Digital government

Foundations for global development and democracy

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Digital government:
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Contents

1. Elements of digital government 3
Overview 3
Digital divide 6
Components of digital government 7
Conditions for effective digital government 13
Benefits of digital government 16
Challenges and risks 18
Pitfalls to avoid 19

2. Country achievement 21
Composite indexes on digital government readiness 21
Digital government component indices 25
Digital government development 2000-2020 34

3. Findings and implications for donor engagement 42
Trends by income group 43
Trends by region 44
Donor regional collaboration 45
Trends by components of digital government 47
Donor coordination 47
Principles for Good Digital Government 50

4. Conclusion 51

References 52
Annex 1. Comprehensive indices on digital government readiness by income group **56**
Annex 2. Comprehensive indices on digital government readiness by region **62**
Annex 3. Components of digital government by income group **69**
Annex 4. Components of digital government by region **76**

1. Elements of digital government

Overview

If there is any question as to how integral information and communications technology (ICT) is to global development, the evidence is in the Sustainable Development Goals (SDGs). Seven of the indicators across four SDGs relate to digital capabilities. Beyond that, to capture the full scope of ICTs as an enabler of development, the Partnership for Measuring ICT for Development[1] has identified another 26 ICT indicators covering 10 of the 17 SDGs (presented in Box 1). Further, the Digital Impact Alliance (DIAL) and International Telecommunication Union (ITU) developed the SDG Digital Investment Framework, designed as an introduction to how digital capabilities can advance specific SDGs.

COVID-19 has brought into stark relief the extent to which our lives are lived online—a digital world in which the private sector is leading and government too often is lagging. Those with access to digital technology have continued work and school from home and transformed their businesses into an online model. Those without access, have lost out on earnings, learning, and social connections. The pandemic has revealed a sharp digital divide within and between countries and communities. Some governments with advanced digital capabilities and strong political leadership have been able to innovate in response to the needs of their populations; others have been left struggling.

While there is a strong correlation between digital development and national income, as is demonstrated in Section 2 of this paper, national wealth is not sufficient. Political leadership and openness to innovation are equally, or even more, critical factors in contributing to digital development. For instance, several developing countries were able to respond effectively to the coronavirus by utilizing digital services to speed delivery of relief efforts. Take India, for example, a lower-middle-income country (LMIC). Within one week, the government was able to transfer $8 per month to 200 million vulnerable women through Aadhaar, its biometric-enabled digital identity system launched in 2009 and now covering 1.3 billion citizens.[2] Sri Lanka, another LMIC, with an existing robust Health Management Information System, was able to

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[1] The Partnership for Measuring ICT4 Development is an international, multi-stakeholder initiative to improve the availability and quality of ICT data and indicators.
[2] Mukherjee (2020).

adapt within two days an open source DHIS2 platform[3] to create a system to register and track incoming travelers from areas of high risk of COVID-19.[4]

More telling, Togo, a low-income country (LIC), used an existing Unstructured Supplemental Service Data (USSD)-based platform to collaborate with telecommunications companies to ensure mobile network compatibility. In 10 days, it built Novissi, a monthly digital cash transfer system that allows individuals to enroll and automatically receive payment via a mobile phone. Within a week of launch, nearly 450,000 beneficiaries received funds.[5] The system is specifically structured to account for gender inequalities in the country.

In contrast, at the top of both the wealth and digital pyramids, the United States issued 169 million payments, amounting to $395 billion, through a lengthy piecemeal approach of direct deposits, paper checks, and pre-paid Visa card.[6] By one calculation, government COVID-19 response programs have taken 51 days to commence distribution using electronic means, but 86 days using manual methods.[7]

These examples illustrate the benefits of digital government service adoption in developing countries. With the right platforms, developing countries even have the potential to leapfrog some developed countries in government digital service provision. As the examples above demonstrate, countries that had spent the prior decade investing in digital infrastructure and skills had an easier time responding to the pandemic than those that did not. This COVID-19 wakeup should catalyze action: Transitioning emergency systems into full scale government service platforms and helping those without systems deploy open source digital public goods for a range of modern digital government services.

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[3] DHIS2 is an open source, web-based platform used as a health management information system (HMIS) that is managed by the Health Information Systems Program (HISP) at the University of Oslo.
[4] DHIS2 (2021).
[5] Debenedetti (2021).
[6] Konish (2021).
[7] Digital Public Goods Alliance, Norwegian Ministry of Foreign Affairs, and Rockefeller Foundation (2021), pg. 13.

Box 1. Thematic list of ICT indicators for the SDGs

PI	Detailed Proposed Indicator (PI)	Collected by	Related SDG Targets	Methodology
PI01	Proportion of individuals using the Internet	ICT surveys (NSO) – ITU	1.4, 2.3, 4.5, 5.b, 8.5, 9.c, 12.8, 16.10, 17.8	ITU-Households
PI02	Proportion of households with Internet access	ICT surveys (NSO) – ITU	1.4, 9.1	ITU-Households
PI03	Proportion of individuals owning a mobile phone	ICT surveys (NSO) – ITU	1.4, 2.3, 2.c, 3.8, 5.b, 8.5 ,8.10, 10.c, 16.10	ITU-Households
PI04	Population covered by a mobile broadband network	Telecom regulators – ITU	1.4, 2.3, 2.a, 2.c, 8.1, 8.2, 9.1, 9.a, 9.c	ITU-ICT
PI05	Internet broadband subscriptions per 100 inhabitants	Telecom regulators – ITU	9.c, 17.6	ITU-ICT
PI06	Countries having adopted a national e-health record	WHO	3.8	WHO
PI07	Enrolment in basic computer skills and/ or computing courses in secondary education	Education ministries – UIS	4.5	UIS-EDU
PI08	Proportion of graduates in ICT-related fields at post-secondary levels (ISCED 5-8)	Education ministries – UIS	4.5	UIS-EDU
PI09	Individuals with ICT skills, by type of skill	ITU	4.4, 8.2	ITU-Households
PI10	Percentage of youth/adults who have achieved at least a minimum level of proficiency in digital literacy skills.	UIS	4.4	UIS
PI11	Learner-to-computer ratio (ISCED 1-3)	Education ministries – UIS	4.a	UIS-EDU
PI12	Proportion of educational institutions with computers for pedagogical purposes (ISCED 1-3)	Education ministries – UIS	4.a	UIS-EDU
PI13	Proportion of educational institutions with Internet for pedagogical purposes (ISCED1-3)	Education ministries – UIS	4.a	UIS-EDU
PI14	Internet traffic (in exabytes)	Telecom regulators – ITU	8.2	ITU-ICT
PI15	Proportion of individuals using the Internet for the following activities: - Internet banking	ICT surveys (NSO) – ITU	1.4, 8.1, 8.3, 8.10, 10.c	ITU-Households
PI16	Businesses using the Internet for Internet banking; for accessing other financial services	UNCTAD	8.3	UNCTAD
PI17	Educational institutions (schools) with Internet (ISCED 1-3)	Education ministries— ITU, UIS	9.1 Balance of payments trade statistics (NSOs)	UIS-EDU/ ITU-Households
PI18	ICT prices as a % of GNI p.c.	Telecom regulators – ITU	9.1, 9.c	ITU-ICT
PI19	International Internet bandwidth (bps) per Internet user	Telecom regulators – ITU	9.5, 9.a	ITU-ICT
PI20	Businesses using the Internet	UNCTAD	17.8	UNCTAD
PI21	UN E-participation index	UNDESA	16.6, 16.7, 16.10	UNDESA-EPI
PI22	Proportion of e-waste treated environmentally sound	OECD, UNSD/UNEP, UNU	12.4, 12.5	EWASTE
PI23	Proportion of businesses receiving orders over the Internet	UNCTAD	17.8	UNCTAD
PI24	Proportion of businesses placing orders over the Internet	UNCTAD	17.8	UNCTAD
PI25	Business use of broadband subscriptions	UNCTAD	8.2	UNCTAD
PI26	International trade in digitally-deliverable services as a % of total services trade	Balance of payments trade statistics (NSOs)	8.2	UNCTAD-ICT

Source: Partnership on Measuring ICT4 Development, "Partnership on Measuring ICT for Development Contribution to the thematic review of the 2021 High-Level Political Forum on Sustainable Development"

Box 2. Definitions

Digital government: There is considerable variation in terminology for information and communications technology (ICT) as it relates to government—variously referred to as e-government, digital government, and digital transformation.

- **E-government** was a potential candidate to use in this paper, but the preface "e" is suggestive of "electronic," and government needs to do more than just adopt electronic technologies and capabilities.
- **Digital transformation** was another candidate, but it suggests whole-of-society and whole-of-economy adaptation to the digital world, which is broader than the scope of this paper.
- **Digital government** has been chosen as the term for this paper, as it is not as narrow as e-government but more limited than digital transformation. The focus of the paper is on government—how and what government can do to function effectively in the digital world. But government digital functionality also depends on the wider enabling environment, the ability to upgrade companion analog aspects of government, and the existence of supportive systems such as education.

Digital Public Goods/Infrastructure: There are various and inconsistent definitions/usages of the terms Digital Public Goods and Digital Public Infrastructure. Public goods refer to a technological product/capability that is readily available to anyone. In the digital arena, it is used to refer to a product/capability that is built on open source software. The following definitions are used in this paper.

- **Digital Public Infrastructure (DPI)** refers to foundational digital programs (sometimes referred to as building blocks) on which user applications are built. DPIs include electronic identification systems, digital payment systems, digital registries, and digital data storage, management, and exchange platform(s).
- **Digital Public Goods (DPG)** are the sector/solution specific applications that are built on DPIs.

Digital divide

ICT infrastructure serves as the platform upon which digital government is built. Without it, nations cannot develop digital solutions for their populations. Yet there is a considerable divide between developed and developing countries, and between different regions and groups within a country, in terms of ICT infrastructure access and capacity. Bridging the digital divide is an enormous task, requiring stepped up international commitment and investment to help bring developing countries into the digital world.

Digital has become the lifeblood of global economic, social, and political affairs, but not in an inclusive manner. As of the end 2020, 85 percent of the world's population was covered by 4G.[8] This coverage reached 97 percent of the population of developed countries, 82 percent in developing countries, but only 40 percent in least developed countries. The urban-rural divide is equally broad. In developed countries, 100 percent of urban residents and 84 percent of rural populations have 4G coverage. But in developing countries, the urban-rural divide is 94 percent-70 percent, and in least developed countries the divide is more extreme at 68 percent-27 percent.[9]

Looking at internet access, as opposed to 4G coverage, 87 percent of the population in developed countries is reached, compared with 65 percent in developing countries and 25 percent in least developed countries.[10] The urban-rural divide is 87 percent-81 in developed countries, 65 percent-28 percent in developing countries, and 25 percent-10 percent in least developing countries.

In addition to urban-rural digital divides, many countries have stark gender divides in digital capabilities and access. Differential digital capabilities and opportunities between men and women can retard economic growth, limit women's ability to obtain equitable social and political rights, and act as a major contributor to national inequity. The gender gap in internet usage is modest in developed countries, at 88 percent-86 percent. However, the gap widens to 49 percent-40 percent in developing countries and to 28 percent-15 percent in least developing countries.[11]

Components of digital government

This ICT infrastructure is only one element on which digital government is constructed. There are capabilities and structures both within and outside of government that are essential to the performance of digital government. Besides government ICT capabilities, there is a broader enabling environment on which effective digital government depends. While not as all-encompassing as whole-of-nation economic and social digital transformation, this enabling environment encompasses the digital knowledge and capabilities of the workforce and populace; government organizational management, behavior, and business processes; analog government policy and regulation; and public-private partnerships and interactions.[12] Digital government must be customer-sensing and promote a culture of innovation.

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[8] 4G is the fourth generation of broadband cellular network technology. 4G users get speeds of up to 100 Mbps, while 3G only promised a peak speed of 14 Mbps.
[9] ITU (2020), pg. 5.
[10] ITU (2020), pg. 4-8; Dutta and Lanvin (2020), pg. 6.
[11] ITU (2020), pg. 4-8; Dutta and Lanvin (2020).
[12] Astok et al. (2017), Cisco (2020), pg. 7; Ojo, Adegboyega, and Janowski (2011), pg. 5.

Digital government—electronically delivered communications and services by national, local, and regional governments[13]—is not only a common characteristic among advanced countries, but a growing imperative for countries at all income levels. There are various definitions and categorizations of digital government and its components. While there is overlap, a standard typology remains elusive.[14] This paper identifies six principal components of digital government based on the core capabilities required for a government to function in the digital age:

- Digital infrastructure
- Digital literacy
- Digital data/communications/services
- Digital participation
- Digital institutions/policies/regulations
- Digital security & rights

Digital infrastructure

Digital infrastructure is the complex ICT network that includes: internet backbone (data routes such as communication cables and facilities); fixed and wireless broadband (the last mile connecting businesses, homes, users); mobile telecommunications (cellular networks); communications satellites; submarine cables; and network infrastructure such as data centers and cloud computing. Beyond this basic national digital infrastructure are services that deliver the signal to the end-user: Wi-Fi networks; edge computing; platforms for software; applications (apps); user devices (such as cell phones and laptops).[15]

Digital literacy

Digital infrastructure has little value if government workers, businesses, and individuals do not know how to access and use it. In the contemporary world, digital skills must be integrated into the traditional education system, alongside essentials like reading, writing, and arithmetic. Digital skills are both a basic concept to be learned, as well as a means of delivering education. They go beyond just understanding how to use a computer and access information on the internet to how to manage and analyze data. Digital skills should be part of foundational learning from an early age. With the constant change in information and communication technology, digital literacy must be integrated into K-12 and higher education and be part of continuing education and training for government, business, and individuals.[16] Beyond formal structures, digital capabilities and skills are transmitted through informal channels for sharing

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[13] Alshehri and Drew (2010), pg. 79; Ahmadzai (2019), pg. 28.
[14] See European Commission (2019), *pg. 8 & 44;* Alshehri and Drew (2010), pg. 2; World Bank Group (2016a), pg. 62; Ojo, Shareef, and Janowski (2010). pg. 2*;* World Bank Group (2016c), pg. 4; Ahmadzai (2019), pg. 29; Ndou (2004), pg. 5; Digital Impact Alliance, October 2020
[15] Spacey (2017); African Union (2020), pg. 9.
[16] World Bank Group (2016c).

and developing knowledge, including on-job mentoring, social media, public forums, podcasts, and YouTube. Digital education and training should include information on digital risks and harm mitigation, as well as how to use digital tools safely.

Digital data/communications/services

Digital data/communications/services is the enterprise architecture for digital government. At the basic level, it entails the digitization of government databases and the ability to communicate electronically within and among government agencies. Too often, databases are built in siloes to provide a specific solution for a specific problem within a specific agency or service without the ability to interact or be accessed more broadly across government. The result is a confusing system of isolated, duplicative government databases that are unable to share information and cross-communicate, which produces inefficient processes for procurement, funding, and governance. The answer is not a centralized database, which is vulnerable to cyberattack and human error, but connected decentralized databases. The byword is interoperability, requiring a set of common operating standards and rules across the government, so that maximum benefit and efficiency can be achieved through sharing data and communications. This is best achieved by creating a central government platform that links databases and provides core centralized digital public infrastructures such as identification and payment systems that support all government digital services, rather than a service-by-service approach.[17]

Moving beyond the basic ability to communicate and share data among government agencies, digital services encompass the provision of online information and services to individuals. It starts with one-way provision of information, with government making available information on its websites, and develops into two-way interactive applications whereby individuals, businesses, and civil society organizations can obtain and submit information to secure passports, business licenses, and other documents; obtain health services; submit tax returns; respond to procurement opportunities; apply for social services. Ideally, the government asks for basic personal information “only once” and agencies share data as needed—the gold standard developed by Estonia. This reduces the burden on users, avoids the risk of data duplication, and ensures data quality. There are risks to sharing personal data across government agencies, so adequate safeguards must be built in. Interestingly, digital services shift some of the burden of service provision away from government employees and onto individuals, reducing costs of government and allowing reinvestment of time and savings into other functions.[18]

There is a vast array of government digital functions and services. They all should rest on a few basic software platforms, sometimes referred to as building blocks. Four such building blocks —

[17] OECD (2020), pg. 20; Eggers et al. (2021), pg. 8; European Commission (2019), pg. 53; Mukherjee and Maruwada (2021), pg. 1.
[18] European Commission (2019), pg. 19.

are central to digital government. Government data and services depend on a basic *data collection, storage, and management* platform(s). A *digital identity system* provides each citizen with a unique identification that allows for entry into and engagement with commercial, economic, and government digital services and protects his/her personal data. More than a billion people today lack recognized personal identification, hampering access to basic government, financial, economic, and social services. *Digital payments* allow individuals to pay taxes, receive social payments, and engage in e-commerce. Core *data registries* provide essential data and information on population characteristics, business ownership and licenses, taxation, and land and real estate ownership; registries provide efficient government retention of basic datasets and facilitate individual access and usage of the data. It is upon these basic platforms that sector and solution specific applications operate, which if using publicly available, open source software are referred to as Digital Public Goods.[19]

Digital participation

Digital participation is the step beyond digital services, whereby individuals engage in government decisionmaking by providing input, participating in dialogues and forums, and even voting. It offers a new mechanism for citizen democratic participation and the enhancement of democracy. A major challenge is that for digital participation to function properly, individuals must have trust in the political system and in digital government platforms and services. They must have confidence that their input will receive attention, and government must have the incentive and capacity to respond. It opens government processes and decisionmaking through greater transparency, accountability, and responsiveness.[20] Advanced digital participation allows citizens to vote from their home computers, as did 44 percent of Estonia's population of 1.3 million in 2019.[21]

Digital institutions/policies/regulations

Digital government requires strong, sustained leadership and effective policies and regulations. Digital platforms and guidelines must be aligned across government agencies, which requires high level government leadership and coordination, ideally organized under one central office with that as its sole charge. Digital government requires more than simply imposing digital tools on existing government policies and institutions. Government must be adapted, and even re-engineered, to fit digital operations.

Just as literacy is a precondition for digital government, so are basic government institutions, policies, and regulations that guide and facilitate government, economic, and social activity.

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[19] e-Governance Academy (2019), pg. 6; United Nations (2020a), pg. 11; Deloitte Insights (2021), pg. 3; African Union (2020), pg. 40.
[20] World Bank Group (2016c), pg. 164; E-governance academy (2017), pg. 28; Shadrach (2007), pg. 19.
[21] E-Estonia (2021).

The goal is not for all government activities to move online, as governments today must function both digitally and by traditional analog; both must function effectively and operate in tandem. Some elements of government are relatively easy to automate and routinize and therefore lend themselves to digital application. Others, including those involving considerable exercise of judgement, such as teaching, providing health services, policing, and managing, must retain some components in-person and on-paper. Implementing digital government fails if the focus is solely on digital elements, at the expense of companion analog elements.

So digital government is about more than technology and moving from paper to computers, or imposing digital capabilities on top of existing legacy government structures, processes, and rules. Digital government requires a revisioning and restructuring of how government operates. It requires different administrative structures, policies, and processes, which necessitates a transformation of how the analog parts of government operate in order to fit new digital dynamics.[22] It is about change management and orienting public service to be people-centric, moving from a paper-based to a digital-based way of operating, and rethinking and reengineering the way government functions. It requires overcoming resistance to change. Done well, it avoids ad hoc digital applications in favor of comprehensive solutions that serve all government functions. It involves re-engineering how government works to improve collaboration across government units, increase interactions with individuals, simplify and speed up procedures, innovate services, and develop new channels of communications.[23]

The change management aspect of digital government goes beyond the move to digital. What is the value of digitizing ineffective, non-inclusive government? Moving to digital government should be part of a larger government-society reinvention that prioritizes inclusion, human rights, effectiveness, efficiency, and responsiveness.

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[22] Deloitte Insights (2021), pg. 21.
[23] Deloitte Insights (2020), pg. 21; Eggers et al. (2021); OECD (2020), pg. 8-10; Ahmadzai (2019), pg. 31; European Commission (2019), pg. 24 and 33; E-governance academy (2017), pg. 46.

Box 3. Revisioning government institutions and processes

The European Commission, in its roadmap for e-government development in Africa, highlights that e-government initiatives must go beyond simple digitization of existing services to investment in improved government institutions, regulations, and capacity as a core component of any effort. As articulated by the European Commission in Guidelines and Roadmap for full deployment of e-governance in Africa:

> "The implementation of e-governance should however be a comprehensive process, not focused primarily on technology, but a process in which organisational and regulatory issues are addressed. If this is not done, there is a danger of a situation where instead of fully benefiting from modern technologies there will be problems such as digital data and transactions having no legal meaning; data not being re-used; service delivery processes just being copied from the paper era with no changes; computers used as typewriters; and even online application forms printed out in the government offices and data manually submitted. With an exclusively technology-focused approach, there may be functional technology in place, but it may not be integrated into the government processes in a sustainable way with proper institutional and legislative support, and there may be a lack of trained personnel."

