍	❍
Governance / Legal and regulatory frameworks	❍	❍	❍	❍	❍
Digital economy	❍	❍	❍	❍	❍
Type of ICT usage / Local content	❍	❍	❍	❍	❍
Sustainability	❍	❍	❍	❍	❍

2. If your country has priority areas for the measurement of ICT indicators that are not included in the draft list of subregional priorities, please specify these priorities.

Other priority #1 _____

Other priority #2 _____

3. With reference to the remaining items in the draft list of subregional priorities, which areas are **NOT** a priority to your country?

- ❑ Pricing / Affordability of services
- ❑ Service monitoring
- ❑ Meaningful and universal connectivity
- ❑ Inclusivity
- ❑ Digital skills, industry training and capacity building
- ❑ Cybersecurity
- ❑ Governance / Legal and regulatory frameworks
- ❑ Digital economy
- ❑ Type of ICT usage / Local content
- ❑ Sustainability
- ❑ All are priorities to your country

Section 2: Current systems for measurement

4. What are your current systems for data collection and analysis relating to the measurement of ICT indicators on the digital society and/or digital inclusion? (Please include in your response the names of agencies empowered to collect data within the current systems).

_____
_____

5. Are these systems being fully implemented and utilised?

- ❍ Yes (if YES, answer 6a, and then go to Question 7)
- ❍ No (if NO, answer 6b, and then go to Question 7)

6a. Please describe how these systems are fully implemented and utilised.

_____
_____

6b. Please describe the gaps that prevent these systems from being fully implemented and utilised.

_____
_____

7. Have there been any steps taken or recommendations made to strengthen these systems? If so, please describe.

- ❍ Yes _____
- ❍ No

8. What are the strengths of these systems for data collection and analysis relating to the measurement of ICT indicators on the digital society and/or digital inclusion?

_____
_____

9. What are the weaknesses of these systems for data collection and analysis relating to the measurement of ICT indicators on the digital society and/or digital inclusion?

_____
_____

10. What are some general challenges that you have **encountered** regarding the measurement of ICT indicators in the priority areas you selected and identified?

_____
_____

11. What are some general challenges that you **envisage** may arise regarding the measurement of ICT indicators in the priority areas you selected and identified?

_____
_____

12. How challenging is it for you to collect data on ICT indicators to measure each of the following priority areas?

	Very challenging (1)	(2)	(3)	(4)	Not challenging at all (5)	I do not know
Pricing / Affordability of services	❍	❍	❍	❍	❍	❍
Service monitoring	❍	❍	❍	❍	❍	❍
Meaningful and universal connectivity	❍	❍	❍	❍	❍	❍
Inclusivity	❍	❍	❍	❍	❍	❍
Digital skills, industry training and capacity building	❍	❍	❍	❍	❍	❍
Cybersecurity	❍	❍	❍	❍	❍	❍
Governance / Legal and regulatory frameworks	❍	❍	❍	❍	❍	❍
Digital economy	❍	❍	❍	❍	❍	❍
Type of ICT usage / Local content	❍	❍	❍	❍	❍	❍
Sustainability	❍	❍	❍	❍	❍	❍

13. How challenging is it for you to collect data on ICT indicators to measure each of the following additional priority areas?

	Very challenging (1)	(2)	(3)	(4)	Not challenging at all (5)	I do not know
_____	❍	❍	❍	❍	❍	❍
_____	❍	❍	❍	❍	❍	❍

14. What are some challenges you have encountered or envisage that are specific to the measurement of each of the priority areas you chose from the draft list of subregional priorities?

Challenges

Pricing / Affordability of services _____

Service monitoring _____

Meaningful and universal connectivity _____

Inclusivity _____

Digital skills, industry training and capacity building _____

Cybersecurity _____

Governance / Legal and regulatory frameworks _____

Digital economy _____

Type of ICT usage / Local content _____

Sustainability _____

Have these challenges been encountered or are they envisaged?

