Department of Economic and Social Affairs

# UNITED NATIONS E-GOVERNMENT SURVEY 2016

E-GOVERNMENT IN SUPPORT OF SUSTAINABLE DEVELOPMENT

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## United Nations Department of Economic and Social Affairs

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2016 E-Government for Sustainable Development

2014 E-Government for the Future We Want

2012 E-Government for the People

2010 Leveraging E-Government at a Time of Financial and Economic Crisis

2008 From E-Government to Connected Governance

2005 From E-Government to E-Inclusion

2004 Towards Access for Opportunity

2003 World Public Sector Report: E-Government at the Crossroads

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# Foreword

The year 2015 marked a milestone in efforts to eradicate poverty and promote prosperity for all people on a safe planet. With the adoption of the 2030 Agenda for Sustainable Development and other major international commitments, we embarked in an unprecedented endeavour to transform our world. The 2030 Agenda is centred on a set of far-reaching and people-centred universal Sustainable Development Goals (SDGs). Reaching these goals in all countries and creating peaceful, just and inclusive societies will be extremely difficult in the absence of effective, accountable and inclusive institutions. Institutions need to be capable and equipped to adapt the Agenda to the national situation. They need to be able to mobilize the society and the private sector in implementing the SDGs. Capacities and innovation will be required to promote policy integration, enhance public accountability, promote participation for more inclusive societies as well as ensure equitable and effective public services for all, particularly for the poorest and most vulnerable groups. ICT and e-government are important tools to realize these objectives.

Against this backdrop, the *2016 United Nations E-Government Survey* highlights a positive global trend towards higher levels of e-government development. Countries in all regions are increasingly embracing innovation and utilizing ICTs to deliver services and engage people in decision-making processes. One of the most important new trends is the advancement of people-driven services. It addresses the growing demand for more personalized services that reflect individual needs, as well as people's aspiration to be more closely engaged in the design and delivery of services. These new demands are transforming the way the public sector operates.

At the same time, disparities remain within and among countries. Lack of access to technology, poverty and inequality prevent people from fully taking advantage of the potential of ICTs and e-government for sustainable development. For ICTs to truly transform the public sector into an instrument of sustainable development, efficiency in service delivery must be also coupled with social equity and ensuring that all people can access quality services. Such efforts are vital to making sure that the sustainable development goals are at the centre of all government policies and of public management and that no one is left behind.

WU Hongbo
Under-Secretary-General for Economic and Social Affairs
United Nations Department of Economic and Social Affairs

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# Acronyms

| | |
|---|---|
| AAAA | Addis Ababa Action Agenda |
| AfDB | African Development Bank |
| App | Software Applications |
| CARICOM | Caribbean Community and Common Market |
| CDO | Chief Data Officer |
| CIO | Chief Information Officer |
| CPI | Corruption Perception Index |
| DESA | Department of Economic and Social Affairs |
| DPADM | Division for Public Administration and Development Management |
| EEA | European Environmental Agency |
| EGDI | E-Government Development Index |
| EIA | Environmental Impact Assessment |
| EPI | E-Participation Index |
| FOI | Freedom of Information |
| FOIAs | Freedom of Information Acts |
| G2G | Government-to-Government |
| GCC | Gulf Cooperation Council |
| GFW | Global Forest Watch |
| GIS | Geographic Information Systems |
| GNI | Gross National Income |
| GODAN | The Global Open Data for Agriculture and Nutrition |
| GPS | Global Positioning System |
| HCI | Human Capital Index |
| HTML | Hyper Text Markup Language |
| ICT | Information and Communication Technology |
| IDRC | International Development Research Centre |
| ILO | International Labour Organization |
| INTOSAI | International Organization of Supreme Audit Institutions |
| IoT | Internet of Things |
| ITU | International Telecommunication Union |
| LDC | Least Developed Country |
| MAMA | Mobile Alliance for Maternal Action |
| MDGs | Millennium Development Goals |
| MENA | Middle East and North America |
| METEP | Measurement and Evaluation Tool for Engagement and e-Participation |
| MFI | Microfinance Institutions |
| MYS | Mean Years of Schooling |
| NEPAD | New Partnership For Africa's Development |
| NGO | Non-Governmental Organization |
| OECD | Organization for Economic Cooperation and Development |
| OGD | Open Government Data |
| OSI | Online Service Index |
| OSM | Open Street Map |
| PPPP | Public-Private-People Partnerships |

| | |
|---|---|
| PPP | Public Private Partnerships |
| RSS | Really Simple Syndication |
| SDGs | Sustainable Development Goals |
| SIDS | Small Island Developing States |
| SME | Small and Medium Enterprise |
| SMS | Short Message Service |
| TGEG | Task Group on E-government |
| TII | Telecommunication Infrastructure Index |
| UGC | User-Generated Content |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDG | United Nations Development Group |
| UNDP | United Nations Development Programme |
| UNECA | United Nations Economic Commission for Africa |
| UNECE | United Nations Economic Commission for Europe |
| UNECLAC | United Nations Economic Commission for Latin America and the Caribbean |
| UNEP | United Nations Environment Programme |
| UNESCAP | United Nations Economic and Social Commission for Asia and the Pacific |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNESCWA | United Nations Economic and Social Commission for Western Asia |
| UN-OHRLLS | United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States |
| UNPOG | United Nations Project Office on Governance |
| UNSC | United Nations Statistical Commission |
| UNU-IAS | United Nations University Institute for the Advanced Study of Sustainability |
| URL | Uniform Resource Locator |
| W3C | World Wide Web Consortium |
| WOG | Whole of Government |
| WRI | World Resources Institute |
| WSIS | World Summit on the Information Society |

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# About the *Survey*

## Background

The *2016 United Nations E-Government Survey* (hereinafter referred to as "the *Survey*") is issued at the moment when countries are launching the implementation of the 2030 Agenda for Sustainable Development. It provides new evidence and new analysis to reflect on the potential of e-government to support the implementation of the Agenda and the 17 Sustainable Development Goals (SDGs) that are at its core. The 2030 Agenda itself recognized that "the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies, as does scientific and technological innovation across areas as diverse as medicine and energy" (United Nations, 2015, paragraph 15).