Source: European Commission (2019), pg. 10.

Digital security and rights

The growing prevalence and severity of cyberattacks in recent years highlight the importance of digital security. Digital government requires protections—protection against cybersecurity attacks and protection of individual digital rights and privacy. The growing adaptation by authoritarian regimes of digital capabilities to maintain power, suppress opposition views, and abuse human rights demonstrates all too well how digital can be used for malignant purposes. Effective digital government requires that government officials have the technical and legal capacity to issue and implement cyber regulations. It requires that individuals have confidence in government institutions to function securely and confidence that their data privacy will be protected. Digital tools and platforms must be designed in ways that protect the digital autonomy and security of individuals, especially women, youth, indigenous peoples, and marginalized communities, who may face safety risks moving to online platforms. Individuals should ideally be able to opt into data sharing with government databases, giving the individual ultimate control over what is shared and with whom.

Conditions for effective digital government

These six main components are the core elements of digital government. To recap, there needs to be adequate digital infrastructure in place on which to run digital government platforms and for individuals, business, and civil society to access and utilize those resources. Government staff and users must be digitally literate. Digital government needs to be constructed as a comprehensive platform, not department-by-department or service-by-service, based on common whole-of-government standards. Government data systems and applications must be interoperable and user friendly. Existing institutions and policies need to be adapted for digital use. The systems must be secure from cyberattacks and protect data privacy and rights.

These core components, however, are not the sole ingredients for effective digital government. A number of conditions/capabilities/dynamics, some of which are touched on in the explanations of the core components, are important for effective digital government.

1. **Political leadership.** Strong, high-level sustained political leadership is essential, especially in dealing with the considerable disruption during the transition to digital government. Digital government changes the way government has traditionally functioned and how individuals interact with elected officials and receive services, so it may meet resistance from vested interests. It is a long march that requires sustained leadership and budgetary commitments over decades, well beyond the typical tenure of political leaders.

2. **Comprehensive government plan.** A comprehensive government plan should underpin the transformation to digital government. It should provide a clear vision, avoid duplicative investments, gain buy-in from multiple government institutions and private stakeholders, and ensure inter-governmental coordination and collaboration.

3. **Mix of coordination and decentralization.** There must be a careful mix of coordination and decentralization in digital government administration. Alignment is essential in order to ensure there are common standards and guidelines across agencies, avoid duplication, support innovation, and ensure consistency in how government services interact with the public. At the same time, centralization of decisionmaking is to be avoided. Digital government functions best through high level coordination and decentralized implementation at the agency and local government level.[24] The comprehensive national plan must empower government at the local level to develop people-centered services that are responsive to the unique needs of the target

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[24] United Nations (2020b), pg. 5; Allen (2021), pg. 3; United Nations (2020a), pg. 5; Dzhusupova et al. (2011), pg. 2; Ahmadzai (2019), pg. 35 and 42; European Commission (2019), pg. 23; Deloitte Insights (2021); OECD (2020), pg. 17; World Bank Group (2016a), pg. 105.

populace. Effective decentralization evolves as digital government matures, as early stage digital government typically is accompanied by insufficient capability at sub-unit and sub-national levels.

4. **Risk taking.** To create a hospitable environment for innovation, there needs to be a degree of calculated risk taking, acceptance of failure, built-in evaluation that identifies successes and failures, and the ability to pivot quickly with failure and changing circumstances.

5. **Trust.** Discussions of digital government are replete with the concept of trust. Trust is required on two levels—internal to government and external. To be willing to use digital systems, government workers must have trust that they work, that they permit responsible officials to carry out their duties, that they facilitate rather than complicate their jobs, and that they do not threaten job security. Similarly, individuals must trust that digital services work and are reliable, that they facilitate their relationship with government and are responsive to their needs, and that individual rights and data and information are secure and protected from theft and misuse.

6. **Transparency**. Critical to earning trust and facilitating accountability is transparency. Government transparency helps the populace understand what digital government is and can deliver and how government intends to use digital platforms. Individuals need to know what services are being provided, how to use them, and how to report issues if service delivery does not meet expectations. Transparency around new initiatives helps create buy-in and support. It is a principal means for individuals and civil society to hold government accountable for fulfilling its mission, providing effective services, and respecting individual and human rights. A vibrant and digitally literate civil society is critical to holding government accountable.

7. **Democratic norms.** Trust and transparency undergird this larger principle of digital government. Democratic norms are critical in ensuring that digital government is rights respecting and people-centric. Digital capabilities can make democratic government more transparent and accountable, enabling better services and greater protection of individual and human rights. Digital capabilities also have the potential to give authoritarian governments control over their populations and enable repression. Without a grounding in democratic norms, digital government has the potential to make oppressive governments more efficient.

8. **Digital identification (ID)** is critically important to effective and responsive digital government, as it not only enables access to services, but also can enhance gender equity, financial inclusion, social protection, and even allow for voting. But users must

have faith in the digital ID system and trust that their ID cannot be stolen, hacked, and otherwise misused.[25]

9. **Stakeholders, partners, and users.** Individuals, civil society organizations, and the private sector play important roles as stakeholders, partners, and users of digital government. Multi-stakeholders should be involved from the early design phase on. As the private sector is a key source of knowledge, innovation, and investment in digital services, collaborative public-private partnerships bring efficiency and effectiveness to digital government. Individuals must know about digital government services and their advantages in order to have an incentive to use them. Civil society organizations are critical to holding digital government accountable. Successful early pilot projects are important in building public and political support by demonstrating the benefits of digital government, which can include improving the speed of service delivery and saving consumers and government money[26] by eliminating the middleman in routine government services that are often ripe with corruption.[27]

10. **Personalized, frictionless, seamless, rights-respecting, and anticipatory.** The ideal digital government system is personalized, frictionless, seamless, rights-respecting, and anticipatory of future national and community needs. It must meet the personal needs and interests of the population; be accessed with minimal effort; be accessible anywhere, anytime, and from any device; be respectful of the rights of the individual; be proactive in identifying the requirements of individual citizens.[28] Digital government should be simple, intuitive, and user-centric rather than government-centric. It should put the individual in control of his/her information and enable them to seek redress when mistakes occur.[29]

11. **Tailored to country contexts.** The elements of digital government cannot be imposed from outside. Each country has a unique relationship between government and its population, work environment, culture, skill sets, and technology framework. What works in one location and community will not necessarily work in another. Basic frameworks or platforms can be adopted from global public goods and standard commercial products, but indigenous stakeholders must do the selection and adaption

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[25] E-Governance Academy (2019), pg. 8; Ahmadzai (2019), pg. 52; Alshehri and Drew (2010), pg. 83; African Union (2020), pg. 39; World Bank Group (2016c), pg. 17.
[26] The USAID/Eurasia Foundation supported Tapas program supports the digital procurement program Prozorro in Ukraine, reported to have saved the government over $7 billion from 2015 through 2021 (12/13/2021 email from Nehal Gupta, Eurasia Foundation).
[27] Ndou (2004), pg. 17; Astok et al. (2017)*;* World Bank Group (2016a), pg. 34-35, 51, 119, 139, 147; AlphaBeta (2020); Eggers and Bellman (2015)*; Republic of South Africa* National Department of Public Health (2019), pg. *11-12;* Foundation of Digital Development (2020), pg. 9; Eggers et al. (2021), pg. 7; Urban (2018), pg. 27; OECD (2020), pg. 20; World Bank Group (2016c), pg. 171; Shadrach (2007).
[28] Deloitte Insights (2021), pg. 4, 20-26; Eggers et al. (2021), pg. 4.
[29] OECD (2020), pg. 26; Deloitte Insights (2020), pg. 13; Foundation of Digital Development (2020), pg. 16.

according to local priorities and dynamics.[30] In particular, while technologies and standards can be imported and adapted to the local context, mind-shift and organizational change cannot; they must be developed and nurtured in-country.

This list of conditions for effective digital government is intended to serve as a synopsis of issues that planners, mentors, and implementers of digital government should address. This list illustrates the interdependence of the conditions and that implementing digital government is a complex process that is not for the lighthearted. Especially in least developed countries, building a strong foundation for digital government does not happen overnight. It is a multi-year process that takes long-term political commitment and buy-in.

Benefits of digital government

The advantages of digital government are multifold. It has the ability to bring economic, political, and social benefits to societies and individuals by making government more efficient, effective, responsive, transparent, accountable, and quicker acting. It has the potential to improve government processes and facilitate how individuals, civil society, and business access services, provide feedback, and engage with government. It can deliver social benefits quickly, inexpensively, and to remote areas. It can even change the government employee experience, making the work environment more attractive, to the benefit of recruitment and retention.

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[30] Astok et al. (2017), pg. 49; Dada (2006), pg. 6.

Box 4. Digital government as a potential driver of governance systems change

When done correctly, digital government has the potential to change the way government functions and interactions with its citizens, building trust, flexibility, and innovation. Valentina Ndou highlights this potential in "E-Government for Developing Countries: Opportunities and Challenges" the differences between traditional analog government and digital government:

> "The traditional bureaucratic paradigm, characterized by internal productive efficiency, functional rationality, departmentalization, hierarchical control and rule-based management (Kaufman, 1977), is being replaced by competitive, knowledge based economy requirements, such as: flexibility, network organization, vertical/horizontal integration, innovative entrepreneurship, organization learning, speed up in service delivery, and a customer driven strategy. These new paradigms thrust the shift toward eGovernment paradigm, which emphasizes coordinated network building, external collaboration and customer services (Ho, 2002)."

Source: Ndou (2004), pg. 2.

Digital provides government with the ability to serve individuals with access to connected devices in a rapid, responsive mode; to scale up government programs quickly and cheaply; and to adapt government programs in real time, as some countries with existing digital capability were able to do in the early days of COVID-19. A "24/7 one-stop service center" that serves as a secure, single entry point allows government to efficiently meet individuals' needs on their own timeline and with minimal user effort.

Effective digital government facilitates communication, user feedback, and accountability. It can improve the quality of services for the population, simplify business processes, and streamline procurement. It enhances financial management, financial transfers to individuals and contractors, and revenue collection. It can reduce paperwork, red tape, and the cost of government processes. Automation removes routine manual processes that are prone to error and manipulation. With fewer government intermediates, less discretionary decisionmaking, and greater transparency, opportunities for error and corruption are minimized. Data sharing across government departments, with adequate protections for individuals, can minimize redundancies and mistakes and reduce the time for transactions.

Digital government can bridge the divide between individuals and government. It allows for individual and civil society participation and influence in decisionmaking through submission of ideas and feedback. It can improve the capacity of government through data sharing, pooling skills and capacities for problem solving, facilitating communications and coordination

among departments, bringing to light diverse views and new information, and avoiding the bottleneck of paper flows. Digital government is an enabler of e-commerceand e-health.[31]

Challenges and risks

Developing countries often confront a host of underlying hurdles in starting a digital government initiative—limited financial and human resources, poor literacy and skills, inadequate public and private institutions, unreliable power, expensive and monopolistic broadband, low purchasing power and economic returns that discourage private investment, and digital divides. The whole-of-government approach is often undercut by the tendency of governments and donors to approach a task by sector, i.e., to work in siloes. Additional challenges are the absence of vision and sustained high level political leadership and the need to protect personal privacy and security and to build trust in this new approach to government-populace relations. Effective coordination within government is often a challenge in an underdeveloped bureaucracy.[32]

Digital government is not a panacea. It comes with challenges and risks.

Digital government, if implemented poorly or used maliciously, can cause harm. While digital technologies can increase democratic participation, they can also *facilitate anti-democratic tendencies*, from demagoguery to greater government repression, scrutiny, breach of citizen privacy and security, and abuse of human rights. Authoritarian regimes are learning all too well how to use digital technology to control the political space, gain access to information on opponents, and restrict freedom of information. They are deploying cameras, facial recognition, and spy malware to monitor individuals, identify dissidents, and keep tabs on government officials to identify and discourage threats from within. They are using control of digital communications and the internet to confuse, repress, censor critics, and use misinformation and disinformation to troll and harass the opposition and manipulate the populace. Autocrats have learned to co-opt digital technology to mimic the appearance of democracy while dictating outcomes. Over the past decade, the civic and political space has narrowed in many countries and there has been significant democratic backsliding. Government digital capabilities and tools need to be implemented concurrently with democratic reforms.[33]

Digital platforms may not achieve their maximum value until they reach scale, but scale brings the *risk of concentration*. This dynamic is most vividly seen in the arena of commercial

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[31] World Bank Group (2016c), pg. 160, 170; Relhan, Ionkova, and Huque (2012), pg. 11, 18, 23; Dzhusupova et al. (2011), pg. 3; Ndou (2004), pg. 8-11; Ahmadzai (2019), pg. 6-9, 31, 57; World Bank Group (2016a), pg. 2, 93, 102-108; DIAL and Smart Africa (2020).
[32] United Nations (2020b), pg. 5; Allen (2021), pg. 3; United Nations (2020a), pg. 5; Dzhusupova et al. (2011), pg. 2; Ahmadzai (2019), pg. 42; European Commission (2019), pg. 23; Bala and Verma (2018), pg. 264.
[33] Fischer, Smith and Valk (2013), pg. 233; Shahbaz (2018); USAID (2021).

communications platforms, with their openness and lack of regulations and standards creating an environment where online harassment, hate speech, and dangerous misinformation flourish; we need to go no further than America and the turmoil engulfing Facebook to understand the ramifications of such monopolies. This demonstrates the importance of enacting, alongside digital government development, policies, and regulations to monitor and contain abuse of digital space and monopolies.[34]

Digital divides—within and across countries, across urban/rural geographies, between genders and marginalized groups—act as another major challenge to digital government development. The advanced stage of digital development in developed countries means they are better able to deploy and benefit from its advantages, as are the urban, the wealthy, and the educated in all countries. While a core component of any digital government initiative is building out ICT infrastructure and addressing digital skills gaps, these are generational investments that take time to reach fruition.

As digitalization creates winners and losers, digital government efforts may broaden the divide if marginalized groups are left behind in other aspects of national life. Thus, development of digital government must be accompanied by concurrent analog processes for those in marginalized circumstances—expanding education to girls and children in rural areas, and empowering women and girls and minority groups— to help mitigate this risk. Take this hypothetical example: Enhanced digital government will not help expand opportunity and reduce inequality "if a man is able to submit his taxes online but a women still has to take a day off work to head to the main city and deal with analog processes."[35]

Pitfalls to avoid

While digital government can be a powerful tool to improve government effectiveness and civil society engagement, there are common pitfalls in digital government initiatives that need to be avoided. Several have been mentioned above, but it is useful to repeat them in this synopsis.

The notion that digital government is an easy, quick fix cure-all. In fact, it is a *long slog* that requires continued upgrading and innovation.

While a common digital platform across governments can streamline data sharing and create an easier user interface for individuals, this does not suggest *a single, centralized database*, which must be avoided as it can be a risky point of failure.[36]

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[34] World Bank Group (2016c), pg. 248; United Nations (2020b), pg. 12.
[35] Example provided by Laura Sigelmann in November 2021 comments on the draft paper.
[36] European Commission (2019), pg. 19.

Too often *data collection and management* are treated as an unimportant adjunct to digital development. Instead, they should be seen as critical components of a digital strategy. A streamlined data management strategy and basic data registers are an important element of any digital government effort.[37]

Digital government development is about more than simply *transferring digital government solutions* from developed to developing countries. This risks implementation of solutions that were designed for a different polity, a different economic structure, and a different culture. Local capacity building is thus a critical element of digital government development, bringing in government, the private sector, academia, IT departments, and other stakeholders to help shape technology development and decisions.

While donor assistance can play an important role, there is a *risk of over-dependence on donor suppo*rt, which often comes with erratic funding and fragmented, siloed applications. Donor work tends to be isolated in specific sectors where they offer digital solutions that are unique to a sector and not interoperable with other sectors. It is critical that content and language be developed locally so as to be context-specific at both the national and sub-national levels. Over reliance on donor-driven solutions is a sure path to failure, as it ignores the unique dynamics, capabilities, and priorities of a country and undercuts sustainability.

Failure is endemic to digital government initiatives and requires avoidance of an inflexible commitment to a specific solution and continuous assessment of the effectiveness of applications. By one analysis, 30 percent of IT projects in developing countries are total failures and 50-60 percent are partial failures, leaving less than 20 percent achieving the intended objectives.[38] Country-led ownership with multi-stakeholder involvement must be a cornerstone of any digital strategy.

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[37] Foundation of Digital Development (2020), pg. 20; OECD (2020), pg. 14.
[38] World Bank Group (2016c), pg. 165.

2. Country achievement

For donor institutions to maximize their contribution to bridging the digital divide, a starting point is to assess the capabilities and needs of countries on the key elements of digital government. Fortunately, there are data and indexes that measure or serve as proxies for each of these components. While they are imperfect, as discussed in a forthcoming Brookings paper Measuring "Good" Digital Infrastructure by Priya Jaisinghani Vora,[39] they do provide an informative look at the state of digital government in developing countries.

Section 2 first presents data from five comprehensive *composite indices* of digital government readiness that paint a broad picture of the state of digital government in countries. It then highlights trends from *component indices* that measure the six components of digital government discussed in Section 1.

Composite indexes on digital government readiness

There are five broad-based indexes that measure the overall state of readiness for countries to deliver digital government. The first two are targeted especially at core components of digital government readiness while the other three cover a broader range of capabilities on which digital government is built. There are other indices in this arena, but these five were chosen as covering a wider range of countries and/or being more digitally relevant.[40]

UN E-Government Development Index (covers 193 countries, latest data from 2020). Assesses a country's capacity and usage of telecommunications services. The index is a composite of three indicators: quality of online services; state of telecommunications infrastructure; and human capital development.[41]

ITU Development Index (176 countries, latest data from 2017). Looks at the level of ICT development across countries. The index is based on three components: availability and access to ICT infrastructure; ICT service usage; and ICT skills.[42]

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[39] Jaisinghani Vora (2021).
[40] Other possible indexes include Economist Intelligence Inclusive Internet Index, Tufts University Digital Intelligence Index, GSMA Mobile Connectivity Index, A4AI Affordability Drivers Index, Global Innovation Index, and Google Future Readiness Economic Index. The Digital Impact Alliance (DIAL) has created a repository of digital transformation indicators, of which digital government is one component, which is a great resource for those looking to explore a the full range of indicators available on this topic.
[41] UNDESA (2020).
[42] ITU (2017).

World Bank Digital Adoption Index (180 countries, latest data from 2016). Assesses the supply-side of digital adoption by measuring the availability and use of technology. The index covers usage and access across government, business, and citizens.[43]

Cisco Digital Readiness Index (141 countries, latest data from 2019) Looks at the state of a country's digital readiness. The index is built on the following components: level of basic human needs in a country; human capital development; ease of doing business; levels of business and government investment; start-up environment; level of technology infrastructure; and technology adoption.[44]

Network Readiness Index—(134 countries, latest data from 2020)—assesses a country's digital network readiness. The index is based on the following measures: availability of ICT technology infrastructure and services; ICT skills and access among the population; government regulation of the digital space; and the economic and social impact of ICT services.[45]

For ease of assessment, this paper divides the measurements in each index into 4 categories of e-governance readiness: low (red), basic (yellow), intermediate (blue), and advanced (green). The categories are calculated separately for each index, based on the mean and standard deviation of the data. Thus, low e-governance readiness countries score from the bottom of the respective index range to -1 standard deviation; basic countries score from -1 standard deviation to the mean; intermediate countries score from the mean to +1 standard deviation; advanced countries score from +1 standard deviation to the top of the respective index range. This methodology allows the average country in each index to determine the category breaks, rather than artificially setting a midline score. Table 1 presents the summary data for the five indexes, first broken down by country income level category and then by geographic region. Detailed data on individual country performance can be found in Annexes 1 and 2.

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[43] World Bank Group (2016b).
[44] Cisco (2020).
[45] Dutta and Lanvin (2020).