	Encountered	Envisaged
Pricing / Affordability of services	❍	❍
Service monitoring	❍	❍
Meaningful and universal connectivity	❍	❍
Inclusivity	❍	❍
Digital skills, industry training and capacity building	❍	❍
Cybersecurity	❍	❍
Governance / Legal and regulatory frameworks	❍	❍
Digital economy	❍	❍
Type of ICT usage / Local content	❍	❍
Sustainability	❍	❍

15. What are some challenges you have encountered or envisage that are specific to the measurement of each of the additional priority areas you identified?

Challenges _____

Section 3: Disaggregation of data

The disaggregation of collected data by demographic characteristics (e.g., age, gender, disability status, ethnicity, income level, etc.) or by geographic characteristics (e.g., urban/rural/remote, district/county/parish, population density, coastal /interior, multiple islands, etc.) is important for digital inclusion, as it can reveal inequities and identify underserved persons, communities or areas.

16. What are the top five (5) demographic characteristics that your country would like to prioritise for disaggregation at the subregional level? (You can select from the examples above or formulate your own).

- ❑ Age
- ❑ Gender
- ❑ Disability status
- ❑ Ethnicity
- ❑ Income level
- ❑ Other Demographic Characteristic _____

17. What are the geographic characteristics of your country that you believe are important to account for when collecting data on ICT indicators to measure the digital society or digital inclusion? (You can select from the examples above or formulate your own).

- ❑ Urban/rural/remote
- ❑ District/county/parish
- ❑ Population density
- ❑ Coastal /interior
- ❑ Multiple islands
- ❑ Other Geographic Characteristic _____

18. What challenges have you encountered, or do you envisage, regarding the collection and analysis of disaggregated data for the measurement of the digital society through ICT indicators to advance digital inclusion?

_____
_____

Section 4: Capacity-building needs regarding measurement

19. In which areas connected to the measurement of ICT indicators on the digital society and/or digital inclusion do you believe your country needs capacity-building?

- ❑ Identifying what data should be collected
- ❑ Developing methodologies for indicators
- ❑ Designing data collection instruments
- ❑ Developing data collection procedures
- ❑ Cleaning and processing collected data
- ❑ Analysing collected data
- ❑ Preparing data for sharing
- ❑ Releasing data publicly online
- ❑ Using analysed data for evidence-based policy development
- ❑ Using analysed data to make decisions
- ❑ Communicating analysed data effectively to stakeholders
- ❑ Communicating analysed data effectively to the public
- ❑ Other (Please describe) _____

20. Please identify the capacity-building needs of your organization relating to the measurement of ICT indicators on the digital society and/or digital inclusion?

- ❑ Training programmes to deepen theoretical understanding of the digital society.
- ❑ Training programmes to deepen theoretical understanding of digital inclusion.
- ❑ Training programmes to deepen technical knowledge related to data collection or analysis.
- ❑ Collaborative workshops bringing together technical experts from different fields.
- ❑ Collaborative workshops bringing together technical experts from different countries.
- ❑ Mentorship programmes between people in the same field, but at different levels.
- ❑ Mentorship programmes between people in different fields, and at different levels.
- ❑ Peer learning programmes between people in the same field, but in different countries.
- ❑ Peer learning programmes between people in different fields, but in the same country.
- ❑ Peer learning programmes between people in different fields AND different countries.
- ❑ Specific training on the collection, processing, analysis or communication of disaggregated data on ICT indicators.
- ❑ Other _____

20b. You identified the following as the capacity-building needs of your organization relating to the measurement of ICT indicators on the digital society and/or digital inclusion. For each, please provide details on the type of capacity-building that is required.