The General Assembly has recognized on several occasions the role of information and communications technology in promoting sustainable development and supporting public policies and service delivery.[1] It has underscored that ICT have enabled breakthroughs "in Government and the provision of public services, education, healthcare and employment, as well as in business, agriculture and science, with greater numbers of people having access to services and data that might previously been out of reach or unaffordable" (United Nations, 2015c, para 16). The General Assembly has also specifically affirmed the "potential of e-government in promoting transparency, accountability, efficiency and citizen engagement in public service delivery" (United Nations 2015b). Resolutions adopted earlier by the General Assembly also provided the basis for the *Survey*.

## Scope and purpose

Since 2001, the United Nations Department of Economic and Social Affairs (UNDESA) has published the *United Nations E-Government Survey*. Now in its ninth edition, the *Survey* provides an analysis of progress in using e-government and how it can support the realization of the internationally agreed development goals and help address emerging public administration issues.

The *Survey* measures e-government effectiveness in the delivery of basic economic and social services to people in five sectors, namely education, health, labour and employment, finance and social welfare (UNDESA, 2005). The environment dimension was added to the *Survey* assessment in 2012, and has been retained since then. The *Survey* identifies patterns in e-government development and performance as well as countries and areas where the potential of ICT and e-government has not yet been fully exploited and where capacity development support might be helpful.

The *Survey* is also the only global report that assesses the e-government development status of all Member States of the United Nations. The assessment rates the e-government performance of countries relative to one another, as opposed to being an absolute measurement. It recognizes that each country should decide upon the level and extent of its e-government initiatives in keeping with its own development priorities (UNDESA, 2005).

The *Survey* serves as a tool for countries to learn from each other, identify areas of strength and challenges in e-government and shape their policies and strategies in this area. It is also aimed at facilitating and informing discussions of intergovernmental bodies, including the United Nations General Assembly and the Economic and Social Council, on issues related to

[1] General Assembly Resolution 69/204 of 21 January 2015 stresses "the important role of governments in the effective use of information and communications technologies in their design of public policies and in the provision of public services responsive to national needs and priorities, including on the basis of a multi-stakeholder approach, to support national development efforts" (United Nations 2015a, para.7)

e-government and development and to the critical role of ICT in development.

This publication is intended for policy makers, government officials, academia, civil society, private sector and other practitioners or experts in the areas of public administration, e-government, and ICT for development.

## Structure and methodology

The *Survey* is composed of an analytical part, presented in chapters 1 to 5 and of data on e-government development contained in the annexes of the publication, providing a snapshot of relative rankings of e-government development of all Member States of the United Nations. Every edition of the *Survey* focuses on a specific theme that is of particular interest to the United Nations Member States and the international community at large.

The methodology for the analytical part of the *Survey* is based on a literature review and an analysis of the *Survey*'s data. Innovative practices are also collected to illustrate how ICTs are being used to transform public administration in support of sustainable development. In addition, during the preparatory process of the publication, expert group meetings are organized to solicit views and inputs from world-renowned scholars and practitioners.

The methodological framework for the collection and assessment of the *Survey*'s data on e-government development is based on a holistic view of e-government that incorporates three important dimensions that allow people to benefit from online services and information. These are: the adequacy of telecommunication infrastructure, the ability of human resources to promote and use ICT, and the availability of online services and content. The *Survey* tracks progress of e-government development via the E-Government Development Index (EGDI). The EGDI, which assesses e-government development at the national level, is a composite index based on the weighted average of three normalized indices. One third is derived from a Telecommunications Infrastructure Index (TII) based on data provided by the International Telecommunications Union (ITU), one third from a Human Capital[2] Index (HCI) based on data provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO), and one third from the Online Service Index (OSI) based on data collected from an independent survey questionnaire that assesses the national online presence of all 193 United Nations Member States. The survey questionnaire assesses a number of features related to online service delivery, including whole-of-government approaches, open government data, e-participation, multi-channel service delivery, mobile services, usage up-take, digital divide as well as innovative partnerships through the use of ICT. This data is collected by a group of researchers under the supervision of UNDESA through a primary research and collection endeavour.

As a composite indicator, the EGDI is used to measure the readiness and capacity of national administrations to use ICT to deliver public services. This measure is useful for government officials, policymakers, researchers and representatives of civil society and the private sector to gain a deeper understanding of the relative position of a country in utilizing e-government for the delivery of public services. The EGDI is based on an expert assessment survey of the online presence of all United Nations Member States, which assesses national websites and how e-government policies and strategies are applied in general and in specific sectors for delivery of essential services. National online portals, which include information, service or data portals, or a combination of the three, are assessed; as are sectoral sites and portals such as the websites of ministries or departments of health, education, social development, welfare, labour, finance and environment. The results are tabulated and combined with a set of indicators gauging a country's capacity to participate in the information society, without

[2] See the Methodology chapter for a definition of Human Capital

which e-government development efforts are of limited immediate use.

The methodological framework has remained consistent across *Survey* periods while its components have been updated to reflect new trends in e-government as well as new indicators for telecommunications and human capital. The 2004 and 2005 editions of the *Survey* captured the state of a country's readiness for e-government. However, in 2008, as 'readiness' was not deemed to adequately reflect the need for concrete implementation on the ground, the publication changed its focus from assessing readiness to assessing actual development. In 2014, 'e-government maturity' was viewed as obsolete since e-government goals and targets are constantly evolving to deliver and surpass what the public expects (UNDESA, 2014).

The 2016 *Survey*'s data is presented at the end of the publication. This includes data relative to the EGDI by country (in alphabetical order), by region and by countries in special situations, i.e. Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs), Least Developed Countries (LDCs). The publication then presents information about the Online Service Index and its components; the Telecommunication Infrastructure Index and its components; and the Human Capital Index and its components. Information about the E-Participation Index (EPI) is also contained in the data tables. Further comprehensive information about the methodology of the 2016 *Survey* is available in the Annexes.