Table 1. Composite digital government index scores (recent year) by income group and region

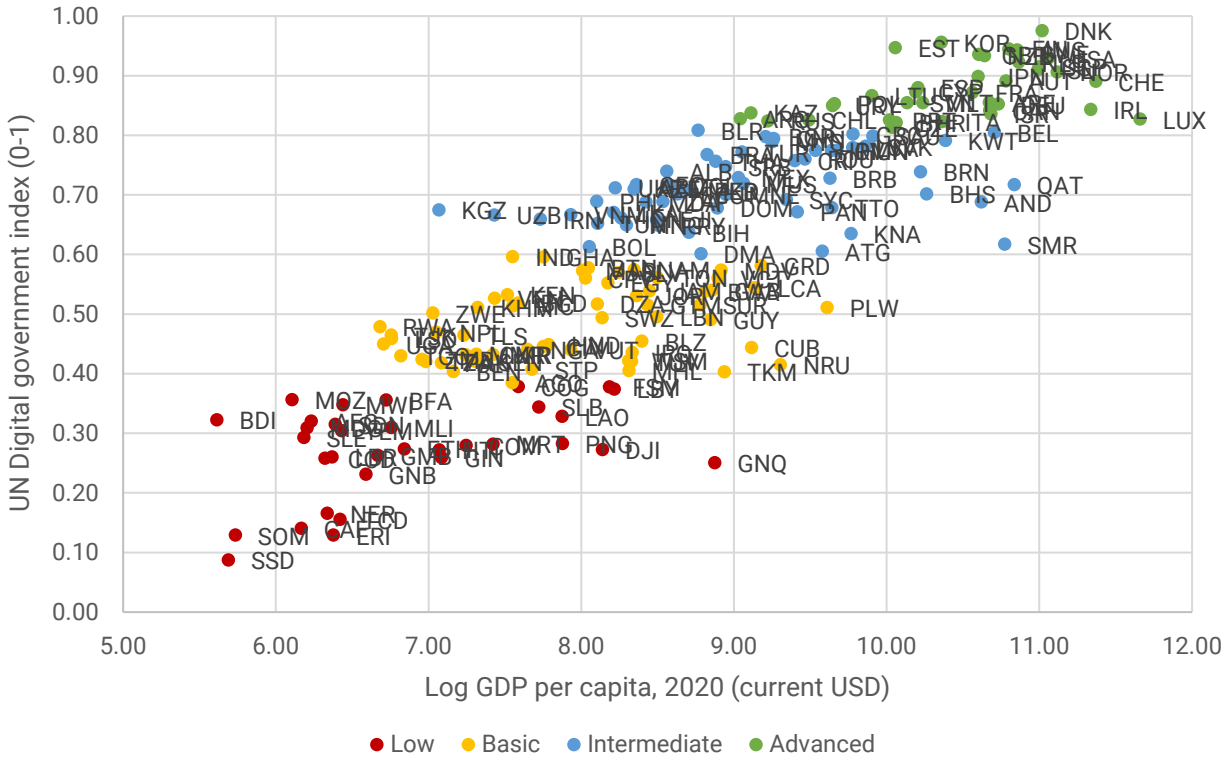
Group	UN E-Government Development Index 2020 (0-1 scale)	ITU Development Index 2017 (0-10 scale)	WB Digital Adoption Index 2016 (0-1 scale)	Cisco Digital Readiness Index 2019 (0-25 scale)	Network Readiness Index 2020 (1-100 scale)
Low income	0.28	1.90	0.27	6.24	25.00
Lower middle income	0.49	3.38	0.39	9.03	36.84
Upper middle income	0.63	5.35	0.53	12.22	47.67
High income	0.82	7.58	0.73	16.33	67.92
East Asia & Pacific	0.59	5.32	0.48	12.76	58.58
Europe and Central Asia (high income)	0.84	7.84	0.76	16.48	69.75
Europe and Central Asia (developing countries)	0.70	6.08	0.57	12.46	48.40
Latin America & Caribbean	0.62	5.04	0.52	11.49	44.60
Middle East & North Africa	0.61	5.61	0.57	12.18	49.61
North America	0.89	7.98	0.72	18.18	76.92
South Asia	0.52	3.21	0.43	8.60	37.07
Sub-Saharan Africa	0.38	2.61	0.32	7.61	30.62
World	**0.60**	**5.11**	**0.52**	**11.90**	**49.49**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

The data reveals that country scores across the five indices are largely consistent. Countries tend to score in the same readiness category across most indexes.

Perhaps unsurprisingly, scores are largely correlated with income level (see Figure 1). Low-income countries (LICs) rank low in digital readiness on all five indexes, lower-middle income (LMICs) basic, upper-middle income (UMICs) intermediate (on 4 out of 5 indices), and high-income countries (HICs) advanced. This strong correlation might suggest that digital government will simply improve along with economic growth, but the analysis in Section 1 indicates that income is important but not sufficient.

Figure 1. GDP per capita (current USD) and UN E-government development index, 2020



Source: UNDESA (2020) and World Bank World Development Indicators (2021)

Looking at the data along regional lines reveals that North America and high-income European countries rank advanced across all indices, consistent with their income group. Developing countries in Europe & Central Asia and the Middle East & North Africa rank intermediate. Both East Asia & Pacific and Latin America & Caribbean score intermediate on half the indices and basic on the remaining. South Asia ranks basic in digital readiness, and sub-Saharan Africa is largely low.

Given the high degree of consistency in country scores across these various composite indices, the remainder of this part of the paper focuses on assessing the state of the six components of digital government outlined in Part 1: digital infrastructure, digital literacy, digital data/communications/services, digital participation, digital government institutions/policies/regulations, and digital security & rights.

Digital government component indices

Digital government readiness, per Section 1, relies on investments in six core areas. The necessary telecommunications infrastructure must be in place to enable equitable access. Individuals and businesses must have the digital literacy and skills to take advantage of digital government services. The government must digitize databases and online services and streamline government processes for easier citizen access. These services should encourage and enable greater participation from citizens. Government policies, institutions, and regulations must be well functioning to allow for stepped-up digital engagement. Governments must have the necessary policies, programs, and capabilities to keep individuals' personal information safe and prevent cybersecurity threats.

With these capacities in mind, the paper draws on data from the sources identified below as proxy measures for the six components of digital government. To ensure accurate representation of the data trends highlighted, the formal names of each proxy index (italicized below) will be used in the text.

Digital infrastructure: measured using the *telecommunications infrastructure* sub-index of the 2020 UN E-Government Development Index.

Digital literacy: measured using the *human capital* sub-index of the 2020 UN E-Government Development Index.

Digital data/communications/services: measured using the *online services* sub-index of the 2020 UN E-Government Development Index.

Digital participation: measured using the *e-participation i*ndex, published by the 2020 UN E-government development index.

Digital government institutions/policies/regulations: measured using the *government effectiveness* index from the 2019 World Bank World Governance Indicators database.[46]

Digital security and rights: measured using the 2020 ITU *Cybersecurity* Index.[47]

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[46] Kaufmann, Kraay and Mastruzzi (2010); Kaufmann and Kraay (2020).
[47] ITU (2021).

These indicators were selected as measurements of the state of digital government development in a country, in order to indicate the potential needs and gaps by income group and region. Each country is evaluated along the 4 levels of achievement in digital government readiness for each indicator: low, basic, intermediate, and advanced, per the methodology described above.

Table 2 presents income group and regional averages across the 6 indicators. Detailed country level data are found in Annexes 3 and 4.

By country income group

The stages of the components of digital governance readiness closely correlate with income level. LICs largely score in the low readiness category across all components, except for cybersecurity where they rank basic. LMICs score basic on all categories. UMICs rank intermediate on all categories, but have work to do in particular on measures of government effectiveness and cybersecurity. Interestingly, HICs rank advanced on two categories (telecommunication infrastructure and government effectiveness) and intermediate on the other four. This reinforces that digital government largely tracks GDP growth and that there is work countries at each income level can do to improve digital government effectiveness.

Table 2: Component digital government index scores (recent year) by income group and region

Group	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Low income	0.30	0.37	0.18	0.31	-1.26	22
Lower middle income	0.47	0.60	0.40	0.47	-0.57	42
Upper middle income	0.58	0.75	0.57	0.58	-0.18	50
High income	0.76	0.86	0.83	0.77	1.05	78
East Asia & Pacific	0.53	0.72	0.51	0.55	0.09	47
Europe & Central Asia (high income)	0.78	0.89	0.86	0.79	1.24	86
Europe & Central Asia (developing countries)	0.68	0.80	0.63	0.72	-0.19	66
Latin America and Caribbean	0.56	0.74	0.56	0.57	-0.18	34
Middle East & North Africa	0.56	0.68	0.61	0.54	-0.26	63
North America	0.89	0.91	0.85	0.97	1.61	99
South Asia	0.59	0.55	0.41	0.57	-0.47	47
Sub-Saharan Africa	0.37	0.47	0.30	0.36	-0.83	34
World	**0.56**	**0.69**	**0.55**	**0.57**	**0.00**	**52**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

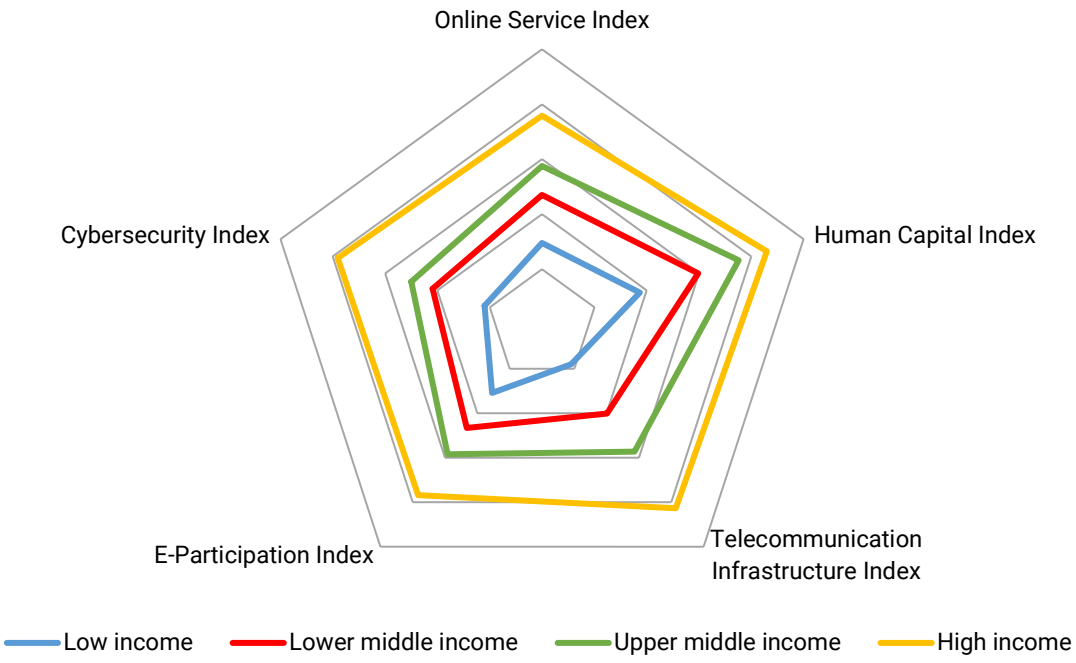
By region

There is greater diversity of performance across regions. Unsurprisingly, high-income European countries and North America do well across all indicators, and sub-Saharan Africa scores below average on all fronts. East Asia & Pacific, Middle East & North Africa, and South Asia score largely in the basic readiness category, while developing Europe & Central Asia score predominately in the intermediate category. Latin America & Caribbean score below average on 3 categories (e-participation, government effectiveness, and cybersecurity) and above average on 3 (online services, human capital, and telecommunication infrastructure).

Income group trends

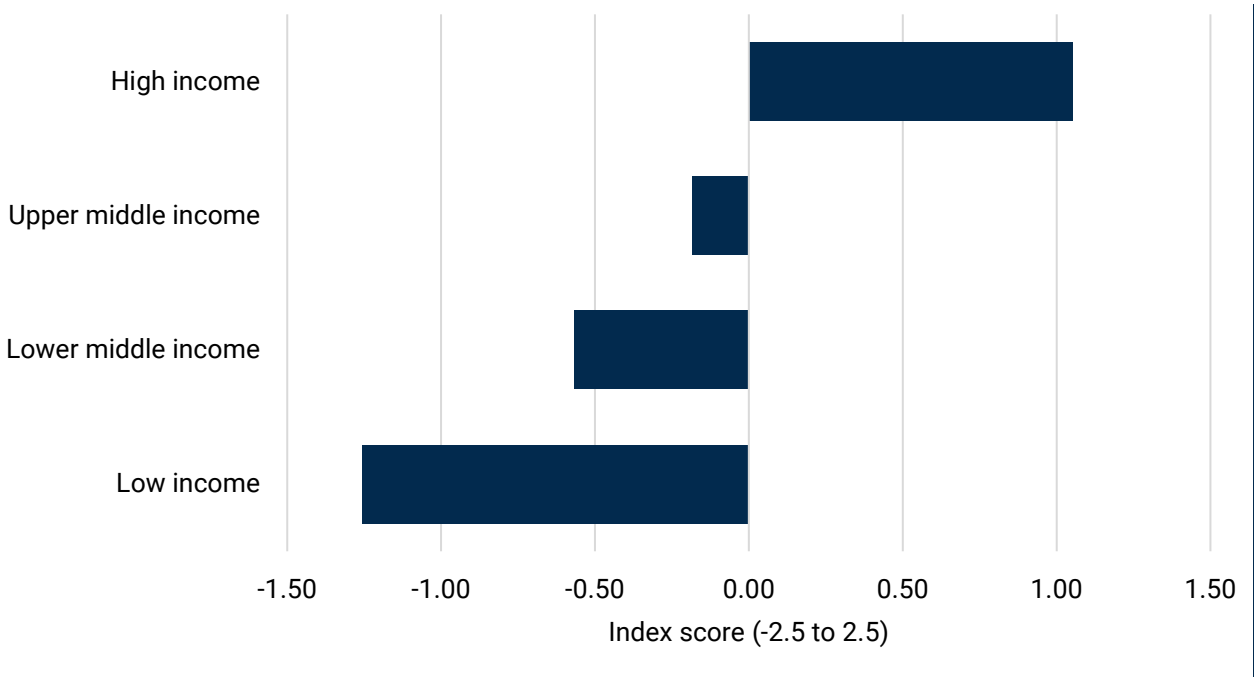
The following section provides several visual presentations of the data on the six indices of digital preparedness by income group. Figure 2, which looks at the relative position of income groups across 5 of the 6 measures of digital government, shows the consistency within each income group across the indexes. Government effectiveness is presented separately in Figure 3, as this indicator is on a different scale. As shown in Figure 2, the components of digital government readiness track with national income levels, with each of the five indices moving up the economic scale. Human capital is more advanced than other components at all income levels. Online services and e-participation outperform telecommunication infrastructure and cybersecurity in LICs and LMICs. Telecommunication infrastructure is the least developed component of digital government in LICs and LMICs, but relatively even with online services and e-participation in upper middle-income countries. Per Figure 3, government effectiveness scores are below average for all developing countries.

Figure 2. Digital government components by income group



Source: UNDESA (2020) and ITU (2021). ITU scores adapted to 0-1 scale for visual presentation.

Figure 3. Government effectiveness index by income group



Source: Kaufmann and Kraay (2020).

These income group averages hide heterogeneity at the country level. Below, country level trends are examined by income group, based on the country specific data in Appendix 3.

Low-income countries (LIC): The 27 LICs score solely in the lowest two categories of digital government readiness, predominately in the "low" category, and particularly low on government effectiveness. Rwanda and Uganda are the exceptions, as they score "intermediate" on online service, e-participation, and cybersecurity, and Rwanda additionally on government effectiveness. LICs score worst on human capital and telecommunications infrastructure—just a quarter of countries score basic or higher. They do relatively well on online services, e-participation, and cybersecurity, with about half of countries scoring at least basic or higher.

Lower-middle-income countries (LMIC): The 54 LMICs score predominately in the "basic" digital government readiness category. LMICs do worst on measures of government effectiveness—only 13 percent of countries score intermediate or higher. They do similarly poorly on telecommunications infrastructure and human capital, where about a quarter of countries score above intermediate. This group does better on measures of e-participation, online services, and cybersecurity, with about a third scoring above average.

Some LMICs do poorly across the board. Comoros and Haiti rank low in digital government readiness on all categories. Republic of Congo, Djibouti, Laos, Mauritania, and Papua New Guinea score in the bottom category on at least 4 components.

On the other hand, Indonesia and the Philippines do quite well, scoring intermediate or above in each category. Bolivia, Ghana, Iran, Kyrgyz Republic, Mongolia, Sri Lanka, Tunisia, Ukraine, Uzbekistan, and Vietnam score above average on at least 4 components.

Five LMICs (Egypt, India, Indonesia, Tanzania, and Vietnam) reach the advanced category of digital government readiness on one component, cybersecurity capabilities, and India also ranks highly in online services and e-participation.

Upper-middle-income countries (UMIC): The scores for UMICs vary substantially. They rank very well on human capital, with 78 percent of countries scoring above average. Around 60 percent of countries rank intermediate or advanced on telecommunications infrastructure, whereas 50 percent of countries do so on online services, e-participation, and cybersecurity. This group ranks worst on government effectiveness, with just 43 percent of countries scoring above the global average.

Guatemala, Guyana, Iraq, Lebanon, Turkmenistan, and Tuvalu are among the lowest UMIC performers, scoring below average on all indicators. On the other hand, Bulgaria, China, Colombia, Costa Rica, Georgia, Kazakhstan, Malaysia, Mauritius, Russia, Serbia, South Africa,

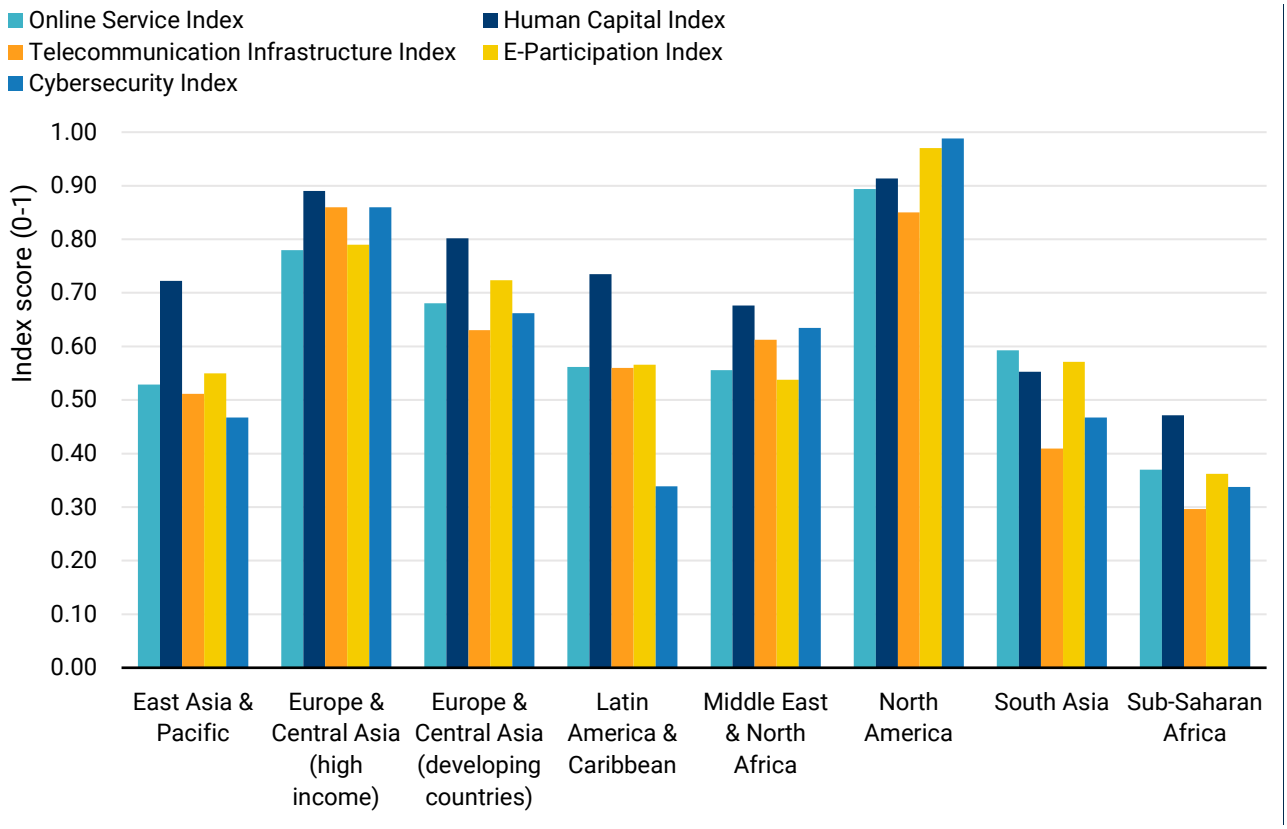
Thailand, and Turkey all score above average in all indicators. Of this group, Russia and Kazakhstan rank advanced on 5 out of 7 indicators.