Training programmes to deepen theoretical understanding of the digital society. _____

Training programmes to deepen theoretical understanding of digital inclusion. _____

Training programmes to deepen technical knowledge related to data collection or analysis. _____

Collaborative workshops bringing together technical experts from different fields. _____

Collaborative workshops bringing together technical experts from different countries. _____

Mentorship programmes between people in the same field, but at different levels. _____

Mentorship programmes between people in different fields, and at different levels. _____

Peer learning programmes between people in the same field, but in different countries. _____

Peer learning programmes between people in different fields, but in the same country. _____

Peer learning programmes between people in different fields AND different countries. _____

Specific training on the collection, processing, analysis or communication of disaggregated data on ICT indicators. _____

Conclusion

21. Do you have any objections to us reaching out to you for clarification and/or to engage in a follow-up interview?

- ❍ No
- ❍ Yes

Annex A2
List of experts surveyed

Table A2.1
List of experts surveyed

Country	Organization	Designation	Name
Anguilla	Government of Anguilla	IT Manager	Mr. Vaughn Hazell
	Government of Anguilla	Permanent Secretary	Mr. Karim Vaughn Deen Hodge
	Public Utilities Commission of Anguilla	Executive Director	Mr. Damien Harrigan
Antigua and Barbuda	Ministry of Telecommunications	Telecommunications Consultant	Mr. Daryl Jackson
Aruba	Government of Aruba	Advisor	Mr. Xiomar Ridderstaat
Belize	E-Governance and Digitalization Unit	Systems Analyst	Mr. John Robateau
British Virgin Islands	Telecommunications Regulatory Commission	Chief Executive Officer	Mr. Guy Lester Malone
Cuba	Ministero de Comunicaciones	Directora General de Organización, Planificación e Información	Sra. Magda de la Caridad Brito D'Toste
Dominica	Government of the Commonwealth of Dominica	Director	Ms. Lynn Delsol
	Government of the Commonwealth of Dominica	Telecommunications Engineer	Mr. Kenneth Esprit
	Government of the Commonwealth of Dominica	Project Manager	Ms. Jermaine Jewel Jean-Pierre
Grenada	Ministry of ICT	Permanent Secretary	Mr. Finley Jeffrey
Jamaica	Ministry of Science, Energy, Technology and Transportation	Director, Post and Telecommunications	Mr. Cecil McCain
	Office of the Prime Minister	Chief Technical Director	Ms. Wahkeen Murray
Montserrat	Government of Montserrat	ICT Coordinator	Ms. Loni Howe
Saint Kitts and Nevis	Ministry of ICT		Ms. Ophelia Blanchard
Saint Lucia	Government of Saint Lucia	Telecommunications Officer III	Mr. Gregory Emmerson Plante
Suriname	Ministry of Transport, Communication and Tourism	Senior Government Official	Ms. Juanita Maclean
	Ministry of Transport, Communication and Tourism	Policy Advisor	Ms. Wendy Palas
	Telecommunications Authority Suriname	Economic Lead Officer	Ms. Haidy Akoeba
Trinidad and Tobago	Ministry of Digital Transformation	Deputy National Chief Digital Officer	Ms. Denise White
	Ministry of Digital Transformation	Deputy Permanent Secretary	Mr. Cory Belfon
	Telecommunications Authority of Trinidad and Tobago	Chief Executive Officer	Ms. Cynthia Reddock-Downes
Turks and Caicos Islands	Turks and Caicos Islands Government	Permanent Secretary	Mr. James Astwood
	TCI Telecommunications Commission	Director General	Mr. Kenva Williams

Source: Authors' compilation.

Annex A3
Table of indicators

This annex summarizes information on the indicators discussed in this study. Table A3.1 shares information on the priority areas and the respective indicators that were agreed at the Workshop, while table A3.2 shares information on potential indicators that were discussed in this study. The table notes for each indicator its origin, and whether it is on the Core List of ICT Indicators (Core List), [20] or the thematic list of ICT indicators for the SDGs (SDG list), both developed by the multi-stakeholder Partnership on Measuring ICT for Development. [21] The names and notations contained in the draft list have been simplified for the purposes of this table.