## Preparatory process of the 2016 *Survey*

The preparatory process of the 2016 *Survey* has included a number of activities. For the first time in 2015, DESA organized, in collaboration with national governments, eight regional consultative meetings on "E Government for Sustainable Development" in an effort to allow for a more inclusive, open and participatory approach in the design of the 2016 *Survey*. The consultative meetings were held in Bahrain, Belgium, Colombia, Estonia, Kazakhstan, Morocco, Republic of Korea and Rwanda. Participants included high-level government officials, particularly those who work as national Chief Information Officers (CIOs), or hold equivalent positions within national governments and have specific responsibilities concerning e government policy design, implementation, and evaluation, with impact on service delivery aspects. In addition, an online platform was set up for Member States to provide recommendations on the *Survey's* content and methodology. A total of 103 out of 193 Member States participated in the preparatory process for the *Survey* either through the consultative meetings or through the online consultation. The feedback received from Member States during the consultative meetings was presented during an Expert Group Meeting (EGM) organized by DESA on "E-Government for Sustainable Development" from 16 to 17 March 2015, and was attended by 17 experts representing all regions of the world. Insights from the EGM were taken into account during the preparation of this edition.

# Executive Summary

With the adoption of the 2030 Agenda for Sustainable Development, Heads of State and Government of all United Nations Member States committed to a shared vision to improve people's lives and transform the world by 2030. This vision is that of a world free of poverty, hunger, disease and want. The 17 Sustainable Development Goals (SDGs) and the 169 targets that are at the core of the 2030 Agenda aim to advance people, planet, prosperity, peace and partnerships. They aim to protect human rights and promote gender equality and the empowerment of women and girls.

The sixteenth SDG calls for effective, accountable and inclusive institutions at all levels, in the framework of peaceful and inclusive societies. It marks the recognition that institutions are critical for realizing the vision of the Agenda and achieving every single SDG.

Governments, together with the private sector and civil society, will play a central role in the implementation of the SDGs. They will need to drive the principles and goals of the 2030 Agenda throughout public institutions at local, national, regional and international levels. This means in particular ensuring that the overarching objective of poverty eradication and "Leaving No One Behind", a key principle of the 2030 Agenda, guides all institutions, actors and policies and public service delivery.

Achieving the SDGs will require governments' unwavering commitment, courageous leadership, creativity, innovation as well as strong capacities and adequate means of implementation.

It will also require far-sighted and holistic decision-making. The SDGs will only be achieved if public and private sector actors take an integrated and balanced approach to social, economic and environmental dimensions – as well as to the various SDGs areas. An unprecedented level of policy integration and institutional coordination will thus be needed so that progress is made on all the SDGs at the same time, building on the interrelations and synergies between them.

It is therefore important to rethink how to provide universal access to quality services while ensuring coherent decisions, developing integrated policies and increasing effectiveness, transparency and accountability. Many countries have already engaged in this direction.

It is against this backdrop that the 2016 *Survey* was carried out. It analyzes how e-government is evolving and gearing itself to support the realization of the SDGs. Through advanced electronic and mobile services, e-government aims at improving the relationship between people and their government. It aims at making public services delivery more effective, accessible and responsive to people's needs. It also aims at increasing participation in decision making and making public institutions more transparent and accountable. The purpose of e-government is thus consistent with the principles and goals of the 2030 Agenda and it should contribute to the implementation of the Agenda.

At the same time, advances in e-government must go hand in hand with efforts to bridge the digital divide. Too many people do not have access to Internet or mobile devices. Bridging the digital divide and ensuring that the poorest and most vulnerable benefit from the progress in the area of ICT and e-government requires an integrated approach to public policy. This means addressing the various facets of inequality between people, countries and regions – an effort which ICT can also greatly facilitate - while also taking measures to bolster access for all and increasing regional and international cooperation. "Leaving no one behind" thus requires improving access to high-speed broadband connection for all through reliable and high-quality infrastructure, and taking a holistic approach that addresses the social, economic and environmental factors that influence digital inclusion.

The *Survey* offers a snapshot of the development of e-government in countries across the globe. Its findings may be used in reflecting on the kind of e-government that will best support the implementation of the SDGs. It can help countries learn from one another and support each others' efforts to provide inclusive and equitable electronic and mobile services to all and bridge the digital divide.

## Facilitating integrated policies and services through e-government

A new trend in e-government has been the evolution towards the provision of integrated public services online through, among others, one-stop platforms allowing to access a range of public services. This approach makes it easier for people to interact with public administration and get adequate and holistic responses to their queries and needs.

Progress is being made towards delivering public services in such an integrated way. For example, 98 countries require a digital ID for online and mobile public services. Efforts are being made to ensure privacy and security of personal data. But challenges remain. Some relate to the technical difficulties associated with ensuring interoperability of systems. Proliferation of technologies, while positive, makes it difficult to provide integrated e-health services. It also remains difficult to ensure integration of services across sectors.

Along with integrated services, e-government may increasingly support policy integration and encourage the efforts of various government institutions to work more closely together. It can provide governments with increased insights to help revisit existing decision making processes and work flows. Progress is however slow. Although there are examples of successful integration of policies within the social area for example, integrating policies and services across the economic, social and environmental areas remains difficult. Efforts to promote whole-of-government service delivery and policies have to be accompanied with efforts to ensure that organizational cultures, coordination mechanisms and financial and accountability systems support collaboration among public institutions.

## Open Government Data for promoting effective,accountable and transparent institutions

In an effort to make public institutions more inclusive, effective, accountable and transparent, as called for in the 2030 Agenda for Sustainable Development, many governments across the globe are opening up their data for public information and scrutiny. Making data available online for free also allows the public – and various civil society organizations –to reuse and remix them for any purpose. This can potentially lead to innovation and new or improved services, new understanding and ideas. It can also raise awareness of governments' actions to realize all the SDGs, thus allowing people to keep track and contribute to those efforts.

Overall, in 2016, 128 out of 193 UN Member States provide datasets on government spending in machine readable formats. The remaining 65 have no such information online.

The availability and use of Open Government Data initiatives, however, vary around the world; not only in terms of the number of datasets released and how they are presented and organized, but also in terms of the tools provided to increase usage of data.

Combining transparency of information with Big Data analytics has a growing potential. It can help track service delivery and lead to gains in efficiency. It can also provide governments with the necessary tools to focus on prevention rather than reaction, notably in the area of disaster risk management.