Regional trends

The following section looks at regional performance on the six indices of digital preparedness. Figure 4 shows the relative performance across five indicators by region, with Europe & Central Asia divided between high income and developing countries. Figure 5 looks at the sixth indicator, government effectiveness, as this indicator is on a different scale. North America and high-income Europe stand out as top performers across all indicators. Africa is the least developed in terms of digital government readiness, particularly lagging in online services and e-participation.

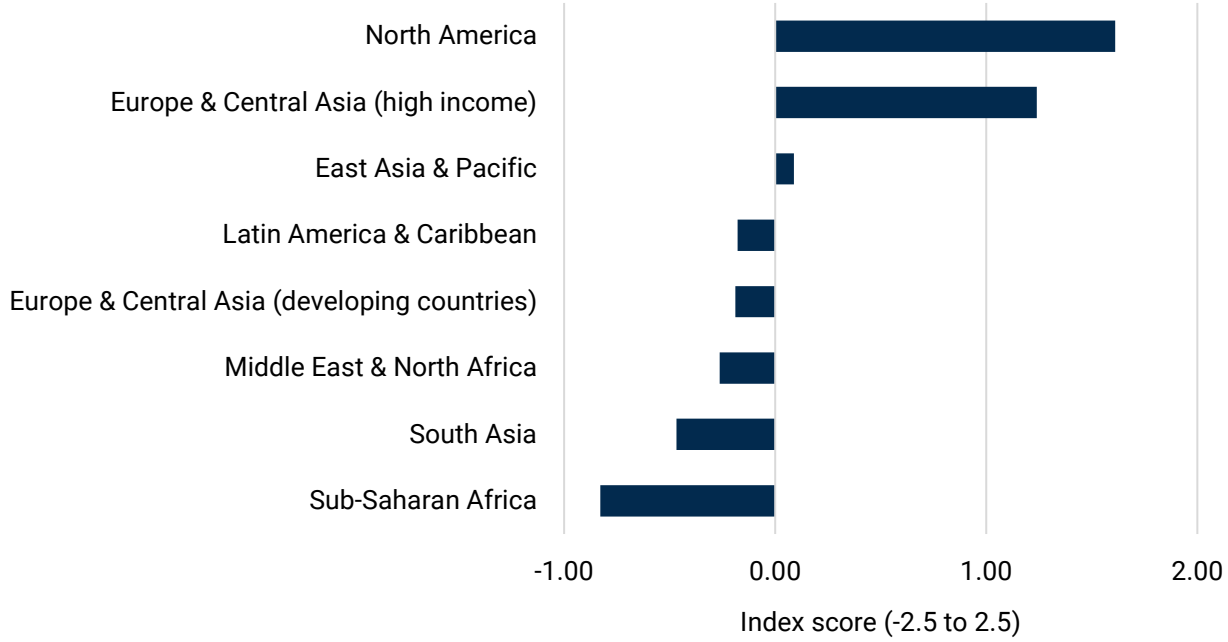
Human capital is the most advanced of all the components of digital readiness, except for North America where it falls behind e-participation and cybersecurity, and South Asia, where it marginally lags online services and e-participation. Telecommunications infrastructure is the laggard in three developing country regions (sub-Saharan Africa, South Asia, and developing Europe & Central Asia), whereas online services and e-participation lag in the Middle East & North Africa and cybersecurity in East Asia & Pacific and Latin America. High-income Europe and North America, unsurprisingly, do well on government effectiveness, as does East Asia & Pacific. Sub-Saharan Africa, South Asia, and the Middle East & North Africa struggle on this indicator.

Figure 4. Digital government components by region



Source: UNDESA (2020) and ITU (2021). ITU scores adapted to 0-1 scale for visual presentation.

Figure 5. Government effectiveness index by income group



Source: Kaufmann and Kraay (2020).

As to digital government readiness, these regional groupings are comprised of a diverse subset of countries. Below, country level trends are examined by region, based on the country specific data in Appendix 4. At the regional level, there are some high performers which could act as models and partners for donors for digital government development for their regional peers—however, some of these high performers are authoritarian governments who are using their digital capabilities in ways that disqualify them as partners.

East Asia & the Pacific: The 30 countries of East Asia & Pacific are very diverse in their digital government capabilities. Ten countries score above average on all 6 indicators, and 12 score below average. East Asian countries do relatively well on human capital, where 57 percent score above average. Around 50 percent of countries score above average on telecommunications infrastructure and government effectiveness, and 40 percent of countries do so on online services, e-participation, and cybersecurity

Australia, South Korea, and Singapore stand out as top performers, scoring advanced in each indicator. At the other end, North Korea, Laos, and Papua New Guinea each score in the low category on at least 4 indicators.

Europe & Central Asia (developing countries): There are 20 developing countries (excluding high income) in Europe & Central Asia. These countries largely score in the intermediate category of digital government readiness. This group lags on government effectiveness, where 65 percent of countries score below average. They do quite well on human capital, with only one country (Turkmenistan) scoring in the bottom half.

Top performers include Kazakhstan, Russia, Serbia, and Turkey, all of whom score above average in each indicator. Turkmenistan stands out as a low performer, scoring below average on every measure, and in the bottom category on 4 indicators. Tajikistan also lags, scoring below average on 5 measures. Interesting to note that Russia, Turkey, and Kazakhstan all score advanced on e-participation (see table 22, Appendix 4), which reveals that e-participation, while an important tool of democratic practice, is not a guarantee.

Latin America & Caribbean: There is great diversity of performance among the 33 countries in Latin America & Caribbean. The region does relatively well on human capital, with 79 percent of countries scoring intermediate or advanced. It is split for online service, telecommunications infrastructure, and e-participation, with around 50 percent scoring above and below average. The region lags on government effectiveness and cybersecurity, with one-third of countries rating above average.

Chile, Colombia, Costa Rica, and Uruguay stand out as top performers in the region, scoring in the top two categories on all indicators. They are followed closely by The Bahamas, Barbados, Panama, and Trinidad and Tobago, which lag only on cybersecurity, and Brazil, Mexico, and Peru which lag on government effectiveness. Haiti stands out at the bottom of the pack,

scoring in the bottom category on all indicators. Guatemala, Guyana, Honduras, and Nicaragua score below average on all indicators.

Middle East & North Africa: The 20 countries in the Middle East & North Africa are split on digital government readiness. They do best on telecommunication infrastructure and cybersecurity, with 65 percent of countries scoring above average. They score worst on e-participation and government effectiveness, with 45 percent of countries above average. Online services and human capital both report 55 percent of countries in the top two categories.

Israel, Kuwait, Malta, Oman, Saudi Arabia, and the United Arab Emirates (UAE) stand out as top performers, scoring above average on all categories. Djibouti, Iraq, Lebanon, Syria, and Yemen all score in the bottom two categories on all indicators.

South Asia: The 8 countries of South Asia largely score in the basic e-readiness category. They do poorest on human capital and telecommunications infrastructure, where all but one country scores below average. They do best on online services, where 5 of the 8 countries score above average.

The top performers in the region are Sri Lanka and India. Sri Lanka ranks intermediate on 5 indicators, and basic on 2. India scores advanced on 3 indicators, intermediate on 1, and basic on 4. The lowest performer is Afghanistan, which scores in the low category on 4 indicators and basic on 2.

Sub-Saharan Africa: The 48 countries in sub-Saharan Africa score in the low and basic category on digital government readiness. Sub-Saharan Africa does best on cybersecurity, where 25 percent of countries score above average. They do poorly on all other indicators, with 85 percent of countries below average on online services, e-participation, and government effectiveness, 88 percent on telecommunications infrastructure, and 92 percent on human capital.

The top performers in the region are Mauritius and South Africa, which score intermediate or above on all indicators, and Seychelles, which scores above average on 5 out of 6 indicators. The lowest performers are Central Africa Republic, Comoros, Eritrea, Guinea-Bissau, Liberia, and South Sudan, which score in the lowest category on all indicators.

Digital government development 2000-2020

Digital readiness has improved rapidly over the last 20 years. Table 3 looks at change over time on the components of e-governance for which time series data is available. Data on income group and regional changes for online service provision, telecommunications infrastructure, and e-participation are available for 2003-2020. The methodology on the human capital index

changed in 2014, so 2003 and 2020 figures are not directly comparable. Instead, figures from 2003-2010 and 2014-2020 are presented, to illustrate that human capital has improved over the period. Cybersecurity figures are only available from 2014-2020. Time series data for government effectiveness are not reported, as the methodology used by World Governance Indicators creates a normalized index score each year, with the mean index set to 0, so change over time is not visible.

Looking at the UN E-government index as an indicative composite of digital government readiness, from 2003-2020, the average score on the e-government index rose from 0.36 to 0.60, almost doubling. Countries gained the most on average on telecommunications and e-participation, rising from a low baseline in 2003 of 0.18 and 0.15 to almost 0.60 by 2020. The average score for online services and cybersecurity doubled over this period. Human capital, starting from a higher base, rose modestly over this period, from 0.71 in 2003 to 0.76 in 2010, and from 0.66 in 2014 to 0.69 in 2020 under the new methodology.

Income group trends

Looking at the data by income group shows steady progress across all income levels. 2020 income group ratings are used across both time periods for a standard comparison. Upper middle-income countries improved the most from 2003-2020, followed by high-income. Low-income countries almost tripled their score, but they closed the gap the least with respect to other regions. All income groups gained the most on the e-participation index, followed by telecommunications infrastructure (except for low-income countries, which improved more on online services than telecommunications infrastructure).

Low-income countries made massive gains relative to their starting point, with a 4-fold increase in online services, a 20-fold increase in telecommunications infrastructure, and a 10-fold increase in e-participation. Lower middle-income countries almost tripled their score in online services, saw a 10-fold increase in telecommunications infrastructure, and quadrupled their score on e-participation.

Looking at income group performance relative to HICs on the UN E-governance index in Figures 6a and 6b below, UMICs closed the gap with HICs over the time period, while LICs and LMICs saw the gap widen.

Regional trends

Looking at regional trends shows that all regions improved on the UN E-government index over the time period, with the greatest gains by developing countries in Europe & Central Asia. Most regions made the most progress on e-participation, except for Latin America & Caribbean and North America, which improved most on telecommunications infrastructure.

South Asia and sub-Saharan Africa made great gains over the period, though not enough to close the gap with other regions. South Asia more than doubled its score on online services, increased its telecommunications score 20-fold, and more than quadrupled its e-participation score. Sub-Saharan Africa likewise more than tripled its online services score, and increased telecommunications infrastructure and e-participation by a factor of 10.

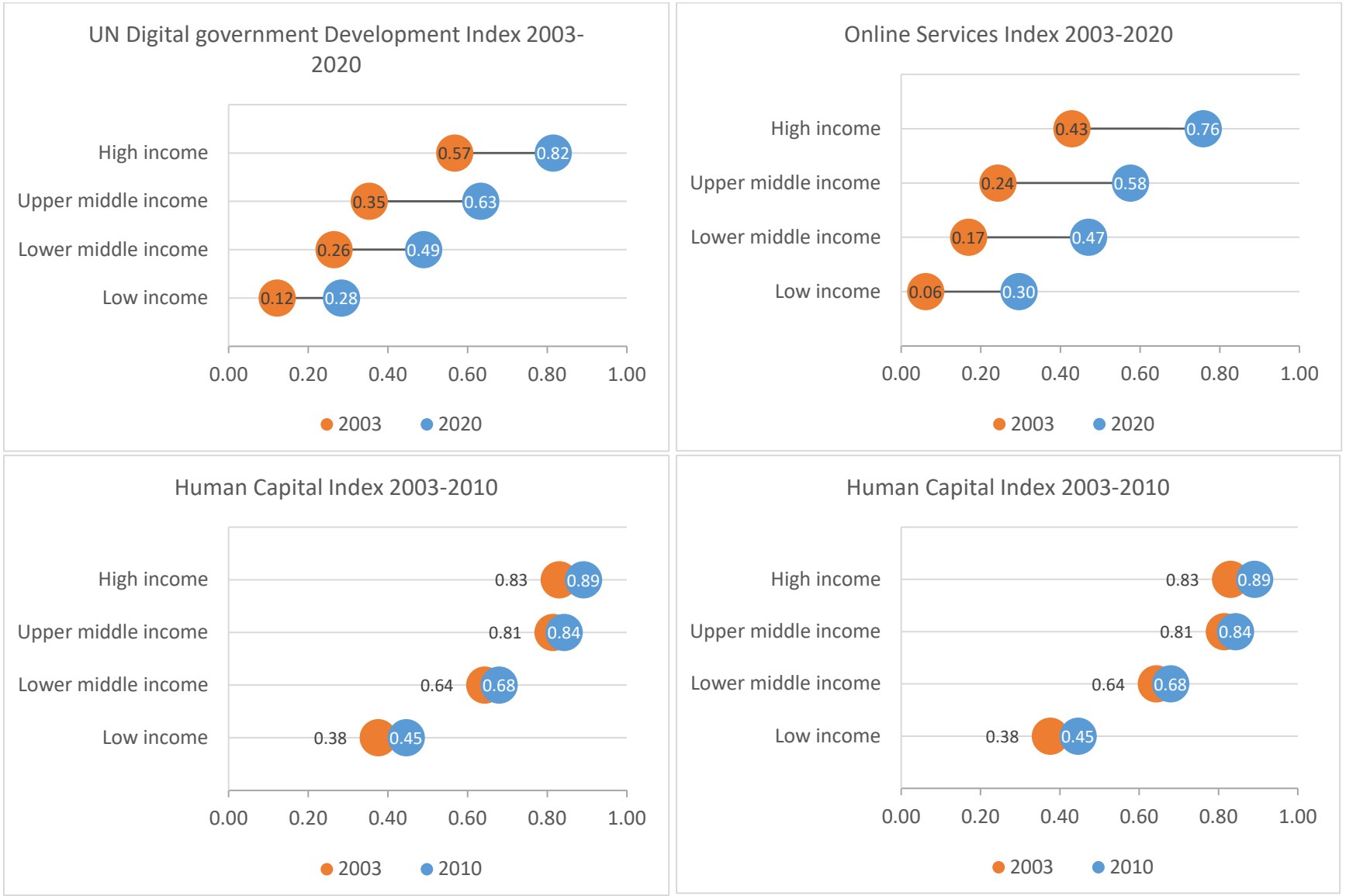
North America is the leader in digital government. Relative to 2003, all regions decreased the gap between themselves and North America by 2020, with the greatest catchup growth by the developing countries of Europe & Central Asia, Middle East & North Africa, and South Asia (see Figure 7a and 7b).

Table 3. Digital government readiness growth, 2003-2020

Group	E-Government Index		Online Services Index		Human Capital Index				Telecommunications Infrastructure Index		E-Participation Index		Cybersecurity Index	
	2003	2020	2003	2020	2003	2010	2014	2020	2003	2020	2003	2020	2014	2020
Low income	0.12	0.28	0.06	0.30	0.38	0.45	0.36	0.37	0.01	0.18	0.02	0.31	0.14	0.22
Lower middle income	0.26	0.49	0.17	0.47	0.64	0.68	0.55	0.60	0.04	0.40	0.09	0.47	0.21	0.42
Upper middle income	0.35	0.63	0.24	0.58	0.81	0.84	0.73	0.75	0.11	0.57	0.10	0.58	0.26	0.50
High income	0.57	0.82	0.43	0.76	0.83	0.89	0.83	0.86	0.44	0.83	0.30	0.77	0.44	0.78
East Asia & Pacific	0.36	0.59	0.26	0.53	0.69	0.67	0.70	0.72	0.16	0.51	0.16	0.55	0.30	0.47
Europe & Central Asia (high income)	0.60	0.84	0.46	0.78	0.83	0.90	0.86	0.89	0.51	0.86	0.33	0.79	0.46	0.86
Europe & Central Asia (developing)	0.33	0.70	0.18	0.68	0.82	0.91	0.77	0.80	0.10	0.63	0.07	0.72	0.30	0.66
Latin America & Caribbean	0.39	0.62	0.28	0.56	0.82	0.86	0.71	0.74	0.14	0.56	0.18	0.57	0.22	0.34
Middle East & North Africa	0.34	0.61	0.22	0.56	0.73	0.79	0.65	0.68	0.16	0.61	0.09	0.54	0.32	0.62
North America	0.87	0.89	0.88	0.89	0.98	0.97	0.92	0.91	0.74	0.85	0.90	0.97	0.81	0.99
South Asia	0.27	0.52	0.24	0.59	0.54	0.61	0.46	0.55	0.02	0.41	0.12	0.57	0.27	0.47
Sub-Saharan Africa	0.20	0.38	0.11	0.37	0.52	0.58	0.43	0.47	0.03	0.30	0.04	0.36	0.16	0.34
World	**0.36**	**0.60**	**0.25**	**0.56**	**0.71**	**0.76**	**0.66**	**0.69**	**0.18**	**0.55**	**0.15**	**0.57**	**0.28**	**0.52**

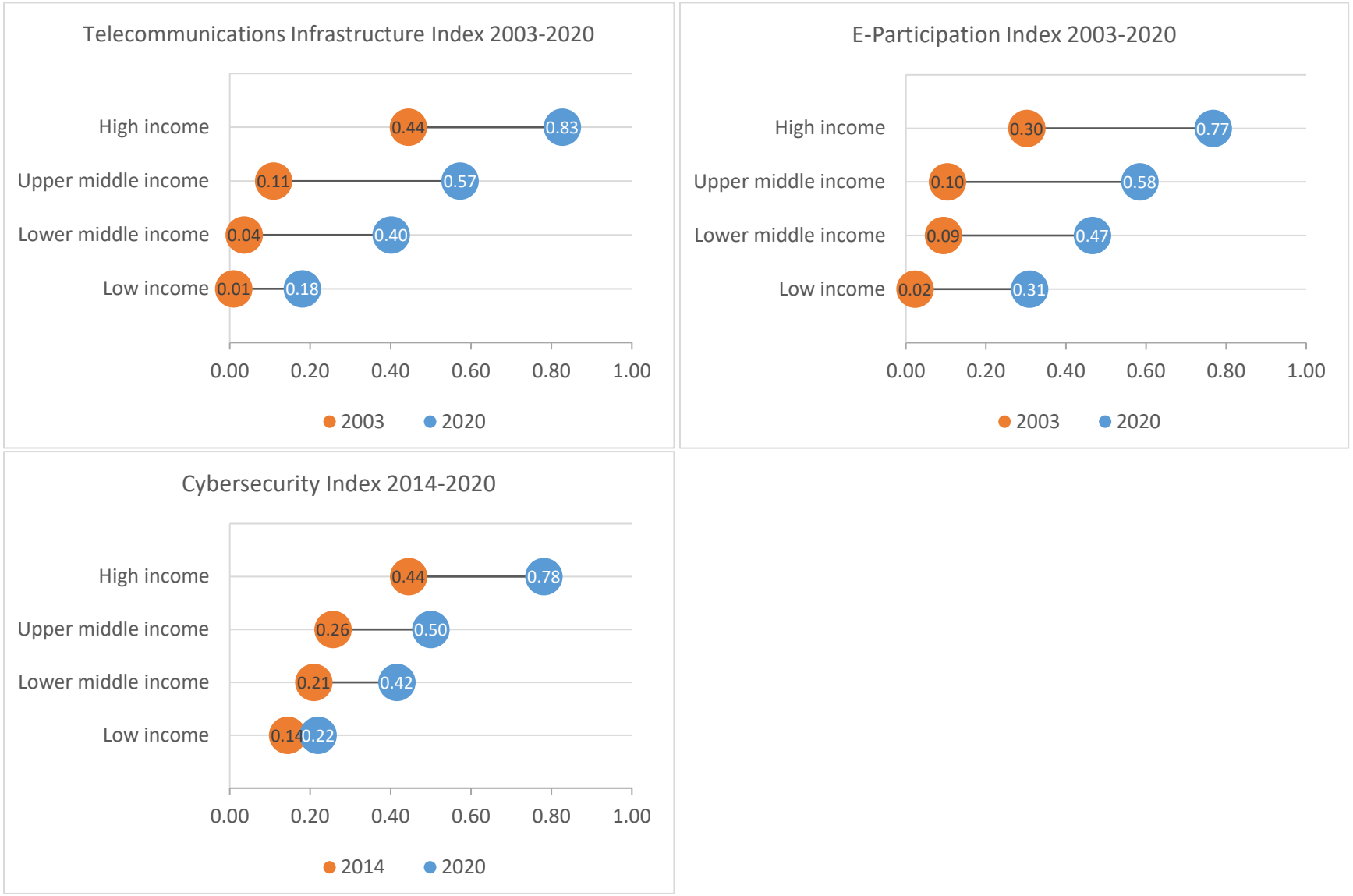
Source: UNDESA (2020), ITU (2021).