Table A3.1
List of the priority areas for measurement, associated indicators, their sources, and connection to the core list and SDG list

Priority Area	Indicator	Source
Governance	Number of female members	ITU DataHub
	Is the Regulatory Authority a collegial body?	ITU DataHub
	Is the Head of the Commission also responsible for day-to-day administrative matters?	ITU DataHub
	Separate ICT regulator	ITU DataHub
	If the ICT Regulatory Authority is a collegial body, what is the total number of members/commissioners (including the Head)?	ITU DataHub
	Who appoints the members and the Head?	ITU DataHub
	What is the normal period of appointment for the members and the Head of the Regulatory Authority?	ITU DataHub
	Is the term of Head/Commissioners renewable?	ITU DataHub
	Does the law establish a clear appointment process and selection criteria for the Head/Chairperson/Commissioners of the ICT Regulatory Authority?	ITU DataHub
	Are the grounds for removal of the Head/Commissioners of the ICT Regulatory Authority set forth in the law?	ITU DataHub
	What are the reasons for removal?	ITU DataHub
	Who has the power to remove the Head/ Commissioners?	ITU DataHub
	ICT regulator has a Regulatory roadmap	ITU DataHub
	Main areas	ITU DataHub
	Level of implementation	ITU DataHub
	Implementation challenges	ITU DataHub
	Reforms in the next two years	ITU DataHub
	Mid-term top priorities for regulators	ITU DataHub
	National policymaker in charge of telecommunications/ICTs	ITU DataHub
	Authority dealing with Internet-related issues	ITU DataHub
	Overlapping mandates on Internet-related issues	ITU DataHub
	Mechanisms of collaboration with the ICT regulator	ITU DataHub
	Jurisdiction over Internet-related issues	ITU DataHub
	Data protection authority	ITU DataHub

[20] https://www.itu.int/en/ITU-D/Statistics/Documents/coreindicators/Core-List-of-Indicators_March2022.pdf.
[21] https://www.itu.int/en/ITU-D/Statistics/Documents/intlcoop/partnership/Thematic_ICT_indicators_for_the_SDGs.pdf.

Priority Area	Indicator	Source
	Overlapping mandates on data protection, privacy	ITU DataHub
	Mechanisms of collaboration with the ICT regulator	ITU DataHub
	Jurisdiction over data protection issues related to electronic communications and transactions	ITU DataHub
	Presence of national e-government strategy or equivalent	United Nations e-government survey
	Competition authority	ITU DataHub
	Overlapping mandates on competition matters in the telecom/ICT sector	ITU DataHub
	Mechanisms of collaboration with ICT regulator	ITU DataHub
	Jurisdiction over competition issues in the telecom/ICT sector	ITU DataHub
	Definition of competition	ITU DataHub
	Review of competition frameworks	ITU DataHub
	ICT sector - Significant Market Power	ITU DataHub
	ICT sector - Relevant markets	ITU DataHub
	ICT sector - Reference Interconnection Offers (RIO)	ITU DataHub
	ICT sector - Other issues	ITU DataHub
	General competition policy	ITU DataHub
Quality of service	Quality of service monitoring required	ITU DataHub
	Services subject to QoS monitoring	ITU DataHub
	Sanctions for non-conformance with QoS requirements exist	ITU DataHub
	Sanctions for non-conformance with QoS requirements applied	ITU DataHub
	Mobile-cellular dropped call ratio	ITU DataHub; WTI questionnaire, i146d; ITU Handbook 8.4
	Mobile-cellular unsuccessful call ratio	ITU DataHub; WTI questionnaire, i146u; ITU Handbook 8.3
	Average Download Throughput for Mobile Broadband	ITU DataHub; WTI questionnaire, i146mwd
	Packet Latency for Mobile Broadband	ITU DataHub ; WTI questionnaire, i146mwl
	Average Upload Throughput for Mobile Broadband	ITU DataHub; WTI questionnaire, i146mwul
	Average Download Throughput for Fixed Broadband	ITU DataHub; WTI questionnaire, i147dl
	Average Upload Throughput for Fixed Broadband	ITU DataHub; WTI questionnaire, i147ul
	Packet Latency for Fixed Broadband	ITU DataHub; WTI questionnaire, i147l
	Service activation time for fixed-broadband service	ITU DataHub; WTI questionnaire, i147t; ITU Handbook 8.8
	Fault Resolution Period for Fixed Broadband Service	ITU DataHub; WTI questionnaire, i147f
Connectivity	Percentage of the population covered by at least a 3G mobile network[a b]	IDI Zero draft
	Percentage of the population covered by at least an LTE/ WiMAX mobile network[b]	IDI Zero draft
	Percentage of the population within [x] kilometres reach of transmission networks	IDI Zero draft
	Active mobile-broadband subscriptions per 100 inhabitants[a b]	IDI Zero draft
	Fixed broadband subscriptions per 100 inhabitants[a b]	IDI Zero draft
	Proportion of individuals who used the Internet (from any location) in the last 12 months[a b]	IDI Zero draft