The issue that many governments are tackling today is not whether to open up their data, but how to do so. Proper governance and careful consideration of both opportunities and

challenges are needed. Challenges include issues related to legal frameworks, policies and principles; data management and protection; identity management and privacy; as well as cyber security. Regarding legal aspects, 105 UN Member States have legislation on the right to access government information. The same number also offer online policies on open government data and 113 countries offer online personal data protection legislation (Data Protection Acts or equivalent).

Innovative demand-driven approaches have been taken to enhance people's ability to request governments to open up data. Multiple approaches and tools can be used to increase open government data usage. These include campaigns to raise awareness of how open government data can help achieve the SDGs and empower people with new tools.

In the future, steps should be taken to increase the publication of Open Government Data related to vulnerable groups. Ways should also be found to ensure that such data truly contribute to improving the lives of the poorest and most vulnerable. For example, data about location of health services and water points near slums or disadvantaged areas can help improve communities' access to essential social and economic resources. Support can also be provided to help relevant non-governmental organizations to analyze and use open Open Data for improving the situation of the poorest and most vulnerable.

Publishing open data online can help to ensure higher degrees of accountability and transparency not only of national governments, but also of parliaments and of the judiciary, which will play an important role in the achievement of the SDGs.

## E-participation to promote participatory decision-making and service delivery

E-participation is expanding all over the world. With growing access to social media, an increasing number of countries now proactively use networking opportunities to engage with people and evolve towards participatory decision-making. This is done through open data, online consultations and multiple ICT-related channels. While developed countries, especially European countries, are among the top 50 performers, many developing countries are making good progress as well; especially lower-middle income countries. In general, a country's lower income level is not an obstacle to posting basic public sector information online on national portals or using social media and other innovative means for consulting and engaging people on a broad range of development-related issues. Yet, a country's income level matters when it comes to developing more technically complex and specialized e-participation portals, such as for e-petitioning or online consultation and deliberation. Low income countries need to be supported in addressing such challenges.

A growing number of e-participation applications and tools are put in place in various sectors with the objective of responding to the needs of various communities. This can contribute to the development of new forms of collaborative partnerships between government bodies and people and reinforces the focus on people's needs. The largest share of these initiatives relates to the central government and local authorities giving access to public sector information and public consultation via e-tools. But there has been a growing focus on mobilizing contributions to policy-making, even though progress has been modest so far. Making progress in participatory and democratic decision-making will increasingly be the criteria against which the success of e-participation will be assessed.

Advances in e-participation today are driven more by civic activism of people seeking to have more control over their lives, rather than by the availability of financial resources or expensive technologies. Several developing countries, including some least developed countries, generate numerous good practices by using low-cost (open code source) ready-made solutions that are based on collaboration among citizens.

Overall, enhanced e-participation and the related social practices can support the realization of the SDGs by enabling countries to ensure that their policy decisions are more participatory. This will increase the ownershipof policies by civil society and the momentum for implementation. More analysis is needed to understand whether and how e-participation impacts on the content of policies and focus of decisions ultimately made.

## Advanced online services and bridging divides

As of 2014, all countries have an online presence, albeit with different degrees of development. Countries across the world have made substantial progress in online service delivery. This is measured by the Online Service Index (OSI) that assesses the national online presence of all 193 United Nations Member States.[3] The *Survey* shows that digital technologies—the Internet, mobile phones, and all the other tools to collect, store, analyze, and share information digitally— are being increasingly utilized. In fact, the OSI values for the majority of UN Member States have increased, which suggests that innovative approaches are being applied in the public sector and specifically in public service delivery. In all sectors reviewed, mobile services have experienced a large and significant growth.

The *Survey* shows that since 2014 the number of countries with very high OSI has increased from 22 to 32 whereas the number of countries with low OSI dropped from 71 to 53.

Higher levels of online service tend to be positively correlated with a country's income level. The majority of the high-income countries are at the top 50% of the OSI, while the majority of low-income countries are at the lowest end of the OSI. However, as countries make advances in their e-government reforms, more developing countries feature in the groups with higher levels of OSI. At the same time, the capacity of countries to reform public institutions and their commitment to providing advanced people-driven service delivery, can also influence their ability to use ICT and e-government for promoting inclusive societies and sustainable development.

Regarding sectorial and transactional services, more countries have introduced online services for tax submission and registration of businesses, thus reducing the administrative burden for new and existing businesses and increasing transparency. Online application is also being provided for a growing number of certificates (e.g. birth, marriage, social security). This saves time and money for people, may have significant impacts on poverty and increases the efficiency of public institutions. The availability of information has increased in the area of education, health, finance, welfare, labour and the environment, with the finance sector leading and the environment sector experiencing the sharpest increase.

The increase in the online provision of sectorial and transactional services has been driven by the bold adoption of new technological approaches, a high commitment of the leadership of concerned countries and administrations, effective and capable institutions, as well as regulatory reform. Most of this growth was channelled via SMS services, mobile apps and user-friendly social media tools. At the same time, more efforts are needed to deliver online services in major areas related to the SDGs.

While these advances are overall very positive, access to the Internet and availability of mobile devices, as well as digital literacy are essential to exploit the full potential of the use of technology, in particular information and communications technology. The overall availability of broadband has increased globally, but there are substantial regional disparities and a major divide persists. Accessibility and availability of mobile devices support improvements in health, education, agriculture, commerce, finance and social welfare. It can allow regions that leapfrogged into wireless broadband to step up innovation and narrow the digital divide.

[3] OSI is one of the three components of the EGDI used by the *UN E-Government Survey* (see above: "About the *Survey*").

Overall, ensuring the accessibility and availability of broadband remains an urgent global priority. As called for in SDG 9 (on building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation), a major effort is required to increase access to ICT and reach universal and affordable access to the Internet in LDCs by 2030. This needs to go hand in hand with efforts to realize the 17 SDGs and lift people out of poverty.

While divides between and within regions and countries are wide, all regions have seen some advancements in mobilizing ICT and e-government for the poorest and most vulnerable. The *Survey* shows that 26 out of 43 countries in Europe (over 60% of the total number of countries), provide online services to at least one vulnerable group. Africa has also recorded a significant increase with 7 new countries introducing targeted services to vulnerable groups.

At the national level the digital divide does not reflect only issues related to access, infrastructure and availability of technology. It also reflects the inequalities that exists in the social and economic areas. Educational and income levels, race, gender, culture and age also often influence access to digital technology and e-government services. So does geography.