Figure 6a. Change in digital government components by income group, 2003-2020



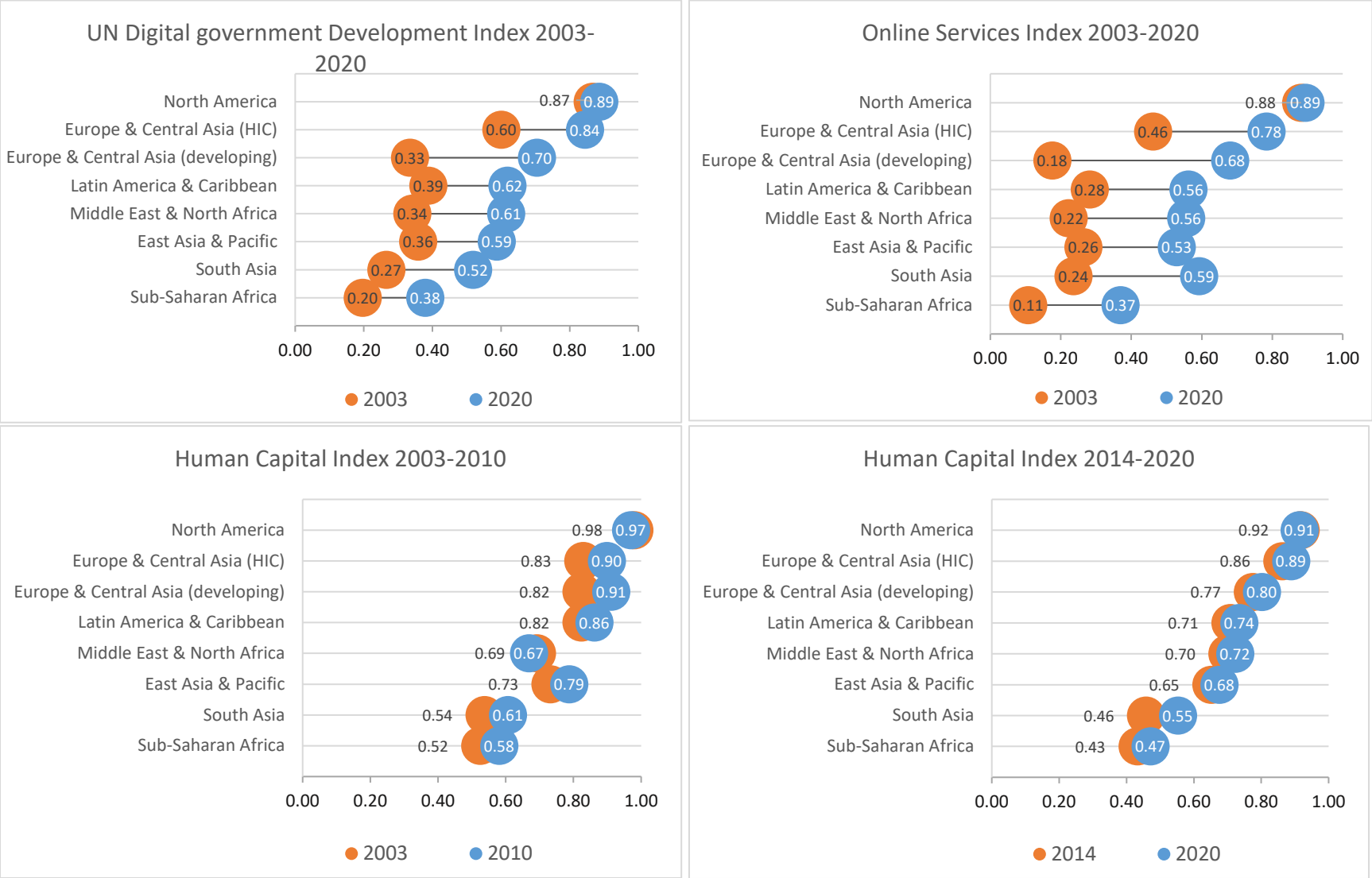
Source: UNDESA (2020).

Figure 6b. Change in digital government components by income group, 2003-2020



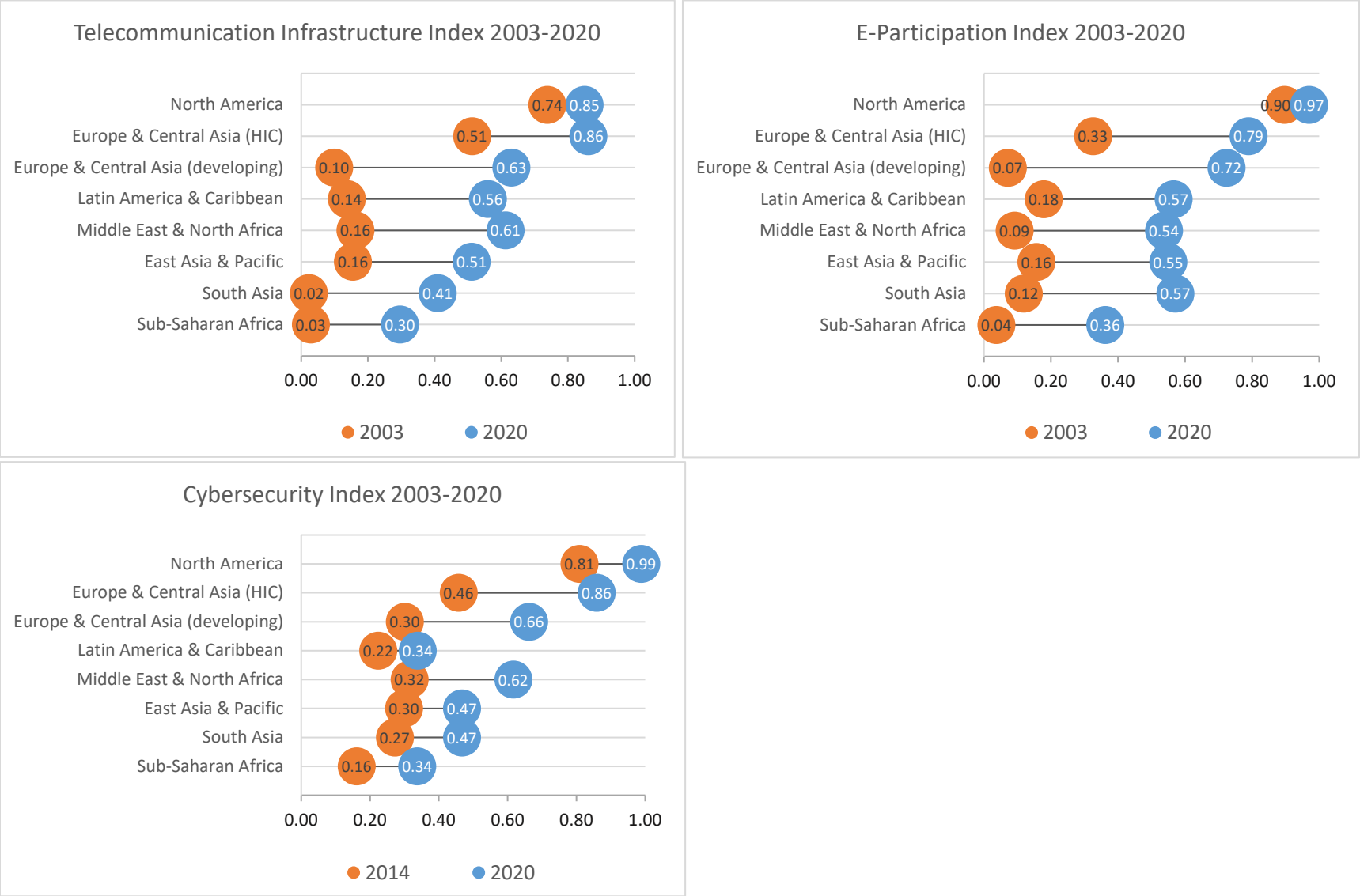
Source: UNDESA (2020) and ITU (2021).

Figure 7a: Change in digital government components by region, 2003-2020



Source: UNDESA (2020).

Figure 7b. Change in digital government components by region, 2003-2020



Source: UNDESA (2020) and ITU (2021).

3. Findings and implications for donor engagement

The above analysis highlights key trends in digital government development across developing countries. While much progress has been made, significant gaps exist at both the income group and regional level. Strengthening human capital and government institutional capability in LICs and LMICs will continue to be an important part of the development agenda writ large and will concomitantly advance digital government readiness. Beyond these baseline capabilities, many countries need substantial support to build out digital infrastructure and require technical capacity building to transition to digital services and promote greater citizen digital engagement.

COVID-19 has illustrated the centrality of digital skills and capacities for the future of work and livelihood, both in developing and developed countries. Digital infrastructure and digital government services are no longer just nice to have, but essential elements of a well-functioning 21st century nation. Yet, at the moment, the digital divide between developed and developing countries is wide and widening for many of the poorest countries. There is much the international community can do to narrow this gap, through both investments and capacity building.

This section provides key findings by income group and region and suggests areas for donor engagement to help build the broad scope of developing country capabilities required for effective digital government. These recommendations are based on the analysis of digital development readiness data in Section 2, and thus, as appropriate, continue to use the names for the proxy indicators of digital government components. However, as argued above, getting digital government right is not just about digital, it is also about companion analog processes, including strengthening government institutions and democratic norms and processes.

A full political economy analysis of each developing country candidate for digital assistance is beyond the scope of this paper. As the paper covers all countries in the data analysis, it includes governments that are using digital capabilities in authoritarian ways, and the findings and recommendations in this section should not be taken to suggest that donors should assist these governments in strengthening digital capacities at the expense of civic space and individual and human rights. These recommendations should be taken as guideposts for

further country level review and analysis. A useful guide for political analysis is Freedom House's survey Freedom of the Net 2021.

Trends by income group

Observations: Digital government readiness largely correlates with income level. While all income groups made significant progress over the past several decades, LICs and LMICs show the lowest digital government development, and the gap between HICs and these groups has widened. As a whole, developing countries have made the most progress on e-participation, allowing citizens to engage in government services and even democratic processes online. The least progress has been made in online services, cybersecurity, and human capital, though human capital is the most developed component.

LICs struggle with human capital development and lag substantially on telecommunications infrastructure. LMICs are hampered by government effectiveness and similarly lag on human capital and infrastructure. UMICs lag on government effectiveness, though they have made progress on all six components over the last 20 years and closed the gap with high-income countries.

Implications for donor support: Developing countries need support across all domains of digital government. Some are universal aspects of development that are essential for digital government readiness, such as human capital development and government effectiveness. Some are digital specific, such as capacity building in cybersecurity, developing online services, and basic infrastructure investments.

- **Foundational support**: LICs and LMICs continue to need support for human capital development. While this is important for economic and social development in general, it is also crucially important for digital readiness. Digital literacy is a key component of any digital government approach, for individuals must know how to access and use online services and government workers must know how to manage and analyze data in order to reap the gains from greater online digital government presence. LICs, LMICs, and UMICs all struggle with government effectiveness, and thus need large scale institution and capacity building support, both for agencies focused on digital readiness and beyond.

- **Digital infrastructure**: LICs and LMICs lack telecommunications infrastructure, though many countries are bypassing traditional fixed broadband and landlines for mobile data subscriptions. Concerted efforts to address digital infrastructure under an initiative like that proposed in a recent paper by one of the authors (Ingram), *Bridging the Global Development Divide*, would target LICs and LMICs that have limited capacity for large

scale domestic infrastructure operations.[48] Such efforts should be designed as part of digital systems that are interoperable, open source, user-centric and responsive, transparent, and secure.

- **Technical capacity building**: All developing countries lag in cybersecurity. As digital infrastructure and online systems are built out, there is a strong need to do so in ways that protect individuals' privacy and data security and respect human rights. HICs are the leaders in cybersecurity, and thus could provide technical know-how and lessons to developing countries to help build secure systems from the start. LICs and LMICs, likewise, need technical support to build out robust online platforms that bring government services closer to their citizens. In places with low institutional effectiveness, this challenge will be particularly acute.

Trends by region

Observations: Looking at regional trends, North America and the developed countries of Europe unsurprisingly stand out as digital government leaders, while sub-Saharan Africa and South Asia lag. All developing regions improved on the UN E-government index over the past several decades, with each closing the gap between themselves and North America. Developing countries in Europe & Central Asia achieved the greatest catch-up growth.

Sub-Saharan Africa and South Asia are furthest behind in digital government readiness. All regions (other than East Asia & Pacific) struggle with government effectiveness. Sub-Saharan Africa needs assistance on all components of digital government. Other specific regional gaps are South Asia and East Asia & Pacific on telecommunications and cybersecurity, Latin American & Caribbean on e-participation and cyber security, and Middle East & North Africa on e-participation and online services.

Implications for donor support: While digital government readiness is largely correlated with income level, most donors organize around regions. Thus, a regional approach to digital government improvement is warranted. Looking at developing regions across the categories outlined above, support is needed in the following areas:

- **Foundational support**: South Asia and sub-Saharan Africa need support on human capital development in order to build the skill sets necessary to engage in a digital world and take advantage of digital services. All developing regions except East Asia & Pacific lag in government effectiveness, and thus require institutional and capacity building support within and beyond digital agencies.

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[48] Ingram (2021).

- **Digital infrastructure**: All developing regions lag in digital infrastructure, with particularly poor scores in South Asia and sub-Saharan Africa. Sub-Saharan Africa requires a large digital infrastructure investment, along the lines spelled out in A Digital Moonshot for Africa, put forward by the World Bank.[49] Many of these countries are leapfrogging analog technology and moving straight to mobile phone based internet subscriptions, which perhaps could streamline some infrastructure needs if designed in a regionally coordinated fashion.

- **Technical capacity building**: Online service provision lags in East Asia & Pacific, Latin America & Caribbean, the Middle East & North Africa, and sub-Saharan Africa. Most developing regions sans the Middle East and developing Europe struggle with cybersecurity. There is a core role for donor capacity building here, perhaps led by regional leaders, to help build out high quality government service provision while protecting citizen privacy. E-participation support is needed in Latin America & Caribbean and the Middle East & North Africa, which could be integrated into larger governance and civil society strengthening programs.

Donor regional collaboration

Assistance tends to be most relevant and sustainable if it is "home grown", or "regionally grown;" solutions and experts are most relevant if they come from countries with similar backgrounds and interests and/or that have similar development experiences. Thus, donors with similar regional interests might seek to collaborate on a regional basis and partner with regional developing country standouts in supporting digital government efforts. It is important to note that democracy and human rights concerns must be paramount in identifying both partner and target countries, in order to avoid working with countries where increased digital capacity might lead to greater repression and abuse.

For example, in sub-Saharan Africa, the U.S. and European donors with a strong interest in Africa could partner with the African Union, the Economic Community of Western African States (ECOWAS), and developing country digital standouts like South Africa, Mauritius, Kenya, Rwanda, and Seychelles to support digital government efforts. Almost all countries in the region could be targets for assistance.

In East Asia & Pacific, the U.S. could collaborate with one or more advanced countries in the region—Australia, New Zealand, Japan, South Korea, and Singapore. This group might then partner with several of the regional developing country standouts—Indonesia, Malaysia, Philippines - to advance digital government in the region, focusing particularly on countries most in need, including Cambodia, Laos, Myanmar, Papua New Guinea, Timor-Leste, and

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[49] World Bank (2019).

Pacific island states. ASEAN, which has been particularly active in the digital space, would be a natural regional partner.

In South Asia, a donor consortium of the U.S., Australia, Japan, Korea, New Zealand, and Singapore might partner with Sri Lanka and India, regional standouts scoring in the intermediate category or above on the majority of indicators. Countries in the region in particular need of assistance are Afghanistan, Nepal, and Maldives, which are furthest behind on digital government indicators.

India cannot be referenced without noting that it is a special case—special in that it represents both the achievements and challenges of digital development, making it a potential model of digital development for other developing countries, yet also a potential target country for donor digital assistance. India can be thought of as two countries, one digitally advanced and one lacking basic digital skills and infrastructure. India is at the forefront of digital development, having invested in digital infrastructure to emerge as a world leader in digital identification and service provision. However, there is a wide digital divide in the country, with less advanced areas largely left behind, and thus an appropriate target for support. Unfortunately, India's use of digital has not been benign. The government has deployed digital technology to breach privacy and repress minority groups. It has used government regulations and digital tools to surveil, censor, and arrest individuals. Any partnerships with India must be accompanied by democratic norms-building and safeguards to ensure that their methods of digital repression and surveillance are not copied elsewhere.

In Latin America & Caribbean, the U.S., Canada, and Spain, working with other interested donors, could partner with regional leaders - Chile, Colombia, Costa Rica, and Uruguay. Key target countries in the region would be Guatemala, Guyana, Honduras, and Nicaragua, which score below average on all indicators of digital government.

In the Middle East & North Africa, Israel, Saudi Arabia, UAE, Oman, Malta, and Bahrain are the most advanced in digital government readiness. Those furthest behind are fragile states that struggle in a range of areas of development, including Iraq, Lebanon, Syria, and Yemen. As the problems in these countries are more complex than just digital government readiness, a coalition of donors might target a middle tier of more stable countries for digital government interventions, such as Egypt, Jordan, Morocco, and Tunisia.

In Europe & Central Asia, Turkey, with a cultural and historical affinity with many countries in the region, could be a partner with the U.S. and interested European donors. Turkmenistan and Tajikistan are particularly underdeveloped in digital government. Note, while the data might identify these countries as possible targets for assistance, the nature of the ruling regime might dictate otherwise, and Turkey does not present itself as a particularly probable partner at this point in time.

Trends by components of digital government

Observations: Interestingly, while the indices do not identify telecommunications infrastructure as the area in which developing countries lag the most, basic digital infrastructure and "last mile" connectivity are key needs, with 40 percent of the world's populace lacking internet access. Developing countries score best on human capacity and least well on government effectiveness. The next highest need is cybersecurity. The other components—telecommunications infrastructure, online services, and e-participation - are at a similar level of development and need.

This highlights three things.

1. Development writ-large involves a host of capabilities and dependencies that interlock across sectors and are short-changed by single-focused, siloed programs.
2. Donors and partner governments interested in advancing digital government must look at more than just the digital capabilities of a country, focusing on a comprehensive set of capabilities and institutions that make digital government function.
3. A single initiative can take on only so much. A digital government initiative, even a comprehensive one, is likely focused mainly on the digitally specific components—telecommunications infrastructure, government digital capacity and online services, digital participation, and cybersecurity. For the other components that support digital government, there are existing well-established donor programs in building human capacity through education and training, in strengthening government institutions, services, policies, and regulations, and in advancing democracy and political participation. Ideally, a digital lens would be embedded in these programs to create mutually strengthening synergies with digital government: education programs addressing digital literacy, institution building efforts adapted to the digital world, and democracy programs focused on citizen engagement in an online world.

Implications for donors: Donors, like USAID, are coming to understand that support for developing countries in digital government needs to be comprehensive. They need to ensure that their assistance packages are strategic in encompassing telecommunications infrastructure, online services, government digital capabilities, and cyber security, while also informing and being coordinated with related programs in institution building, democracy, and human capital.

Donor coordination

Observations: The world of donor efforts in digital development is filled with innumerable siloed donor activities and solutions, most of which do not connect with one another and are not part of a comprehensive national digital plan. Thus, they often fail to contribute to a

coherent national digital system, result in disconnected programs and over investment in some sectors or countries and under investment in others, and undercut the critical element of interoperability.

Unfortunately, the logical remedy, donor coordination, is a field replete with failed and missed opportunities. In a recent publication, *States, Markets, and Foreign Aid*, Simone Dietrich identifies one barrier to donor coordination as differences in institutional ideology.[50] Specifically, some donors (exemplified by Germany and France) *engage* with partner governments in almost all circumstances, whereas other donors (United States, United Kingdom, Sweden) *bypass* partner governments when confronted with ineffective and corrupt governance. Beyond Dietrich's premise, an additional hindrance to donor coordination is each donor having its own complex of priorities, processes, rules, and reporting requirements.