Priority Area	Indicator	Source
	Proportion of households with Internet access at home[a] [b]	IDI Zero draft
Sustainability	ICT regulator's mandate	ITU DataHub
	Other Government Ministry or agency mandates	ITU DataHub
	Regulatory or legislative framework on emergency telecommunications	ITU DataHub
	National Emergency Telecommunications Plan adopted	ITU DataHub
	Measure or initiatives for implementing the National Emergency Telecommunications Plan	ITU DataHub
Digital skills	Gross enrolment ratio for secondary education (%)	IDI Zero draft
	Gross enrolment ratio for tertiary education (%)	IDI Zero draft
	Proportion of learners enrolled at the post-secondary level in ICT-related fields[a]	Core List
Digital economy	Proportion of businesses with a web presence[a]	Core List
	Proportion of businesses receiving orders over the Internet	Core List, SDG List
Affordability	Data-only mobile-broadband basket price (as % of GNI per capita)[a] [b]	ITU ICT Price Baskets
	Fixed-broadband Internet basket price (as % of GNI per capita)[a] [b]	ITU ICT Price Baskets

Source: Authors' compilation.
[a] On Core List.
[b] On SDG List.

Table A3.2
List of potential indicators for measurement, their sources, and connection to the core list and SDG list

Priority Area	Indicator	Source
Sustainability	See Thematic List of ICT Indicators for the SDGs, indicator PI22[b]	SDG List
	See IUI, Category X, Theme C, "Sustainable development"	IUI
	See IUI, OE.5, p. 65	IUI
Digital skills	See Thematic List of ICT Indicators for the SDGs, indicators PI08, PI09[b]	SDG List
	Individuals with ICT skills, by type of skill[a] [b]	Core List, SDG List
	Proportion of graduates in ICT-related fields at post-secondary levels	SDG List
Digital economy	See Core List of ICT Indicators, indicators B1-B12 "ICT access and use by enterprises[a]	Core List
	See Core List of ICT Indicators, indicators ICT1-ICT8 "ICT sector and trade in ICT goods[a]	Core List
	See Thematic List of ICT Indicators for the SDGs, indicators PI16, PI20, PI24, PI25, PI26[b]	SDG List
	See IUI, OA.2, p.58; OA.3, p.59; XA.6, p.93; XC.7, p.97	IUI
Affordability	Data-only mobile-broadband basket price (in PPP$)	ITU IPB
	Fixed-broadband Internet basket price (in PPP$)	ITU IPB
Usage and local content	See Core List of ICT Indicators, indicators HH5, HH8, HH9, HH10, HH12, HH14, HH16, HH17, HH18, HH19, HH20, HH21, HH22, HH23[a]	Core List
	See Thematic List of ICT Indicators for the SDGs, indicators PI03, PI08[b]	SDG List
	See IUI, Category X, Theme E, "Local Content and Language", pp.76-77	IUI
	See Core List of ICT Indicators, indicators EW1-EW3 "Waste electronic and electrical equipment (WEEE, or e-waste)[a]	Core List
Cybersecurity and trust	See IUI, RD.4, p.50	IUI
	See IUI, OA.1, p. 58, OB.5, p. 60	IUI
	See IUI, MA.1, p. 84	IUI
	See IUI, Category X, Theme D, "Trust and Security", pp.98-99	IUI