It is also important to better understand the factors that influence a country's e-government readiness and overall development so as to develop more targeted interventions to mobilize e-government and online service delivery for the benefit of all people, including the poorest and most vulnerable. Bridging the digital divide calls for enhanced international and regional cooperation in the areas of technology and finance, but also in supporting the capacities of public institutions to develop policies for realizing the SDGs overall.

Technological progress continues to drive innovative development interventions. The use of Geographic Information System data and Internet of Things (IoT) hold the potential to transform the way public policy is formulated, implemented and monitored. Their early adoption has shown increased levels of civic participation and enhanced efficiency, transparency and accountability of public institutions. However improvements of legal and regulatory frameworks and enhanced cooperation are required at all levels.

## World e-Government rankings

E-government has grown rapidly over the past 15 years, since the first attempt of the United Nations to benchmark e-government in 2001.[4] In the 2016 *Survey*, 29 countries score "very-high", with e-government development index (EGDI) values in the range of 0.75 to 1.00, as compared to only 10 countries in 2003. Since 2014, all 193 Member States of the UN have delivered some form of online presence. E-government is now ubiquitous in many more countries, a stark contrast in comparison to 2003 – when 18 countries or about 10% of countries globally were without any online presence.[5] 51 per cent of countries had "low-EGDI" or "medium EGDI" values in 2016, as compared to over 73 per cent of countries in 2003.

Despite the considerable investments in finance and human resources and the related development gains, e-government divides, just as digital divides, exist between and within regions and countries. Regional trends have remained largely unchanged over the past 15 years: in 2016, there is a huge gap between African countries, with a low EGDI average of 0.2882, and European countries, with EGDI average of 0.7241. Oceania countries, with an average EGDI of 0.4154, are also below the global average of 0.4623. Asia and the Americas are very close, with average EGDI values of 0.5132 and 0.5245 respectively.

At the same time, there are champions of e-government in each region, as well as among the small island developing states and least developed countries. In December 2015, the General

[4] Research publication "Benchmarking E-government: A Global Perspective - Assessing the UN Member States"
[5] There were 191 UN Member States at the point of assessment in 2003

Assembly, as a result of its overall review of the implementation of the World Summit on the Information Society, highlighted the breakthroughs which ICT have enabled in government and the provision of public services.

Looking back at the past fifteen years, the e-government development process has been shifting away from a staged process or progression to non-sequential, overlapping and connected building blocks. This allows for leap-frogging and quick wins while calling for longer term sustainable strategies. Evidence suggests that the conceptualization of the e-government maturity[6] no longer holds as e-government goals and targets are constantly evolving in response to evolving values and needs.

Moving forward, concerted efforts are needed to: (i) establish global, national and local e-government indicators to better understand e-government's impact on sustainable development; (ii) adopt a fully inclusive approach to e-government development including through bridging all digital divides and ensuring multilingualism; and (iii) enhance global and regional cooperation, including North-South, South-South and triangular cooperation, and public-private partnerships.

Further work is needed to better understand the expectations people have from e-government and the use they make of it, so that the systems put in place help to improve people's well-being, respond to their needs and empower them to contribute to policy making and public services.

Also critical is to understand how non-state actors, including NGOs and the private sector, engage with e-government; be it to deliver better services to people or make their voices heard.

Today, e-government has become a development indicator and an aspiration in and of itself. It can clearly contribute to development. It has helped advance the delivery of basic services such as education, health, employment, finance and social welfare. It is helping small island developing states in building resilience to climate change and disaster preparedness and disaster management. It can play a critical role in making institutions more inclusive, transparent, and effective.

But for e-government to realize its full potential impact on development, it needs to be accompanied by measures to ensure access and availability of ICT and make public institutions more accountable and more responsive to people's needs. E-government is but one small part of the major effort we are undertaking to close the deep inequalities that continue to exist between countries and within societies. It is important to mobilize its contribution while taking into account the various levels and characteristics of countries' development and keeping the focus on realizing the SDGs.

[6] E-government maturity implies that e-government initiatives can reach a level of full development. Instead, e-government development can be seen as a continuing process that evolves in line with developments in the area of technology and innovation (UNDESA, 2003:14,17).

# E-government for policy integration

## 1.1. Introduction

The sustainable development goals, which are at the heart of the 2030 Agenda for Sustainable Development, are closely interrelated. Advancing one goal will trigger progress on the others. This integrated nature has shed new light on the need for integrated policy making. Integrated policies and Whole-of-Government (WoG) approaches allow governments to pursue sustainable development more effectively, by taking into account the interrelations between economic, social and environmental dimensions as well as between the sectors and sub-sectors addressed by the goals and targets.

WoG denotes public service agencies working together across organisational portfolio boundaries in a shared response to particular issues. WoG is closely associated with "Connected" and "Joined-Up" government concepts (UNDESA, 2012; Government of Australia, 2004).

The growing importance attached to WoG approaches has been accompanied by a more integrated approach to e-government and online service delivery. There is a trend towards providing service delivery through "one-stop-shops" online, or through other systems, including call centres, allowing to manage public services in interrelated areas. WoG approaches to policy making and WoG approaches to service delivery and e-government are mutually reinforcing. Both are complex endeavours and face challenges related to institutional dynamics, regulations, technological difficulties, capacities and resources as well as cultural and developmental dimensions. At the same time, both can provide significant benefits to people by making it easier for them to interact with public administrations and get responses to their queries and needs.

This chapter examines how e-government can support integrated service delivery in the economic, social and environmental dimensions of sustainable development, while also supporting integration across these three dimensions. It also looks at how e-government can support policy integration and institutional coordination by bridging the silos that exist between organizations. Several countries have been successful and lessons may be drawn from their experiences.

## 1.2. Whole-of-Government service delivery and the three dimensions of sustainable development

E-government can help connect individual systems and government functions, as well as public services, into a coherent system, thus enabling enhanced WoG service delivery in the economic, social and environmental areas. The integration of services, enabled by WoG and e-government, also helps deliver interlinked social-economic-environmental activities together, this allows to build on synergies

Photo credit: UN Photo/Mark Garten

In this chapter:

while avoiding trade-off and unwanted impact of measures in one area on measures in other areas (UNEP, 2009).