Implications for donors: Donor collaboration is essential to the effectiveness of development efforts in reaching scale and coherence. A concerted effort is needed to push for greater coordination across major donors, finding ways to circumvent the barriers in order to promote more efficient, effective digital development.

Potential solutions to donor coordination barriers include:

- Donors concentrate more of their investment on fewer digital solutions that are open to all and can be used for multiple purposes, including the use and funding of Digital Public Goods (DPG) platforms. DPGs provide open source, compatible platforms that are free for use and adaptation. Use of DPGs allows for consistency and interoperability across digital systems and countries. Interested governments can build on the existing work of others, utilizing open source platforms offered by MOSIP and the Digital Impact Alliance's Catalogue of Digital Solutions. Donors should advance the use of DPGs, but not to the exclusion of commercial products where they are preferred by the development partner and offer the best solution.
- Donors provide support through country-led or donor-led platforms that align multiple donor activities under a coherent national plan.
- Donors collaborate with existing multilateral and civil society efforts around digital government to build common approaches. There are a number of available digital public goods efforts, and governments, donors, international organizations, the private sector, and civil society organizations should support and draw from them and avoid reinventing the wheel. Such efforts include:
    - Future State works with donor institutions and the private sector to build common strategies to ensure that digital solutions are user-centric and inclusive

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[50] Dietrich (2021).

- Digital Impact Alliance advances common digital approaches, including through
  - Principals for Digital Development
  - Catalogue of Digital Solutions
  - SDG Digital Investment Framework
  - Digital Transformation Indicator Library
- Digital Public Goods Alliance promotes development and use of open-source global public goods
- MOSIP offers a modular, open-source, foundational platform from which to build a national digital identification system
- GovStack presents a series of building blocks on which to construct whole-of-society digital transformation

- Even where donors are unable to engage in coordination at the level of implementation, they could agree on certain principles and objectives to guide parallel investments and solutions to ensure they are compatible and contribute to common goals. Such frameworks already exist. Digital Donors Anonymous[51] provides a community of practice for donor organization staff working on digital development initiatives. The Principles for Digital Development (Box 5) provide a set of guideposts for donor activity in the digital development space.

Box 5. Principles for Digital Development

Source: Principles for Digital Development (2021)

[51]Hosted by Dial, Digital Donors Anonymous is an informal community of practice of over 25 donor organizations, ranging from major bilateral aid agencies to small private foundations, that convenes virtually to share best practices around integrating digital into their strategies.

Principles for Good Digital Government

Observation: As explained in the analysis above, a growing concern in the expansion of digital government is its cooption for authoritarian purposes. As donors work to build the digital capabilities of developing country governments, they must be constantly alert as to how those capabilities might be used. They must be careful in choosing the partners with whom they work and constrain their assistance from being used in malignant ways. The support they provide must be accompanied by the ethos of full transparency and be citizen centric. The principles for digital development are designed to deal with the technical aspects of developing digital capabilities, not their potential misuse by government.

Implications for donors: What is needed is for donors, government partners, civil society, and the private sector to work together to develop a set of Principles of Good Digital Government. The principles should be aligned with the Universal Declaration of Human Rights and the rule of law. The principles would be used to help identify good partners and seek to ensure that digital capabilities are developed and deployed for benevolent purposes. They should build walls to protect user data and prevent government abuse of its digital capabilities. The principles should ensure that donor support is deployed to build open and transparent government and advance the rights and privacy of citizens.

4. Conclusion

As the world becomes ever more digitally integrated and dependent post COVID-19, investments in digital government will be more essential than ever. Country digital government capacity is largely correlated with income level, such that high-income countries are relatively more advanced than low income. Developing countries have improved rapidly on various metrics of digital government readiness over the past 20 years, but barriers remain, specifically for low and lower-middle income countries, South Asia, and sub-Saharan Africa. While investments in the core components of digital government are required—like digital infrastructure, digital services, and digital participation—so are foundational investments in governance, human capital, and institutions.

There is an important role for the donor community to play in this space. Relying on partnerships with regional developing country leaders in the digital arena, the U.S. and other donors could leverage regional expertise and capacity building to help lagging countries catch up, while continuing to invest in foundational governance and human capital development programs. Greater donor alignment will be required in this effort to ensure against duplication of efforts and coverage of the broad range of digital government readiness components. There are existing multilateral and civil society initiatives which donors could support and draw on, building on civil society and private sector expertise to advance the state of digital government around the world.

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Annex 1. Comprehensive indices on digital government readiness by income group

Table 4. Composite digital government index scores (recent year), low-income countries

Low-income countries					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Afghanistan	0.32	1.95	0.34	5.96	
Burkina Faso	0.36	1.90	0.24	6.26	25.79
Burundi	0.32	1.48	0.26		22.62
Central African Republic	0.14	1.04	0.15		
Chad	0.16	1.27	0.23	4.32	14.80
Congo, Dem. Rep.	0.26	1.55	0.21		16.60
Eritrea	0.13	0.96		4.91	
Ethiopia	0.27	1.65	0.27	6.48	23.49
Gambia, The	0.26	2.59	0.36		29.40
Guinea	0.26	1.78	0.21	6.31	28.42
Guinea-Bissau	0.23	1.48	0.26		
Korea, Dem. People's Rep.	0.22				
Liberia	0.26		0.24	5.03	
Madagascar	0.31	1.68	0.25	6.48	25.84
Malawi	0.35	1.74	0.26	7.03	25.23
Mali	0.31	2.16	0.29		27.00
Mozambique	0.36	2.32	0.25	6.53	24.18
Niger	0.17		0.16	5.31	
Rwanda	0.48	2.18	0.43	9.04	37.24
Sierra Leone	0.29		0.27	5.33	
Somalia	0.13				
South Sudan	0.09				
Sudan	0.32	2.55	0.30		
Syrian Arab Republic	0.48	3.34	0.32		
Togo	0.43	2.15	0.25	7.78	
Uganda	0.45	2.19	0.34	7.29	31.40
Yemen, Rep.	0.30		0.26	5.78	18.00
TOTAL	**0.28**	**1.90**	**0.27**	**6.24**	**25.00**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 5. Composite digital government index scores (recent year), lower middle-income countries

Lower middle-income countries					
Country	UN E-Government Development Index 2020 (0-1 scale)	ITU Development Index 2017 (0-10 scale)	WB Digital Adoption Index 2016 (0-1 scale)	Cisco Digital Readiness Index 2019 (0-25 scale)	Network Readiness Index 2020 (1-100 scale)
Algeria	0.52	4.67	0.43	9.99	35.15
Angola	0.38	1.94	0.33	6.14	20.96
Bangladesh	0.52	2.53	0.37	8.53	36.01
Belize	0.45	3.71	0.40		
Benin	0.40	1.94	0.22	6.87	32.25
Bhutan	0.58	3.69	0.44		
Bolivia	0.61	4.31	0.48	10.12	36.72
Cabo Verde	0.56	4.92	0.43		42.01
Cambodia	0.51	3.28	0.40	9.27	36.01
Cameroon	0.43	2.38	0.30	7.63	29.86
Comoros	0.28	1.82	0.25		
Congo, Rep.	0.38		0.31	6.92	
Cote d'Ivoire	0.45	3.14		8.02	31.23
Djibouti	0.27	1.98	0.30		
Egypt, Arab Rep.	0.55	4.63	0.53	10.24	42.56
El Salvador	0.57	3.82	0.50	10.76	37.33
Eswatini	0.49		0.32		27.21
Ghana	0.60	4.05	0.45	9.55	36.97
Haiti	0.27	1.72	0.25	5.96	
Honduras	0.45	3.28	0.43	10.14	36.23
India	0.60	3.03	0.51	9.46	41.57
Indonesia	0.66	4.33	0.46	11.68	46.71
Iran, Islamic Rep.	0.66	5.58	0.51	11.02	43.91
Kenya	0.53	2.91	0.45	9.15	43.22
Kiribati	0.43	2.17	0.21		
Kyrgyz Republic	0.67	4.37	0.50	11.00	38.60
Lao PDR	0.33	2.91	0.26	8.58	37.12
Lesotho	0.46	3.04	0.29	7.43	27.72
Mauritania	0.28	2.26	0.34	6.41	
Micronesia, Fed. Sts.	0.38				
Mongolia	0.65	4.96	0.54	10.85	41.44
Morocco	0.57	4.77	0.56	10.87	39.71
Myanmar	0.43	3.00	0.26	8.08	
Nepal	0.47	2.88	0.37	9.27	31.81
Nicaragua	0.51	3.27	0.46	9.91	
Nigeria	0.44	2.60	0.42	6.47	30.44
Pakistan	0.42	2.42	0.40	7.77	33.29
Papua New Guinea	0.28		0.34	5.54	
Philippines	0.69	4.67	0.49	11.03	45.95

Samoa	0.42	3.30	0.36		
Sao Tome and Principe	0.41	3.09			
Senegal	0.42	2.66	0.35	8.11	36.90
Solomon Islands	0.34	2.11	0.27		
Sri Lanka	0.67	3.91	0.48	10.58	42.65
Tajikistan	0.46		0.32	8.81	34.14
Tanzania	0.42	1.81	0.34	7.98	33.92
Timor-Leste	0.46	3.57	0.29	7.36	
Tunisia	0.65	4.82	0.56	10.87	41.30
Ukraine	0.71	5.62	0.54	11.47	49.43
Uzbekistan	0.67	4.90	0.40	11.14	
Vanuatu	0.44	2.81	0.32		
Vietnam	0.67	4.43	0.52	12.06	49.68
West Bank and Gaza		3.55			
Zambia	0.42	2.54	0.34	8.13	30.54
Zimbabwe	0.50	2.92	0.33	8.02	25.78
TOTAL	**0.49**	**3.38**	**0.39**	**9.03**	**36.84**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 6. Composite digital government index scores (recent year), upper middle-income countries

Upper middle-income countries					
Country	UN E-Government Development Index 2020 (0-1 scale)	ITU Development Index 2017 (0-10 scale)	WB Digital Adoption Index 2016 (0-1 scale)	Cisco Digital Readiness Index 2019 (0-25 scale)	Network Readiness Index 2020 (1-100 scale)
Albania	0.74	5.14	0.61	12.02	44.21
Argentina	0.83	6.79	0.69	13.06	50.36
Armenia	0.71	5.76	0.62	12.76	51.91
Azerbaijan	0.71	6.20	0.59	12.77	48.76
Belarus	0.81	7.55	0.59	12.95	49.16
Bosnia and Herzegovina	0.64	5.39	0.60	12.13	41.73
Botswana	0.54	4.59	0.47	11.53	36.94
Brazil	0.77	6.12	0.68	12.31	50.58
Bulgaria	0.80	6.86	0.63	13.72	55.03
China	0.79	5.60	0.59	13.22	58.44
Colombia	0.72	5.36	0.64	12.44	46.81
Costa Rica	0.76	6.44	0.66	13.58	52.15
Cuba	0.44	2.91	0.24		
Dominica	0.60	5.69	0.50		
Dominican Republic	0.68	4.51	0.50	10.93	45.77
Ecuador	0.70	4.84	0.57	11.29	42.20
Equatorial Guinea	0.25	1.86	0.19		
Fiji	0.66	4.49	0.46		
Gabon	0.54	4.11	0.36	9.77	
Georgia	0.72	5.79	0.60	13.75	47.95
Grenada	0.58	5.80	0.53		
Guatemala	0.52	3.35	0.52	10.31	35.51
Guyana	0.49	3.44	0.36		
Iraq	0.44		0.30	7.84	
Jamaica	0.54	4.84	0.50	11.55	47.36
Jordan	0.53	6.00	0.55	12.14	47.50
Kazakhstan	0.84	6.79	0.67	13.49	51.38
Lebanon	0.50	6.30	0.57		41.30
Libya	0.37	4.11			
Malaysia	0.79	6.38	0.69	14.31	61.43
Maldives	0.57	5.25	0.51		
Marshall Islands	0.41		0.22		
Mauritius	0.72	5.88	0.62	13.61	49.83
Mexico	0.73	5.16	0.60	12.34	49.67
Moldova	0.69	6.45	0.60	11.65	47.09
Montenegro	0.70	6.44	0.62	13.31	50.95
Namibia	0.57	3.89	0.38	9.95	36.11
North Macedonia	0.71	6.01	0.57	12.78	48.28
Panama	0.67	4.91	0.57	12.74	44.74

Paraguay	0.65	4.18	0.54	11.00	41.12
Peru	0.71	4.85	0.55	11.93	43.67
Romania	0.76	6.48	0.64	13.34	54.16
Russian Federation	0.82	7.07	0.74	13.63	54.23
Serbia	0.75	6.61	0.69	13.13	52.96
South Africa	0.69	4.96	0.64	11.39	45.26
St. Lucia	0.54	4.63	0.40		
St. Vincent and the Grenadines	0.56	5.54	0.50		
Suriname	0.52	5.15	0.49		
Thailand	0.76	5.67	0.62	13.21	53.45
Tonga	0.56	4.34	0.33		
Turkey	0.77	6.08	0.63	12.88	51.24
Turkmenistan	0.40		0.27		
Tuvalu	0.42		0.29		
Venezuela, RB	0.53	5.17	0.49	9.52	34.57
TOTAL	**0.63**	**5.35**	**0.53**	**12.22**	**47.67**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 7. Composite digital government index scores (recent year), high-income countries

High-income countries					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Andorra	0.69	7.71	0.64		
Antigua and Barbuda	0.61	5.71	0.48		
Australia	0.94	8.24	0.71	17.89	75.09
Austria	0.89	8.02	0.86	17.25	72.92
Bahamas, The	0.70	6.51	0.53		
Bahrain	0.82	7.60	0.79		57.59
Barbados	0.73	7.31	0.65		
Belgium	0.80	7.81	0.78	16.22	70.67
Brunei Darussalam	0.74	6.75	0.63		
Canada	0.84	7.77	0.69	17.33	74.92
Chile	0.83	6.57	0.76	14.86	54.06
Croatia	0.77	7.24	0.65	14.01	55.94
Cyprus	0.87	7.77	0.68	15.37	60.67
Czech Republic	0.81	7.16	0.72	15.78	66.33
Denmark	0.98	8.71	0.79	18.98	82.19
Estonia	0.95	8.14	0.83	17.14	70.32
Finland	0.95	7.88	0.81	17.95	80.16
France	0.87	8.24	0.75	16.25	73.18
Germany	0.85	8.39	0.84	17.85	77.48
Greece	0.80	7.23	0.61	13.77	55.20
Hong Kong SAR, China		8.61			70.52

Hungary	0.77	6.93	0.69	14.13	60.05
Iceland	0.91	8.98	0.74	18.16	70.55
Ireland	0.84	8.02	0.66	17.01	72.13
Israel	0.84	7.88	0.79	16.67	69.81
Italy	0.82	7.04	0.77	14.84	63.69
Japan	0.90	8.43	0.83	17.69	73.54
Korea, Rep.	0.96	8.85	0.86	18.22	74.60
Kuwait	0.79	5.98	0.63	13.36	52.27
Latvia	0.78	7.26	0.73	15.00	60.47
Liechtenstein	0.84				
Lithuania	0.87	7.19	0.79	14.78	64.70
Luxembourg	0.83	8.47	0.86	19.54	75.27
Macao SAR, China		7.80			
Malta	0.85	7.86	0.86	15.54	66.73
Monaco	0.72	8.05			
Nauru	0.41				
Netherlands	0.92	8.49	0.84	18.66	81.37
New Zealand	0.93	8.33	0.71	17.75	73.27
Norway	0.91	8.47	0.80	17.98	79.39
Oman	0.77	6.43	0.65	13.53	55.33
Palau	0.51				
Poland	0.85	6.89	0.69	14.94	61.80
Portugal	0.83	7.13	0.79	14.96	64.40
Qatar	0.72	7.21	0.71	15.10	60.26
San Marino	0.62				
Saudi Arabia	0.80	6.67	0.67	13.40	57.97
Seychelles	0.69	5.03	0.60		
Singapore	0.92	8.05	0.87	20.26	81.39
Slovak Republic	0.78	7.06	0.69	14.44	60.78
Slovenia	0.85	7.38	0.71	15.51	66.58
Spain	0.88	7.79	0.77	15.74	67.31
St. Kitts and Nevis	0.64	7.24	0.53		
Sweden	0.94	8.41	0.83	18.42	82.75
Switzerland	0.89	8.74	0.82	18.86	80.41
Trinidad and Tobago	0.68	6.04	0.59	12.59	43.61
United Arab Emirates	0.86	7.21	0.82	16.42	64.42
United Kingdom	0.94	8.65	0.76	17.86	76.27
United States	0.93	8.18	0.75	19.03	78.91
Uruguay	0.85	7.16	0.76	13.88	54.87
TOTAL	0.82	7.58	0.73	16.33	67.92

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Annex 2. Comprehensive indices on digital government readiness by region

Table 8. Composite digital government index scores (recent year), East Asia and the Pacific

East Asia & Pacific					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Australia	0.94	8.24	0.71	17.89	75.09
Brunei Darussalam	0.74	6.75	0.63		
Cambodia	0.51	3.28	0.40	9.27	36.01
China	0.79	5.60	0.59	13.22	58.44
Fiji	0.66	4.49	0.46		
Hong Kong SAR, China		8.61			70.52
Indonesia	0.66	4.33	0.46	11.68	46.71
Japan	0.90	8.43	0.83	17.69	73.54
Kiribati	0.43	2.17	0.21		
Korea, Dem. People's Rep.	0.22				
Korea, Rep.	0.96	8.85	0.86	18.22	74.60
Lao PDR	0.33	2.91	0.26	8.58	37.12
Macao SAR, China		7.80			
Malaysia	0.79	6.38	0.69	14.31	61.43
Marshall Islands	0.41		0.22		
Micronesia, Fed. Sts.	0.38				
Mongolia	0.65	4.96	0.54	10.85	41.44
Myanmar	0.43	3.00	0.26	8.08	
Nauru	0.41				
New Zealand	0.93	8.33	0.71	17.75	73.27
Palau	0.51				
Papua New Guinea	0.28		0.34	5.54	
Philippines	0.69	4.67	0.49	11.03	45.95
Samoa	0.42	3.30	0.36		
Singapore	0.92	8.05	0.87	20.26	81.39
Solomon Islands	0.34	2.11	0.27		
Thailand	0.76	5.67	0.62	13.21	53.45
Timor-Leste	0.46	3.57	0.29	7.36	
Tonga	0.56	4.34	0.33		
Tuvalu	0.42		0.29		
Vanuatu	0.44	2.81	0.32		
Vietnam	0.67	4.43	0.52	12.06	49.68
TOTAL	**0.59**	**5.32**	**0.48**	**12.76**	**58.58**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 9. Composite digital government index scores (recent year), Europe and Central Asia high income

Europe & Central Asia (high income)					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Andorra	0.69	7.71	0.64		
Austria	0.89	8.02	0.86	17.25	72.92
Belgium	0.80	7.81	0.78	16.22	70.67
Croatia	0.77	7.24	0.65	14.01	55.94
Cyprus	0.87	7.77	0.68	15.37	60.67
Czech Republic	0.81	7.16	0.72	15.78	66.33
Denmark	0.98	8.71	0.79	18.98	82.19
Estonia	0.95	8.14	0.83	17.14	70.32
Finland	0.95	7.88	0.81	17.95	80.16
France	0.87	8.24	0.75	16.25	73.18
Germany	0.85	8.39	0.84	17.85	77.48
Greece	0.80	7.23	0.61	13.77	55.20
Hungary	0.77	6.93	0.69	14.13	60.05
Iceland	0.91	8.98	0.74	18.16	70.55
Ireland	0.84	8.02	0.66	17.01	72.13
Italy	0.82	7.04	0.77	14.84	63.69
Latvia	0.78	7.26	0.73	15.00	60.47
Liechtenstein	0.84				
Lithuania	0.87	7.19	0.79	14.78	64.70
Luxembourg	0.83	8.47	0.86	19.54	75.27
Monaco	0.72	8.05			
Netherlands	0.92	8.49	0.84	18.66	81.37
Norway	0.91	8.47	0.80	17.98	79.39
Poland	0.85	6.89	0.69	14.94	61.80
Portugal	0.83	7.13	0.79	14.96	64.40
San Marino	0.62				
Slovak Republic	0.78	7.06	0.69	14.44	60.78
Slovenia	0.85	7.38	0.71	15.51	66.58
Spain	0.88	7.79	0.77	15.74	67.31
Sweden	0.94	8.41	0.83	18.42	82.75
Switzerland	0.89	8.74	0.82	18.86	80.41
United Kingdom	0.94	8.65	0.76	17.86	76.27
TOTAL	**0.84**	**7.84**	**0.76**	**16.48**	**69.75**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 10. Composite digital government index scores (recent year), Europe and Central Asia developing countries