Priority Area	Indicator	Source
Inclusivity	See IUI, pp. 42-53 “Rights”	IUI
	See IUI, pp. 67-78 “Accessibility to All”	IUI
	See IUI, pp. 82-86 “Multi-stakeholder participation”	IUI
	See IUI, pp. 91-93 “Gender equality”	IUI
	See IUI, pp. 94-95 “Children”	IUI
	See IUI, pp. 96-97 “Sustainable development”	IUI

Source: Authors’ compilation.
[a] On Core List.
[b] On SDG List.

Annex A4
Comprehensive description of methodology

Purpose and scope

The overall purpose of this paper is to provide information to support decision-making by policymakers and regulators in the subregion that are working to develop ICT indicators suited to the Caribbean context. The discussions on the Caribbean ICT indicators are at an early stage, and the priority areas and indicators are projected to be further refined at a future workshop. To advance this work, this study expands upon the outcomes of the 2023 Workshop in four main ways: (1) It clarifies the scope of the draft Priority Areas and ICT indicators as they currently exist, including by creating a list compiling all the indicators, reviewing their origins, and providing information on applicable methodology; (2) It provides a meta-analysis of the availability and recency of the data for the list of indicators, to assess the degree to which each priority area is currently measured, and where gaps and challenges exist; (3) It provides additional commentary regarding the ICT measurement systems in the Caribbean, related challenges and capacity-building needs, based on a survey of experts working with policymaking or ICT regulation in the subregion; (4) It provides more detailed information regarding the priorities of surveyed experts related to the measurement of ICT indicators for the Caribbean.

The temporal scope of this study is limited to the period between March and August 2023. The data availability analysis was conducted throughout that period, while the survey of experts was conducted in June 2023. As such, this study provides a snapshot of the data available during the period of research and does not convey any changes which may have taken place since then.

The analysis contained in this study is based on two main research efforts: A desktop study on the availability and recency of data on the indicators, and a survey of experts from the subregion that are working with ICT policymaking or regulation.

Desktop study

The first step of the desktop study consisted of reviewing the report of the Workshop (ECLAC,2023), and developing a list of indicators based on the outcomes of the discussions held. This first step was necessary to facilitate the data availability analysis, as some priority areas were discussed extensively, while others did not benefit from a discussion. Where specific indicators were identified, these were added directly to the list of indicators. Where Workshop participants did not identify specific indicators, but rather suggested a specific source for the indicators for a priority area or sub-area, all the indicators that meet the criteria have been included in the list of indicators. This work produced a list of 74 indicators, ranging from 39 indicators for one priority area to zero for three other priority areas. As part of this process, the source of each indicator, its methodology, and the database in which relevant data could be obtained was noted.

The second step of the desktop study consisted of reviewing each of the identified databases for data on the 74 indicators, for each of the 29 countries of the CDCC. Wherever possible, the data for each indicator was downloaded directly from the database. Using filtering tools in a spreadsheet software, the data for each indicator was narrowed down to the study countries. For each indicator, the names of the countries for which data was available was noted, as well as the year of the most recent database entry for each entity. As a third step, this data was then summarized per indicator, to provide an overall, subregional picture of data availability and recency. To assess data availability, the data points were summarized by counting the number of countries for which data was available per indicator. The data availability per indicator is then expressed as a percentage of the total CDCC membership. This information is further summarized per sub-area (if any) and priority area by calculating the median data availability across the applicable set of indicators. To assess data recency, the median data age was calculated per indicator

based on the most recent entry of each country or territory. This was then summarized further per sub-area (if any) and priority area to provide a median data age for the subregion. Due to the temporal scope of the study, the data age refers to the number of years since 2022.