### 1.2.1. Recent developments in Whole-of-Government service delivery

WoG service delivery, enabled by e-government technology, can offer people services from various public agencies bundled together as a single, joined-up service in a one-stop-shop. For people, it means that interacting with public administration becomes much simpler. Achieving such an integrated approach to public service delivery depends on (i) the use of a common organisational and technical platform to ensure back-office integration, so that internal processes are coordinated and run smoothly together, (ii) robust interoperability (i.e. that each system is compatible and works with other systems), and (iii) an infrastructure that supports the use of electronic identity cards and signatures. Some countries have successfully implemented such a service. However, by and large, WoG service delivery, including interoperability does not function well in many countries yet, regardless of their level of income. Ensuring that an integrated approach is effective and sustained across ministries and agencies remains challenging. In the OECD, most countries face important interoperability challenges, notwithstanding their concerted efforts to address them (OECD, 2012).

There is no comprehensive data available about the extent of the current interoperability and implementation of WoG service, but the *2016 United Nations E-Government Survey* offers some insight. The *Survey* provides indicators to measure interoperability and the degree to which countries have implemented WoG systems that are seamlessly connected online. These indicators relate to the following (UNDESA, 2012):

- One-stop-shop service platform;
- Advanced search features (since integrated portals typically include an advanced search feature that may index content from dozens of government websites);
- Digital ID features that enable different systems to seamlessly exchange information; and
- Online tracking system that permits citizens to check on the status of online transactions. As with an identity management feature, such a system implies that the national website or portal used by people for transactions is able to communicate with the system that government officials use to process the transaction.

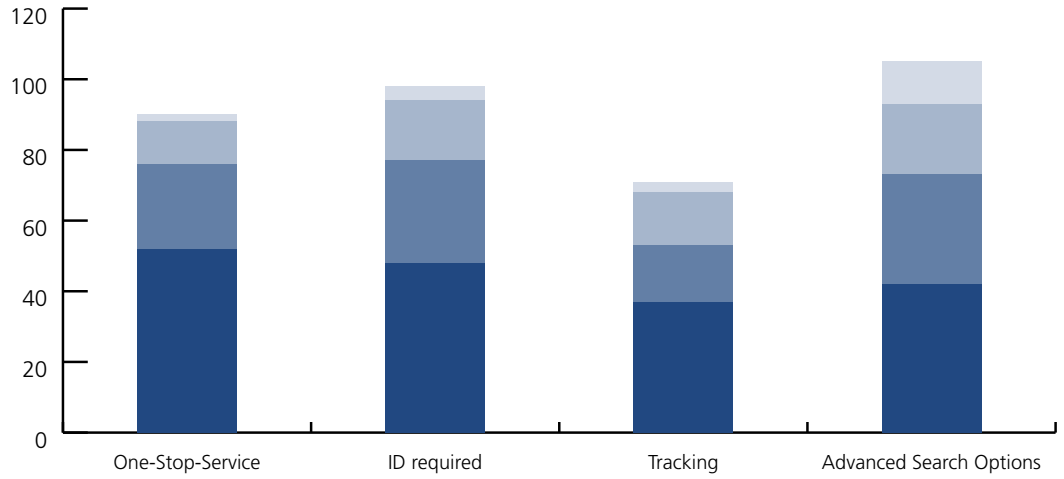
According to the 2016 *Survey*: 90 countries (including over 50 developing countries) provide a link to a one-stop-shop service platform; 105 countries provide advanced search features; 98 countries require digital ID for online or mobile services; and 71 countries provide an online tracking system. Below Figure 1.1 shows the breakdown of countries that provide these features by income group.

Increased integration requires building appropriate legal frameworks and security systems to guarantee the privacy and confidentiality of personal data.

According to the *2012 United Nations E-Government Survey* data, government websites of 79 countries provided a privacy statement, and only 39 countries had a visible security policy with a secure link clearly featured on their government website (UNDESA, 2012).

According to the 2016 *Survey*, a privacy statement is now available on the national portal of 101 countries. In 141 countries, the government offers a security feature such as https and a digital certificate for online services, and in 113 countries "personal data protection" legislation is available online.

Figure 1.1: Number of Countries offering WoG-related online features, by income group




| | Advanced Search Options | Digital ID | One-Stop-Service | Online Tracking |
|---|---|---|---|---|
| Low income countries | 12 | 4 | 2 | 3 |
| Lower Middle income countries | 20 | 17 | 12 | 15 |
| Upper Middle income countries | 31 | 29 | 24 | 16 |
| High income countries | 42 | 48 | 52 | 37 |

The ultimate purpose of countries' service integration effort is to achieve people-centred services. One example of people centred services is the "Government 3.0" initiative of Republic of Korea. It aims at governments' active sharing of data and removing barriers between agencies for better collaboration. The ultimate goal is to provide people-centric services that are relevant for each individual. Methods aimed at overcoming barriers between different ministries include granting budget adjustment authority to inter-ministerial cooperation task forces and the provision of incentives (e.g., offering extra points in performance evaluations to organisations for excellence in collaboration) (Nam, 2013).

Increasingly, people are demanding people-centred services. Governments are thus called upon to place people at the centre of multi-agency, multi-jurisdictional interactions. In addition, people in some countries have the possibility to create their own integrated electronic portfolio of services based on their individual needs (i.e. personalized services). A noteworthy example is "My People" services in Denmark (Millard and Carpenter, 2014).

### 1.2.2 Whole-of-Government services in the economic, social, and environmental areas

By integrating a range of online services and providing people with one-stop-shops, some governments have become more effective in delivering services in economic, social or environmental areas.

Within the social area, such services include e-employment. Examples are the Malaysian Electronic Labour Exchange, the Egyptian joint government jobs portal, the Italian Employment Information System and the European Employment Service [EURES]. The European Union has also been focusing on packages that bundle services oriented to the possible life events of a person; for instance, employment, health and childcare (European Commission, 2015).

In the field of social welfare service delivery, successful integration and service delivery cases include the Slovenian Ministry of Justice and Public Administration's initiative for e-Social

Security (Government of Slovenia, 2013), and Turkey's integrated social assistance services system (ISASS) (see Box 1.1).