Europe & Central Asia (developing countries)					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Albania	0.74	5.14	0.61	12.02	44.21
Armenia	0.71	5.76	0.62	12.76	51.91
Azerbaijan	0.71	6.20	0.59	12.77	48.76
Belarus	0.81	7.55	0.59	12.95	49.16
Bosnia and Herzegovina	0.64	5.39	0.60	12.13	41.73
Bulgaria	0.80	6.86	0.63	13.72	55.03
Georgia	0.72	5.79	0.60	13.75	47.95
Kazakhstan	0.84	6.79	0.67	13.49	51.38
Kyrgyz Republic	0.67	4.37	0.50	11.00	38.60
Moldova	0.69	6.45	0.60	11.65	47.09
Montenegro	0.70	6.44	0.62	13.31	50.95
North Macedonia	0.71	6.01	0.57	12.78	48.28
Romania	0.76	6.48	0.64	13.34	54.16
Russian Federation	0.82	7.07	0.74	13.63	54.23
Serbia	0.75	6.61	0.69	13.13	52.96
Tajikistan	0.46		0.32	8.81	34.14
Turkey	0.77	6.08	0.63	12.88	51.24
Turkmenistan	0.40		0.27		
Ukraine	0.71	5.62	0.54	11.47	49.43
Uzbekistan	0.67	4.90	0.40	11.14	
TOTAL	**0.70**	**6.08**	**0.57**	**12.46**	**48.40**

Table 11. Composite digital government index scores (recent year), Latin American and the Caribbean

Latin America & Caribbean					
Country	UN E-Government Development Index 2020 (0-1 scale)	ITU Development Index 2017 (0-10 scale)	WB Digital Adoption Index 2016 (0-1 scale)	Cisco Digital Readiness Index 2019 (0-25 scale)	Network Readiness Index 2020 (1-100 scale)
Antigua and Barbuda	0.61	5.71	0.48		
Argentina	0.83	6.79	0.69	13.06	50.36
Bahamas, The	0.70	6.51	0.53		
Barbados	0.73	7.31	0.65		
Belize	0.45	3.71	0.40		
Bolivia	0.61	4.31	0.48	10.12	36.72
Brazil	0.77	6.12	0.68	12.31	50.58
Chile	0.83	6.57	0.76	14.86	54.06
Colombia	0.72	5.36	0.64	12.44	46.81
Costa Rica	0.76	6.44	0.66	13.58	52.15
Cuba	0.44	2.91	0.24		
Dominica	0.60	5.69	0.50		
Dominican Republic	0.68	4.51	0.50	10.93	45.77
Ecuador	0.70	4.84	0.57	11.29	42.20
El Salvador	0.57	3.82	0.50	10.76	37.33
Grenada	0.58	5.80	0.53		
Guatemala	0.52	3.35	0.52	10.31	35.51
Guyana	0.49	3.44	0.36		
Haiti	0.27	1.72	0.25	5.96	
Honduras	0.45	3.28	0.43	10.14	36.23
Jamaica	0.54	4.84	0.50	11.55	47.36
Mexico	0.73	5.16	0.60	12.34	49.67
Nicaragua	0.51	3.27	0.46	9.91	
Panama	0.67	4.91	0.57	12.74	44.74
Paraguay	0.65	4.18	0.54	11.00	41.12
Peru	0.71	4.85	0.55	11.93	43.67
St. Kitts and Nevis	0.64	7.24	0.53		
St. Lucia	0.54	4.63	0.40		
St. Vincent and the Grenadines	0.56	5.54	0.50		
Suriname	0.52	5.15	0.49		
Trinidad and Tobago	0.68	6.04	0.59	12.59	43.61
Uruguay	0.85	7.16	0.76	13.88	54.87
Venezuela, RB	0.53	5.17	0.49	9.52	34.57
TOTAL	**0.62**	**5.04**	**0.52**	**11.49**	**44.60**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 12. Composite digital government index scores (recent year), Middle East and North Africa

Middle East & North Africa					
Country	UN E-Government Development Index 2020 (0-1 scale)	ITU Development Index 2017 (0-10 scale)	WB Digital Adoption Index 2016 (0-1 scale)	Cisco Digital Readiness Index 2019 (0-25 scale)	Network Readiness Index 2020 (1-100 scale)
Algeria	0.52	4.67	0.43	9.99	35.15
Bahrain	0.82	7.60	0.79		57.59
Djibouti	0.27	1.98	0.30		
Egypt, Arab Rep.	0.55	4.63	0.53	10.24	42.56
Iran, Islamic Rep.	0.66	5.58	0.51	11.02	43.91
Iraq	0.44		0.30	7.84	
Israel	0.84	7.88	0.79	16.67	69.81
Jordan	0.53	6.00	0.55	12.14	47.50
Kuwait	0.79	5.98	0.63	13.36	52.27
Lebanon	0.50	6.30	0.57		41.30
Libya	0.37	4.11			
Malta	0.85	7.86	0.86	15.54	66.73
Morocco	0.57	4.77	0.56	10.87	39.71
Oman	0.77	6.43	0.65	13.53	55.33
Qatar	0.72	7.21	0.71	15.10	60.26
Saudi Arabia	0.80	6.67	0.67	13.40	57.97
Syrian Arab Republic	0.48	3.34	0.32		
Tunisia	0.65	4.82	0.56	10.87	41.30
United Arab Emirates	0.86	7.21	0.82	16.42	64.42
West Bank and Gaza		3.55			
Yemen, Rep.	0.30		0.26	5.78	18.00
TOTAL	**0.61**	**5.61**	**0.57**	**12.18**	**49.61**

Table 13. Composite digital government index scores (recent year), North America

North America					
Country	UN E-Government Development Index 2020 (0-1 scale)	ITU Development Index 2017 (0-10 scale)	WB Digital Adoption Index 2016 (0-1 scale)	Cisco Digital Readiness Index 2019 (0-25 scale)	Network Readiness Index 2020 (1-100 scale)
Canada	0.84	7.77	0.69	17.33	74.92
United States	0.93	8.18	0.75	19.03	78.91
TOTAL	**0.89**	**7.98**	**0.72**	**18.18**	**76.92**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 14. Composite digital government index scores (recent year), South Asia

South Asia					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Afghanistan	0.32	1.95	0.34	5.96	
Bangladesh	0.52	2.53	0.37	8.53	36.01
Bhutan	0.58	3.69	0.44		
India	0.60	3.03	0.51	9.46	41.57
Maldives	0.57	5.25	0.51		
Nepal	0.47	2.88	0.37	9.27	31.81
Pakistan	0.42	2.42	0.40	7.77	33.29
Sri Lanka	0.67	3.91	0.48	10.58	42.65
TOTAL	**0.52**	**3.21**	**0.43**	**8.60**	**37.07**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Table 15. Composite digital government index scores (recent year), sub-Saharan Africa

Sub-Saharan Africa					
Country	**UN E-Government Development Index 2020 (0-1 scale)**	**ITU Development Index 2017 (0-10 scale)**	**WB Digital Adoption Index 2016 (0-1 scale)**	**Cisco Digital Readiness Index 2019 (0-25 scale)**	**Network Readiness Index 2020 (1-100 scale)**
Angola	0.38	1.94	0.33	6.14	20.96
Benin	0.40	1.94	0.22	6.87	32.25
Botswana	0.54	4.59	0.47	11.53	36.94
Burkina Faso	0.36	1.90	0.24	6.26	25.79
Burundi	0.32	1.48	0.26		22.62
Cabo Verde	0.56	4.92	0.43		42.01
Cameroon	0.43	2.38	0.30	7.63	29.86
Central African Republic	0.14	1.04	0.15		
Chad	0.16	1.27	0.23	4.32	14.80
Comoros	0.28	1.82	0.25		
Congo, Dem. Rep.	0.26	1.55	0.21		16.60
Congo, Rep.	0.38		0.31	6.92	
Cote d'Ivoire	0.45	3.14		8.02	31.23
Equatorial Guinea	0.25	1.86	0.19		
Eritrea	0.13	0.96		4.91	
Eswatini	0.49		0.32		27.21
Ethiopia	0.27	1.65	0.27	6.48	23.49
Gabon	0.54	4.11	0.36	9.77	
Gambia, The	0.26	2.59	0.36		29.40

Ghana	0.60	4.05	0.45	9.55	36.97
Guinea	0.26	1.78	0.21	6.31	28.42
Guinea-Bissau	0.23	1.48	0.26		
Kenya	0.53	2.91	0.45	9.15	43.22
Lesotho	0.46	3.04	0.29	7.43	27.72
Liberia	0.26		0.24	5.03	
Madagascar	0.31	1.68	0.25	6.48	25.84
Malawi	0.35	1.74	0.26	7.03	25.23
Mali	0.31	2.16	0.29		27.00
Mauritania	0.28	2.26	0.34	6.41	
Mauritius	0.72	5.88	0.62	13.61	49.83
Mozambique	0.36	2.32	0.25	6.53	24.18
Namibia	0.57	3.89	0.38	9.95	36.11
Niger	0.17		0.16	5.31	
Nigeria	0.44	2.60	0.42	6.47	30.44
Rwanda	0.48	2.18	0.43	9.04	37.24
Sao Tome and Principe	0.41	3.09			
Senegal	0.42	2.66	0.35	8.11	36.90
Seychelles	0.69	5.03	0.60		
Sierra Leone	0.29		0.27	5.33	
Somalia	0.13				
South Africa	0.69	4.96	0.64	11.39	45.26
South Sudan	0.09				
Sudan	0.32	2.55	0.30		
Tanzania	0.42	1.81	0.34	7.98	33.92
Togo	0.43	2.15	0.25	7.78	
Uganda	0.45	2.19	0.34	7.29	31.40
Zambia	0.42	2.54	0.34	8.13	30.54
Zimbabwe	0.50	2.92	0.33	8.02	25.78
TOTAL	**0.38**	**2.61**	**0.32**	**7.61**	**30.62**

Source: UNDESA (2020), ITU (2017), World Bank (2016b), Cisco (2020), and Dutta and Lanvin (2020).

Annex 3. Components of digital government by income group

Table 16. Digital government components by country, low-income countries

Low-income countries						
Country	**Online Service Index 2020 (0-1 scale)**	**Human Capital Index 2020 (0-1 scale)**	**Telecommunication Infrastructure Index 2020 (0-1 scale)**	**E-Participation Index 2020 (0-1 scale)**	**Government Effectiveness Index 2019 (-2.5 – 2.5 scale)**	**Cybersecurity Index 2020 (0-100 scale)**
Afghanistan	0.41	0.37	0.18	0.46	-1.46	5
Burkina Faso	0.46	0.29	0.31	0.51	-0.76	40
Burundi	0.35	0.49	0.13	0.33	-1.33	2
Central African Republic	0.13	0.25	0.04	0.14	-1.75	3
Chad	0.20	0.18	0.09	0.26	-1.57	40
Korea, Dem. People's Rep.	0.02	0.64	0.01	0.04	-1.40	1
Congo, Dem. Rep.	0.13	0.53	0.11	0.20	-1.63	5
Eritrea	0.01	0.38	0.00	0.00	-1.76	2
Ethiopia	0.36	0.34	0.12	0.33	-0.63	28
Gambia, The	0.03	0.36	0.40	0.04	-0.63	32
Guinea	0.22	0.26	0.30	0.31	-0.78	21
Guinea-Bissau	0.06	0.43	0.20	0.08	-1.51	10
Liberia	0.25	0.39	0.14	0.24	-1.38	10
Madagascar	0.29	0.53	0.11	0.30	-1.14	23
Malawi	0.42	0.48	0.14	0.42	-0.75	37
Mali	0.35	0.23	0.35	0.32	-1.06	10
Mozambique	0.52	0.42	0.13	0.52	-0.82	24
Niger	0.29	0.13	0.07	0.30	-0.80	11
Rwanda	0.62	0.53	0.29	0.63	0.19	80
Sierra Leone	0.31	0.31	0.26	0.39	-1.13	25
Somalia	0.29	0.00	0.09	0.36	-2.24	17
South Sudan	0.00	0.20	0.07	0.02	-2.45	6
Sudan	0.31	0.36	0.28	0.21	-1.62	35
Syrian Arab Republic	0.54	0.51	0.38	0.51	-1.71	22
Togo	0.50	0.54	0.25	0.51	-0.92	33
Uganda	0.58	0.54	0.23	0.57	-0.59	70
Yemen, Rep.	0.32	0.41	0.18	0.31	-2.28	0
TOTAL	**0.30**	**0.37**	**0.18**	**0.31**	**-1.26**	**22**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 17. Digital government components by country, lower-middle-income countries

Lower-middle-income countries						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Algeria	0.28	0.70	0.58	0.15	-0.52	34
Angola	0.49	0.53	0.14	0.45	-1.12	13
Bangladesh	0.61	0.57	0.37	0.57	-0.74	81
Belize	0.26	0.69	0.41	0.30	-0.68	10
Benin	0.51	0.44	0.26	0.55	-0.44	80
Bhutan	0.68	0.51	0.54	0.63	0.31	18
Bolivia	0.58	0.74	0.52	0.60	-0.70	16
Cote d'Ivoire	0.45	0.38	0.50	0.40	-0.48	68
Cabo Verde	0.50	0.63	0.55	0.42	0.29	18
Cambodia	0.45	0.53	0.55	0.42	-0.58	19
Cameroon	0.47	0.60	0.23	0.42	-0.81	46
Comoros	0.12	0.47	0.25	0.12	-1.67	4
Congo, Rep.	0.32	0.58	0.24	0.27	-1.39	15
Djibouti	0.22	0.34	0.25	0.21	-0.71	2
Egypt, Arab Rep.	0.57	0.62	0.47	0.51	-0.42	95
El Salvador	0.58	0.62	0.51	0.68	-0.47	13
Eswatini	0.49	0.64	0.35	0.45	-0.68	18
Ghana	0.64	0.59	0.56	0.63	-0.21	87
Haiti	0.19	0.38	0.24	0.23	-2.02	6
Honduras	0.46	0.56	0.32	0.49	-0.61	2
India	0.85	0.58	0.35	0.86	0.17	98
Indonesia	0.68	0.73	0.57	0.75	0.18	95
Iran, Islamic Rep.	0.59	0.77	0.62	0.46	-0.55	81
Kenya	0.68	0.58	0.34	0.60	-0.38	82
Kiribati	0.49	0.68	0.12	0.56	-0.24	14
Kyrgyz Republic	0.65	0.79	0.59	0.71	-0.68	50
Lao PDR	0.19	0.55	0.24	0.21	-0.78	20
Lesotho	0.35	0.58	0.45	0.35	-0.83	9
Mauritania	0.10	0.36	0.39	0.10	-0.50	19
Micronesia, Fed. Sts.	0.35	0.67	0.11	0.33	-0.19	0
Mongolia	0.53	0.81	0.61	0.61	-0.19	26
Morocco	0.52	0.62	0.58	0.51	-0.12	82
Myanmar	0.26	0.51	0.52	0.26	-1.15	36
Nepal	0.40	0.54	0.47	0.37	-1.05	45

Nicaragua	0.55	0.61	0.38	0.52	-0.77	9
Nigeria	0.52	0.45	0.35	0.49	-1.09	85
Pakistan	0.63	0.38	0.24	0.52	-0.68	65
Papua New Guinea	0.22	0.50	0.12	0.21	-0.81	26
Philippines	0.73	0.75	0.58	0.75	0.05	77
Samoa	0.26	0.74	0.26	0.25	0.44	29
Sao Tome and Principe	0.25	0.67	0.30	0.20	-0.63	16
Senegal	0.49	0.33	0.44	0.44	-0.06	36
Solomon Islands	0.32	0.50	0.21	0.32	-1.00	7
Sri Lanka	0.72	0.77	0.53	0.71	-0.11	59
Tajikistan	0.32	0.73	0.35	0.35	-1.05	17
Timor-Leste	0.44	0.56	0.39	0.49	-0.88	4
Tunisia	0.62	0.70	0.64	0.69	-0.10	86
Ukraine	0.68	0.86	0.59	0.81	-0.30	66
Tanzania	0.55	0.47	0.24	0.56	-0.88	91
Uzbekistan	0.78	0.74	0.47	0.81	-0.51	71
Vanuatu	0.34	0.60	0.38	0.39	-0.55	13
Vietnam	0.65	0.68	0.67	0.70	0.04	95
Zambia	0.26	0.67	0.34	0.31	-0.68	69
Zimbabwe	0.52	0.61	0.37	0.45	-1.21	36
TOTAL	**0.47**	**0.60**	**0.40**	**0.47**	**-0.57**	**42**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 18. Digital government components by country, upper-middle-income countries

Upper-middle-income countries						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Albania	0.84	0.80	0.58	0.85	-0.06	64
Argentina	0.85	0.91	0.73	0.86	-0.09	50
Armenia	0.70	0.79	0.65	0.75	-0.07	50
Azerbaijan	0.71	0.77	0.65	0.69	-0.14	89
Belarus	0.71	0.89	0.83	0.75	-0.18	51
Bosnia and Herzegovina	0.54	0.75	0.63	0.61	-0.63	29
Botswana	0.36	0.69	0.56	0.37	0.43	53
Brazil	0.87	0.78	0.65	0.90	-0.19	97
Bulgaria	0.77	0.84	0.78	0.89	0.34	67
China	0.91	0.74	0.74	0.96	0.52	93
Colombia	0.76	0.77	0.61	0.87	0.07	64
Costa Rica	0.68	0.84	0.75	0.65	0.42	67
Cuba	0.26	0.82	0.25	0.36	-0.17	59
Dominica	0.45	0.67	0.69	0.36	-0.26	4
Dominican Republic	0.76	0.74	0.53	0.77	-0.36	75
Ecuador	0.81	0.78	0.51	0.80	-0.40	26
Equatorial Guinea	0.06	0.55	0.13	0.07	-1.34	1
Fiji	0.51	0.82	0.65	0.46	0.20	29
Gabon	0.32	0.67	0.63	0.27	-0.90	11
Georgia	0.59	0.87	0.69	0.64	0.83	81
Grenada	0.34	0.86	0.54	0.33	-0.14	9
Guatemala	0.51	0.55	0.48	0.50	-0.68	13
Guyana	0.46	0.65	0.36	0.45	-0.39	28
Iraq	0.34	0.44	0.54	0.31	-1.34	21
Jamaica	0.39	0.71	0.52	0.37	0.50	33
Jordan	0.36	0.68	0.55	0.33	0.10	71
Kazakhstan	0.92	0.89	0.70	0.88	0.12	93
Lebanon	0.42	0.66	0.41	0.33	-0.83	30
Libya	0.04	0.74	0.35	0.04	-1.92	29
Malaysia	0.85	0.75	0.76	0.86	1.00	98
Maldives	0.44	0.69	0.60	0.44	-0.19	3
Marshall Islands	0.34	0.75	0.12	0.43	-1.47	5
Mauritius	0.70	0.79	0.67	0.64	0.87	97
Mexico	0.82	0.77	0.59	0.82	-0.16	82
Montenegro	0.54	0.82	0.74	0.55	0.16	53

Namibia	0.52	0.66	0.54	0.50	0.10	11
North Macedonia	0.74	0.74	0.64	0.83	0.00	90
Panama	0.62	0.74	0.65	0.58	0.07	34
Paraguay	0.71	0.70	0.54	0.75	-0.53	57
Peru	0.75	0.79	0.58	0.76	-0.07	56
Moldova	0.75	0.74	0.57	0.76	-0.38	76
Romania	0.72	0.80	0.76	0.81	-0.28	76
Russian Federation	0.82	0.88	0.77	0.87	0.15	98
St. Lucia	0.38	0.72	0.53	0.39	0.23	11
St. Vincent & Grenadines	0.47	0.72	0.49	0.46	0.23	12
Serbia	0.79	0.83	0.62	0.82	0.02	90
South Africa	0.75	0.74	0.58	0.75	0.37	78
Suriname	0.29	0.71	0.55	0.25	-0.59	31
Thailand	0.79	0.78	0.70	0.77	0.36	87
Tonga	0.38	0.83	0.48	0.37	0.16	21
Turkey	0.86	0.83	0.63	0.89	0.05	97
Turkmenistan	0.18	0.68	0.36	0.20	-1.16	14
Tuvalu	0.30	0.68	0.28	0.36	-0.65	6
Venezuela, RB	0.32	0.78	0.48	0.24	-1.66	27
TOTAL	**0.58**	**0.75**	**0.57**	**0.58**	**-0.18**	**50**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 19. Digital government components by country, high-income countries