Where no indicators were identified for a priority area, possible indicators are discussed, but these are not included in the indicator count, and the review of any available data is more limited.

Survey of experts

For the survey of experts, the first step consisted of the development of the survey instrument. The questionnaire, which is reproduced in annex 1, was developed jointly with the Caribbean Telecommunications Union, which also supported the data collection phase of this study. The questionnaire was open from 6 to 26 June 2023. The questionnaire was then submitted to policymakers and telecommunications regulators in 23 of the 29 CDCC members countries and AMCs,[22] including 15 member States[23] and 8 AMCs.[24]

The main respondents in this study are the respective line ministries responsible for ICTs and telecommunications regulators in the countries of the subregion. These two institutions are responsible for formulating and prioritizing national ICT strategies, and the telecommunications regulator is also involved in collecting and publishing some ICT indicator data and statistics. National Statistical Offices were not specifically invited to participate in this study, because the focus of the study was on policy formulation, particularly as related to the List of Priorities.

Multiple in-country responses were received from 15 Caribbean countries (10 member States and 5 AMCs).[25] Table A4.1 provides a summary of the number of countries responding to the survey. In most cases, responses to the survey were received either from the line ministry or from the telecommunications regulator. Responses from both the line ministry and the telecommunications regulator were received from four member States and AMCs.[26] The table shows that 14 (60.9 percent) of invited governments responded to the survey, while only five (5) (21.7 percent) of invited telecommunications regulators responded to the survey.

Table A4.1
Institutional Response Rate

Type of institution	Number Invited	Member States responding	AMCs responding	Total Number Responding	Response rate *(Percentages)*
Government/Line ministry	23	10	4	14	60.9
Telecommunications regulator	23	2	3	5	21.7
Total	46	12	7	19	41.3

Source: ECLAC and CTU based on results of Measuring the digital society through ICT indicators survey.

[22] Caribbean Development and Cooperation Committee membership (https://www.cepal.org/en/headquarters-and-offices/eclac-caribbean/committees).

[23] Antigua and Barbuda, The Bahamas, Barbados, Belize, Cuba, Dominica, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

[24] Anguilla, Aruba, British Virgin Islands, Cayman Islands, Curaçao, Montserrat, Sint Maarten, and Turks and Caicos Islands.

[25] Member States: Antigua and Barbuda, Belize, Cuba, Dominica, Grenada, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Suriname, and Trinidad and Tobago. AMCs: Anguilla, Aruba, British Virgin Islands, Montserrat, and Turks and Caicos Islands.

[26] Anguilla, Suriname, Trinidad and Tobago, and Turks and Caicos Islands.

It is noted that while a substantial number of responses were received to the survey, the sample remains small, compared to the number of possible responses. A common methodology was applied across the respondents to facilitate comparison as much as possible. However, the responses received were in varying degrees of completeness, and so the number of responses per question varies. Responses were invited from both policymakers and regulators, and multiple responses were allowed per country. As such, there are invited countries for which no responses were received, some for which only one response was received, and some where two or more responses were received for the same country. It is further noted that the aim of the research was to solicit the views of the experts, and that the invitations were made per country to ensure sufficient diversity of the sample. The information shared should therefore not be interpreted as being representative of the views of countries or territories, but rather as the interpretations of experts from those countries. The views provided in this study do not constitute an empirical basis upon which the views of the Caribbean countries discussed or the Caribbean subregion as a whole, can be assessed. Rather, the study provides an indication of the current collective sentiment of the experts consulted for this study, and a "jumping-off point" for further discussion on the ICT indicators.

Confidentiality

The persons whose views were submitted are identified in annex 2. The exact responses of the responses are kept confidential and are stored in a secure online platform. The information will be archived and disposed of in due course, in accordance with the retention schedule of the United Nations.