In the area of healthcare, it is possible to leverage e-health tools for better access to information and enhanced quality of care. The newest trend is e-health integration. It is achieved through the use of open source information technology and is updated with continuous feedback from clinicians and technicians in all phases of healthcare service development (Dinevski et al., 2010).

### Box 1.1. Turkey: Integrated Social Assistance System (ISASS)

ISASS is a Government-to-Government (G2G) e-government system that was launched in 2009 and is now in its final phases of development. As of March 2014, seventeen million assistance cases were provided via ISASS, which resulted in great savings in time and resources, as well as increased transparency and accountability.

The level of integration ISASS has achieved goes beyond what has been achieved in many other countries. ISASS integrates 16 public institutions via web service and incorporates information from 1001 local social assistance offices. All social assistance processes ranging from applications to payments can be carried out in an electronic platform. For example, information about all government-funded social assistance cases can be accessed in one centre.

Source: Government of Turkey, 2015; KOÇ, 2011.

Institutional arrangements for data sharing among government institutions are important for effective integration.

Another important e-health trend is telemedicine with integrated web-enabled video cameras ("webcams"), an innovation that has the potential to broaden access to specialists to a much wider pool of patients (Wicks et al., 2014). One pertinent example comes from the Thai Ministry of Public Health, which has developed an initiative called the Webcam Connected Microscope ("WebScope"). The initiative aims to reduce the incidence of malarial mortality and to control drug resistant malaria among the target populations, who tend to be the poorest people in remote border areas. Webscope integrated innovation system reduces the time needed to confirm appropriate treatment to within two days of reporting. The system uses cloud-computing technology, a means of storing information on the Internet, for the standard sharing of the application (Government of Thailand, 2015). Another example is "Danish Briefcase." This mobile solution can connect a patient in his or her own home with professional medical and healthcare personnel through video and audio channels, using a broadband Internet link (Millard and Carpenter, 2014).

Notwithstanding these countries' successes, there are many challenges. In fact, difficulties in delivering e-healthcare are an international challenge and similar problems are often reported across countries. For example, the proliferation of several e-health technologies has made it difficult to fully exchange clinical data, for example, patients' medical records. As a result of achieving a high adoption rate of e-health services, e-healthcare has partly become "a victim of its own success" (Kierkegaard, 2013).

In developing countries, these problems are even more pronounced. For example, due to significant barriers such as the lack of basic ICT infrastructure, African countries suffer from fragmentation and lack of standardisation, which is at the heart of interoperability (Adebesin, 2013). Latin American countries are reported to have similar problems (Montenegro, 2011).

In poverty eradication, there are notable cases where service integration has resulted in a proven track record of improved rural livelihoods.

Regarding integrated services for environmental protection, Austria's integrated electronic data management (EDM) system for the environment is a noteworthy example (see Box 1.3). It

### Box 1.2. India: ICT-based land registry and management system

India initiated the Bhoomi ICT-based land registry and management system, implemented by the Government of Karnataka, which has led to land administration reform. The most significant achievement of Bhoomi has come from the electronic integration of the registration department with land-acquiring bodies, banks and other financial institutions. This electronic integration has resulted in streamlined land record administration activities and simplified transactions.

Source: Government of Karnataka, India, 2014

### Box 1.3. Austria: Electronic Data Management (EDM) for integrated environmental services

Electronic Data Management (EDM) is the Austrian Federal Government's integrated e-government system for the entire environmental field. It has a single sign-on for all users and all applications, integrating the entire business process. The development of the system has led to an increase in the exchange of knowledge among the federal government, the provinces, district administrations and other stakeholders, all of whom can communicate via this central e-government platform. According to the Austrian Government, EDM is one of the most modern and effective e-government tools in the whole of Europe. Efforts are contemplated to build cross-sectoral understanding among government institutions.

Source: Mochty, 2009

shows that introducing ICT into an administration challenges both the legislative process and workflows within distinct authorities and agencies. As a consequence, traditional workflows have to be adapted and some organisational changes are required to ensure efficiency.

### 1.2.3. Whole-of-Government service delivery across the three dimensions

Delivering integrated services in each of the three dimensions of sustainable development is already a challenge. However, delivering integrated services across the three dimensions is even more of a challenge. Many countries struggle to deliver integrated, interconnected and cross-sectoral services due to sectoral specialisation or "departmentalisation". This often results in partial solutions that are inadequate from a broader sustainable development point of view (Berger and Steurer, 2009).

Sustainable development challenges require a holistic and integrative response. Development in the socio-economic and environmental areas should not be pursued as competing agendas to be "traded-off". Policy interventions designed to have impact on one area can ultimately have far reaching and wider consequences than those initially intended, including on other areas (Berger and Steurer, 2009). The need to deal with the integrative challenges of sustainable development becomes even more visible when dealing with a host of closely interlinked policy domains, such as food security, sustainable agriculture, climate change and biodiversity protection (ECOSOC, 2015). For example, ensuring food security requires as much attention to increasing environmental sustainability as it does to improving rural livelihoods and healthcare (UNESCAP, 2015; UNESCWA, 2015).

One approach to deal with the integrative challenges of sustainable development that warrants much attention is "smart cities." While there is no clear and consistent definition of a "smart city", the term generally refers to the management of urban environments through ICT. A large part of the smart city concept hinges on the potential for technology not only to collect and process data, but to transform that information into intelligence and to integrate it across services (Jones, 2013). Generally, these services are provided to people within a well-defined geographic area that is large enough to have sufficient resources, but small enough so that the city government is close to the needs of people and businesses. This combination enables smart cities to deliver services, while saving resources (World Bank, 2012).

The smart city model is being studied as an approach to sustainable development as smart city service integration can assist in the management of large-scale projects, with much emphasis on back-end innovation, involving interaction and a solid information architecture. Further, smart cities harness systems thinking (i.e. a holistic approach that takes into account how various systems interrelate and connect to the larger system) in sectors such as economic, building, transportation and energy infrastructure, and environment.

At the beginning of 2013, there were approximately 143 on-going or completed self-designated smart city projects in the world. Among these initiatives, North America had 35 projects (e.g., Seattle in the United States of America, Toronto in Canada); Europe, 47 (e.g. Barcelona in Spain, Southampton in the UK); Asia, 50 (e.g. Songdo in the Republic of Korea); South America, 10 (e.g. Rio de Janeiro in Brazil), and the Middle East and Africa, 10 (e.g. Abu Dhabi in United Arab Emirates, Cape Town in South Africa; Lee et al., 2014).