High-income countries						
Country	**Online Service Index 2020 (0-1 scale)**	**Human Capital Index 2020 (0-1 scale)**	**Telecommunication Infrastructure Index 2020 (0-1 scale)**	**E-Participation Index 2020 (0-1 scale)**	**Government Effectiveness Index 2019 (-2.5 – 2.5 scale)**	**Cybersecurity Index 2020 (0-100 scale)**
Andorra	0.48	0.74	0.84	0.51		26
Antigua and Barbuda	0.45	0.75	0.62	0.49	0.00	16
Australia	0.95	1.00	0.88	0.96	1.57	97
Austria	0.95	0.90	0.82	0.98	1.49	94
Bahamas, The	0.68	0.75	0.67	0.62	0.49	13
Bahrain	0.79	0.84	0.83	0.77	0.30	78
Barbados	0.58	0.85	0.75	0.60	0.63	17
Belgium	0.66	0.95	0.80	0.65	1.03	96
Brunei Darussalam	0.64	0.76	0.82	0.55	1.32	56
Canada	0.84	0.90	0.78	0.94	1.73	98
Chile	0.85	0.86	0.76	0.86	1.06	69
Croatia	0.75	0.84	0.73	0.89	0.41	93

Cyprus	0.87	0.84	0.91	0.95	0.99	89
Czech Republic	0.72	0.90	0.81	0.73	0.89	74
Denmark	0.97	0.96	1.00	0.96	1.94	93
Estonia	0.99	0.93	0.92	1.00	1.17	99
Finland	0.97	0.95	0.91	0.95	1.93	96
France	0.88	0.86	0.87	0.90	1.38	98
Germany	0.74	0.94	0.89	0.75	1.59	97
Greece	0.71	0.89	0.81	0.79	0.41	94
Hungary	0.75	0.85	0.73	0.68	0.50	91
Iceland	0.79	0.95	0.98	0.77	1.52	80
Ireland	0.77	0.95	0.81	0.86	1.28	86
Israel	0.75	0.89	0.87	0.71	1.33	91
Italy	0.83	0.85	0.79	0.82	0.46	96
Japan	0.91	0.87	0.92	0.99	1.59	98
Kuwait	0.84	0.75	0.79	0.90	0.02	75
Latvia	0.58	0.92	0.84	0.58	1.11	97
Liechtenstein	0.66	0.85	1.00	0.61	1.70	35
Lithuania	0.85	0.92	0.82	0.74	1.04	98
Luxembourg	0.76	0.81	0.91	0.70	1.73	97
Malta	0.81	0.83	0.92	0.83	0.86	84
Monaco	0.47	0.82	0.86	0.37		73
Nauru	0.17	0.60	0.47	0.20	-0.13	21
Netherlands	0.91	0.93	0.93	0.96	1.80	97
New Zealand	0.93	0.95	0.92	0.99	1.67	84
Norway	0.88	0.94	0.90	0.90	1.86	97
Oman	0.85	0.78	0.70	0.83	0.26	96
Palau	0.28	0.88	0.37	0.32	-0.05	
Poland	0.86	0.90	0.80	0.96	0.60	94
Portugal	0.84	0.85	0.79	0.82	1.15	97
Qatar	0.66	0.67	0.82	0.65	0.71	95
Korea, Rep.	1.00	0.90	0.97	1.00	1.38	99
St. Kitts and Nevis	0.39	0.80	0.71	0.33	0.54	12
San Marino	0.28	0.75	0.82	0.31		14
Saudi Arabia	0.69	0.86	0.84	0.71	0.31	100
Seychelles	0.62	0.77	0.69	0.57	0.52	13
Singapore	0.96	0.89	0.89	0.98	2.22	99
Slovak Republic	0.72	0.83	0.80	0.70	0.67	92
Slovenia	0.85	0.93	0.79	0.86	1.08	75
Spain	0.89	0.90	0.85	0.85	1.00	99
Sweden	0.90	0.95	0.96	0.82	1.83	95
Switzerland	0.83	0.89	0.95	0.90	1.95	87
Trinidad and Tobago	0.61	0.74	0.68	0.62	0.10	22

United Arab Emirates	0.90	0.73	0.93	0.94	1.38	98
United Kingdom	0.96	0.93	0.92	0.98	1.44	100
United States	0.95	0.92	0.92	1.00	1.49	100
Uruguay	0.84	0.85	0.86	0.86	0.70	75
TOTAL	**0.76**	**0.86**	**0.83**	**0.77**	**1.05**	**78**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Annex 4. Components of digital government by region

Table 20. Digital government components by country, East Asia & Pacific

East Asia & Pacific						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Tele-communication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Australia	0.95	1.00	0.88	0.96	1.57	97
Brunei Darussalam	0.64	0.76	0.82	0.55	1.32	56
Cambodia	0.45	0.53	0.55	0.42	-0.58	19
China	0.91	0.74	0.74	0.96	0.52	93
Korea, Dem. People's Rep.	0.02	0.64	0.01	0.04	-1.40	1
Fiji	0.51	0.82	0.65	0.46	0.20	29
Indonesia	0.68	0.73	0.57	0.75	0.18	95
Japan	0.91	0.87	0.92	0.99	1.59	98
Kiribati	0.49	0.68	0.12	0.56	-0.24	14
Lao PDR	0.19	0.55	0.24	0.21	-0.78	20
Malaysia	0.85	0.75	0.76	0.86	1.00	98
Marshall Islands	0.34	0.75	0.12	0.43	-1.47	5
Micronesia, Fed. Sts.	0.35	0.67	0.11	0.33	-0.19	0
Mongolia	0.53	0.81	0.61	0.61	-0.19	26
Myanmar	0.26	0.51	0.52	0.26	-1.15	36
Nauru	0.17	0.60	0.47	0.20	-0.13	21
New Zealand	0.93	0.95	0.92	0.99	1.67	84
Palau	0.28	0.88	0.37	0.32	-0.05	
Papua New Guinea	0.22	0.50	0.12	0.21	-0.81	26
Philippines	0.73	0.75	0.58	0.75	0.05	77
Korea, Rep.	1.00	0.90	0.97	1.00	1.38	99
Samoa	0.26	0.74	0.26	0.25	0.44	29
Singapore	0.96	0.89	0.89	0.98	2.22	99
Solomon Islands	0.32	0.50	0.21	0.32	-1.00	7
Thailand	0.79	0.78	0.70	0.77	0.36	87
Timor-Leste	0.44	0.56	0.39	0.49	-0.88	4
Tonga	0.38	0.83	0.48	0.37	0.16	21
Tuvalu	0.30	0.68	0.28	0.36	-0.65	6
Vanuatu	0.34	0.60	0.38	0.39	-0.55	13
Vietnam	0.65	0.68	0.67	0.70	0.04	95
TOTAL	**0.53**	**0.72**	**0.51**	**0.55**	**0.09**	**47**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 21. Digital government components by country, Europe & Central Asia (high-income)

Europe & Central Asia (high-income countries)						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Andorra	0.48	0.74	0.84	0.51		26
Austria	0.95	0.90	0.82	0.98	1.49	94
Belgium	0.66	0.95	0.80	0.65	1.03	96
Croatia	0.75	0.84	0.73	0.89	0.41	93
Cyprus	0.87	0.84	0.91	0.95	0.99	89
Czech Republic	0.72	0.90	0.81	0.73	0.89	74
Denmark	0.97	0.96	1.00	0.96	1.94	93
Estonia	0.99	0.93	0.92	1.00	1.17	99
Finland	0.97	0.95	0.91	0.95	1.93	96
France	0.88	0.86	0.87	0.90	1.38	98
Germany	0.74	0.94	0.89	0.75	1.59	97
Greece	0.71	0.89	0.81	0.79	0.41	94
Hungary	0.75	0.85	0.73	0.68	0.50	91
Iceland	0.79	0.95	0.98	0.77	1.52	80
Ireland	0.77	0.95	0.81	0.86	1.28	86
Italy	0.83	0.85	0.79	0.82	0.46	96
Latvia	0.58	0.92	0.84	0.58	1.11	97
Liechtenstein	0.66	0.85	1.00	0.61	1.70	35
Lithuania	0.85	0.92	0.82	0.74	1.04	98
Luxembourg	0.76	0.81	0.91	0.70	1.73	97
Monaco	0.47	0.82	0.86	0.37		73
Netherlands	0.91	0.93	0.93	0.96	1.80	97
Norway	0.88	0.94	0.90	0.90	1.86	97
Poland	0.86	0.90	0.80	0.96	0.60	94
Portugal	0.84	0.85	0.79	0.82	1.15	97
San Marino	0.28	0.75	0.82	0.31		14
Slovak Republic	0.72	0.83	0.80	0.70	0.67	92
Slovenia	0.85	0.93	0.79	0.86	1.08	75
Spain	0.89	0.90	0.85	0.85	1.00	99
Sweden	0.90	0.95	0.96	0.82	1.83	95
Switzerland	0.83	0.89	0.95	0.90	1.95	87
U.K.	0.96	0.93	0.92	0.98	1.44	100
TOTAL	**0.78**	**0.89**	**0.86**	**0.79**	**1.24**	**86**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 22. Digital government components by country, Europe & Central Asia (developing countries)

Europe & Central Asia (developing countries)						
Country	**Online Service Index 2020 (0-1 scale)**	**Human Capital Index 2020 (0-1 scale)**	**Telecommunication Infrastructure Index 2020 (0-1 scale)**	**E-Participation Index 2020 (0-1 scale)**	**Government Effectiveness Index 2019 (-2.5 – 2.5 scale)**	**Cybersecurity Index 2020 (0-100 scale)**
Albania	0.84	0.80	0.58	0.85	-0.06	64
Armenia	0.70	0.79	0.65	0.75	-0.07	50
Azerbaijan	0.71	0.77	0.65	0.69	-0.14	89
Belarus	0.71	0.89	0.83	0.75	-0.18	51
Bosnia & Herzegovina	0.54	0.75	0.63	0.61	-0.63	29
Bulgaria	0.77	0.84	0.78	0.89	0.34	67
Georgia	0.59	0.87	0.69	0.64	0.83	81
Kazakhstan	0.92	0.89	0.70	0.88	0.12	93
Kyrgyz Republic	0.65	0.79	0.59	0.71	-0.68	50
Montenegro	0.54	0.82	0.74	0.55	0.16	53
North Macedonia	0.74	0.74	0.64	0.83	0.00	90
Moldova	0.75	0.74	0.57	0.76	-0.38	76
Romania	0.72	0.80	0.76	0.81	-0.28	76
Russian Federation	0.82	0.88	0.77	0.87	0.15	98
Serbia	0.79	0.83	0.62	0.82	0.02	90
Tajikistan	0.32	0.73	0.35	0.35	-1.05	17
Turkey	0.86	0.83	0.63	0.89	0.05	97
Turkmenistan	0.18	0.68	0.36	0.20	-1.16	14
Ukraine	0.68	0.86	0.59	0.81	-0.30	66
Uzbekistan	0.78	0.74	0.47	0.81	-0.51	71
TOTAL	**0.68**	**0.80**	**0.63**	**0.72**	**-0.19**	**66**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 23. Digital government components by country, Latin America & Caribbean

Latin America & Caribbean						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Antigua and Barbuda	0.45	0.75	0.62	0.49	0.00	16
Argentina	0.85	0.91	0.73	0.86	-0.09	50
Bahamas, The	0.68	0.75	0.67	0.62	0.49	13
Barbados	0.58	0.85	0.75	0.60	0.63	17
Belize	0.26	0.69	0.41	0.30	-0.68	10
Bolivia	0.58	0.74	0.52	0.60	-0.70	16
Brazil	0.87	0.78	0.65	0.90	-0.19	97
Chile	0.85	0.86	0.76	0.86	1.06	69
Colombia	0.76	0.77	0.61	0.87	0.07	64
Costa Rica	0.68	0.84	0.75	0.65	0.42	67
Cuba	0.26	0.82	0.25	0.36	-0.17	59
Dominica	0.45	0.67	0.69	0.36	-0.26	4
Dominican Republic	0.76	0.74	0.53	0.77	-0.36	75
Ecuador	0.81	0.78	0.51	0.80	-0.40	26
El Salvador	0.58	0.62	0.51	0.68	-0.47	13
Grenada	0.34	0.86	0.54	0.33	-0.14	9
Guatemala	0.51	0.55	0.48	0.50	-0.68	13
Guyana	0.46	0.65	0.36	0.45	-0.39	28
Haiti	0.19	0.38	0.24	0.23	-2.02	6
Honduras	0.46	0.56	0.32	0.49	-0.61	2
Jamaica	0.39	0.71	0.52	0.37	0.50	33
Mexico	0.82	0.77	0.59	0.82	-0.16	82
Nicaragua	0.55	0.61	0.38	0.52	-0.77	9
Panama	0.62	0.74	0.65	0.58	0.07	34
Paraguay	0.71	0.70	0.54	0.75	-0.53	57
Peru	0.75	0.79	0.58	0.76	-0.07	56
St. Kitts and Nevis	0.39	0.80	0.71	0.33	0.54	12
St. Lucia	0.38	0.72	0.53	0.39	0.23	11
St. Vincent & Grenadines	0.47	0.72	0.49	0.46	0.23	12
Suriname	0.29	0.71	0.55	0.25	-0.59	31
Trinidad and Tobago	0.61	0.74	0.68	0.62	0.10	22
Uruguay	0.84	0.85	0.86	0.86	0.70	75
Venezuela, RB	0.32	0.78	0.48	0.24	-1.66	27
TOTAL	**0.56**	**0.74**	**0.56**	**0.57**	**-0.18**	**34**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 24. Digital government components by country, Middle East & North Africa

Middle East & North Africa						
Country	**Online Service Index 2020 (0-1 scale)**	**Human Capital Index 2020 (0-1 scale)**	**Telecommunication Infrastructure Index 2020 (0-1 scale)**	**E-Participation Index 2020 (0-1 scale)**	**Government Effectiveness Index 2019 (-2.5 – 2.5 scale)**	**Cybersecurity Index 2020 (0-100 scale)**
Algeria	0.28	0.70	0.58	0.15	-0.52	34
Bahrain	0.79	0.84	0.83	0.77	0.30	78
Djibouti	0.22	0.34	0.25	0.21	-0.71	2
Egypt, Arab Rep.	0.57	0.62	0.47	0.51	-0.42	95
Iran, Islamic Rep.	0.59	0.77	0.62	0.46	-0.55	81
Iraq	0.34	0.44	0.54	0.31	-1.34	21
Israel	0.75	0.89	0.87	0.71	1.33	91
Jordan	0.36	0.68	0.55	0.33	0.10	71
Kuwait	0.84	0.75	0.79	0.90	0.02	75
Lebanon	0.42	0.66	0.41	0.33	-0.83	30
Libya	0.04	0.74	0.35	0.04	-1.92	29
Malta	0.81	0.83	0.92	0.83	0.86	84
Morocco	0.52	0.62	0.58	0.51	-0.12	82
Oman	0.85	0.78	0.70	0.83	0.26	96
Qatar	0.66	0.67	0.82	0.65	0.71	95
Saudi Arabia	0.69	0.86	0.84	0.71	0.31	100
Syrian Arab Republic	0.54	0.51	0.38	0.51	-1.71	22
Tunisia	0.62	0.70	0.64	0.69	-0.10	86
United Arab Emirates	0.90	0.73	0.93	0.94	1.38	98
Yemen, Rep.	0.32	0.41	0.18	0.31	-2.28	0
TOTAL	**0.56**	**0.68**	**0.61**	**0.54**	**-0.26**	**63**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 25. Digital government components by country, North America

North America						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Canada	0.84	0.90	0.78	0.94	1.73	98
United States	0.95	0.92	0.92	1.00	1.49	100
TOTAL	**0.89**	**0.91**	**0.85**	**0.97**	**1.61**	**99**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 26. Digital government components by country, South Asia

South Asia						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Afghanistan	0.41	0.37	0.18	0.46	-1.46	5
Bangladesh	0.61	0.57	0.37	0.57	-0.74	81
Bhutan	0.68	0.51	0.54	0.63	0.31	18
India	0.85	0.58	0.35	0.86	0.17	98
Maldives	0.44	0.69	0.60	0.44	-0.19	3
Nepal	0.40	0.54	0.47	0.37	-1.05	45
Pakistan	0.63	0.38	0.24	0.52	-0.68	65
Sri Lanka	0.72	0.77	0.53	0.71	-0.11	59
TOTAL	**0.59**	**0.55**	**0.41**	**0.57**	**-0.47**	**47**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

Table 27. Digital government components by country, sub-Saharan Africa

Sub-Saharan Africa						
Country	Online Service Index 2020 (0-1 scale)	Human Capital Index 2020 (0-1 scale)	Telecommunication Infrastructure Index 2020 (0-1 scale)	E-Participation Index 2020 (0-1 scale)	Government Effectiveness Index 2019 (-2.5 – 2.5 scale)	Cybersecurity Index 2020 (0-100 scale)
Angola	0.49	0.53	0.14	0.45	-1.12	13
Benin	0.51	0.44	0.26	0.55	-0.44	80
Botswana	0.36	0.69	0.56	0.37	0.43	53
Burkina Faso	0.46	0.29	0.31	0.51	-0.76	40
Burundi	0.35	0.49	0.13	0.33	-1.33	2
Cote d'Ivoire	0.45	0.38	0.50	0.40	-0.48	68
Cabo Verde	0.50	0.63	0.55	0.42	0.29	18
Cameroon	0.47	0.60	0.23	0.42	-0.81	46
Central African Republic	0.13	0.25	0.04	0.14	-1.75	3
Chad	0.20	0.18	0.09	0.26	-1.57	40
Comoros	0.12	0.47	0.25	0.12	-1.67	4
Congo, Rep.	0.32	0.58	0.24	0.27	-1.39	15
Congo, Dem. Rep.	0.13	0.53	0.11	0.20	-1.63	5
Equatorial Guinea	0.06	0.55	0.13	0.07	-1.34	1
Eritrea	0.01	0.38	0.00	0.00	-1.76	2
Eswatini	0.49	0.64	0.35	0.45	-0.68	18
Ethiopia	0.36	0.34	0.12	0.33	-0.63	28
Gabon	0.32	0.67	0.63	0.27	-0.90	11
Gambia, The	0.03	0.36	0.40	0.04	-0.63	32
Ghana	0.64	0.59	0.56	0.63	-0.21	87
Guinea	0.22	0.26	0.30	0.31	-0.78	21
Guinea-Bissau	0.06	0.43	0.20	0.08	-1.51	10
Kenya	0.68	0.58	0.34	0.60	-0.38	82
Lesotho	0.35	0.58	0.45	0.35	-0.83	9
Liberia	0.25	0.39	0.14	0.24	-1.38	10
Madagascar	0.29	0.53	0.11	0.30	-1.14	23
Malawi	0.42	0.48	0.14	0.42	-0.75	37
Mali	0.35	0.23	0.35	0.32	-1.06	10
Mauritania	0.10	0.36	0.39	0.10	-0.50	19
Mauritius	0.70	0.79	0.67	0.64	0.87	97
Mozambique	0.52	0.42	0.13	0.52	-0.82	24
Namibia	0.52	0.66	0.54	0.50	0.10	11
Niger	0.29	0.13	0.07	0.30	-0.80	11
Nigeria	0.52	0.45	0.35	0.49	-1.09	85
Rwanda	0.62	0.53	0.29	0.63	0.19	80

Sao Tome and Principe	0.25	0.67	0.30	0.20	-0.63	16
Senegal	0.49	0.33	0.44	0.44	-0.06	36
Seychelles	0.62	0.77	0.69	0.57	0.52	13
Sierra Leone	0.31	0.31	0.26	0.39	-1.13	25
Somalia	0.29	0.00	0.09	0.36	-2.24	17
South Africa	0.75	0.74	0.58	0.75	0.37	78
South Sudan	0.00	0.20	0.07	0.02	-2.45	6
Sudan	0.31	0.36	0.28	0.21	-1.62	35
Togo	0.50	0.54	0.25	0.51	-0.92	33
Uganda	0.58	0.54	0.23	0.57	-0.59	70
Tanzania	0.55	0.47	0.24	0.56	-0.88	91
Zambia	0.26	0.67	0.34	0.31	-0.68	69
Zimbabwe	0.52	0.61	0.37	0.45	-1.21	36
AVERAGE	**0.37**	**0.47**	**0.30**	**0.36**	**-0.83**	**34**

Source: UNDESA (2020), ITU (2021), Kaufmann and Kraay (2020).

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