Literature and databases

The main measurement frameworks considered in the preparation of this study are: The 2021 National Digital Inclusion Survey of Trinidad and Tobago (TATT, 2022); the United Nations E-Government Survey 2022 (United Nations, 2022); the "Zero draft" of the revised ITU ICT Development Index (IDI Zero Draft);[27] The UNESCO Internet Universality Indicators (IUI) (UNESCO 2019); ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT 2020 (ITU Handbook) (ITU, 2020a); ITU Manual for Measuring ICT Access and Use by Households and Individuals (ITU Manual) (ITU, 2020b); UNCTAD Manual for the Production of Statistics on the Digital Economy (UNCTAD Manual) (UNCTAD, 2020); UNESCO Institute of Statistics Guide to measuring ICT in education (UNESCO Guide) (UIS, 2009). Two documents developed by the Partnership on Measuring ICT for Development (Partnership), namely the Core List of ICT Indicators (Core List) (Partnership, 2022), and the Thematic List of ICT Indicators for the SDGs (SDG List) (Partnership, 2019), were also reviewed in the process of identifying indicators. The methodologies of the indicators of each measurement framework were also reviewed, where available.

This study evaluates the extent to which data for the indicators in relevant international databases is available and its recency. Most indicators discussed in this study are collected by the International Telecommunication Union (ITU), and the primary source of data is the World Telecommunication/ICT Indicators (WTI) Database, December 2022 Edition (ITU, 2022b). Additionally, ITU DataHub, which contains 179 primary indicators, was consulted frequently, as reference was made to using indicators from the DataHub during the Workshop. Data on the Digital Economy was derived from the UNCTADstat database (2022 release) (UNCTAD, 2022), and data on education and digital skills were found in the database of the UNESCO Institute for Statistics (UIS), in particular the dashboard on Sustainable Development Goal 4 (4 March 2023 release).

[27] This document is not publicly available.

Frequency analysis

The frequency analysis conducted in Section II considered the frequency of selection of a priority area overall, the frequency of selection as first priority, and calculated the mean[28] and modal[29] ranks of the top five priority areas, and noted the standard deviation.[30] The results of the detailed analysis, which was simplified for Section II, is noted below in table A4.2.

Table A4.2
Frequency analysis of top selected priorities
(By frequency of selection)

Priority area	Frequency of selection	Mean Rank	*SD*	Mode Rank	Frequency of Mode Rank	Frequency as First Priority	Percentage as First Priority *(Percentages)*
Cybersecurity and trust	23	3.13	1.424	2	6	3	13.0
Affordability	19	2.26	1.098	1	6	6	31.6
Digital economy	16	3.25	1.291	3	5	2	12.5
Digital skills	16	3.38	1.147	3	6	1	6.3
Governance	16	3.38	1.408	4	5	2	12.5

Source: ECLAC and CTU based on results of Measuring the digital society through ICT indicators survey.

As regards the disaggregation of top priorities by institutional type, the following top priorities were identified for Governments and Telecommunications regulators respectively (table A4.3).

Table A4.3
Comparison of Government vs Regulator prioritization

Government Priorities (by frequency as First Priority)			Regulator Priorities (by frequency as First Priority)		
Priority area	Frequency of Selection	Frequency as First Priority	Priority area	Frequency of Selection	Frequency as First Priority
Connectivity	13 (M = 2.08, SD = 1.441)	7	Inclusivity	3 (M = 1.33, SD = .577)	2
Affordability	15 (M = 2.20, SD = 1.082)	5	Affordability	4 (M = 2.50, SD = 1.291)	1
Cybersecurity and trust	19 (M = 3.00, SD = 1.491)	3	Usage and local content	3 (M = 2.67, SD = 2.082)	1
Digital economy	12 (M = 3.25, SD = 1.422)	2			
Governance	14 (M = 3.29, SD = 1.491)	2			

Source: ECLAC and CTU based on results of Measuring the digital society through ICT indicators survey.

[28] The mean rank (M) is the average score of all the selections made by survey participants for a particular priority area.
[29] The mode/modal rank is the score that is most often selected by survey participants for a particular priority area.
[30] SD is the standard deviation of the mean, and is used to indicate the level a variation of selected scores.

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