Smart cities are actually considered "building blocks" of sustainable development, particularly given the fact that roughly 66.4 per cent of the world's population is expected to live in cities by 2050. From the public service perspective, cities are critical as a large proportion of services for people and businesses are usually delivered at the local level. Moreover, smart cities can have positive social and environmental impact and constitute a "fusion point" for all levels of government. This fusion point both enables and obliges a more practical, joined-up and people-centric approach to delivering services than what national or regional government agencies can do individually. With smart cities, cities have a greater motivation and opportunity to promote efficiency and collaboration among multiple agencies and layers of government across different sectors (Hodgkinson, 2011; Hawley, 2014).

The case of the Brazilian smart city, Rio de Janeiro, shows that e-government can promote joined-up public services across the three dimensions of sustainable development (see Box 1.4).

**Box 1.4. Brazil: Rio de Janeiro, a smart city's integrated service delivery across the three dimensions of sustainable development**

Source: Payton, 2012

The promise of smart cities is that they are able to collect, analyse and channel data in order to make better (and often real time) decisions at the municipal level through improved use of technology.

The city of Rio de Janeiro takes full advantage of ICT to improve data collection and coordinate its city services in a holistic manner, in real time. Its operation centre was initially established as a way to improve the city's emergency response system following the 2010 floods. Staffs from 30 different municipal agencies monitor the city's multiple sectors, including transportation, energy, communications, public safety and health. They obtain essential data (especially with the help of Big Data analytics), with relevant information such as weather forecasts. In doing so, city officials are able to anticipate and respond to problems in a multi-sectoral, integrated manner in real time.

## 1.3. E-government support for integrated policymaking

Delivering WoG public services requires breaking down the silos between public sector agencies, which have grown out of agency mandates to deliver specific services and programs. The ultimate challenge is to ensure more integrated policymaking.

Policy integration entails taking into account inter-linkages among different areas of policy. Integration here implies that policymaking in any one area takes into account the effects of (and on) policies and outcomes in other sectors and areas. Such a holistic approach helps ensure that policies are coherent across the full range of sustainable development dimensions,

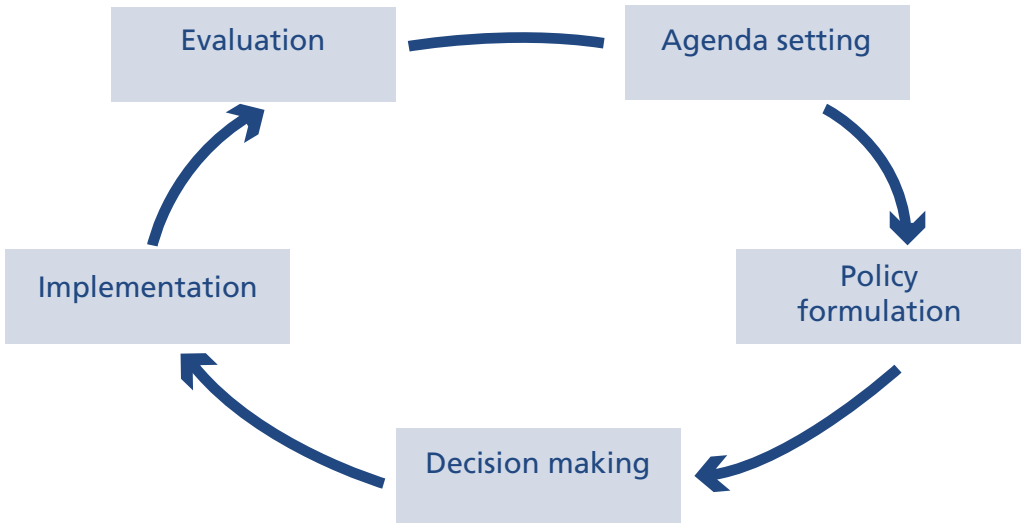
and that the effects of policy in one area do not contradict or undermine desired outcomes in others (ECOSOC, 2015).

The need for an integrated approach to policymaking has been expressed in major international agreements, including the 2030 Agenda for Sustainable Development (United Nations, 2015a), which calls for enhanced policy coherence in its target 17.14. Another seminal document, Agenda 21, also highlights the need to improve decision-making processes so as to achieve the progressive integration of economic, social and environmental issues (United Nations, 1992). Integration should happen not only between the three dimensions but also between sectors or thematic areas. This is illustrated by the 2030 Agenda; the goals are closely related with one another through the targets that refer to multiple goals. Integrated policymaking is needed to trigger progress on sustainable development in interrelated areas (Le Blanc, 2015).

E-government has an important role to play in policy integration. To better understand this role, policymaking can be disaggregated into stages and sub-stages, which make up a "policy cycle" (see Figure 1.2). The phases of policymaking begin with agenda setting (i.e., consideration of a problem or issue that requires government attention). It moves to the policy formulation phase (i.e. consideration of options to address the problem), and then to decision-making (i.e. prescription of a particular course of action). In the policy implementation phase (i.e. translation into action), the selected direction and approach translates into action on the ground. Finally, policy outcomes are monitored and evaluated in the policy monitoring and evaluation phase, often leading to setting a new agenda. An "integration filter" – or a search for the appropriate inter-linkages – may be applied at every stage of the continuous (and not necessarily linear) policy cycle (UNEP, 2009). E-government can support policy integration at almost every stage of the cycle (UNEP, 2009).

WoG service delivery, enabled by e-government, belongs to the policy implementation phase (as discussed in section 1.2); however, there are applicable examples across the policy cycle. In the case of policy modelling and integration, e-government helps integrated policy formulation for informed decision-making in Hammarby, Sweden (see section 1.3.1), while e-government in the Australian social services has greatly assisted in the integrated policy implementation phase (see section 1.3.1). The Electronic Ayil-Okmotu system in Kyrgyzstan belongs to the decision-making phase (see section 1.3.1); likewise e-government tools like Big Data analytics (to be discussed in section 1.3.2) also belong to the decision-making phase, while simultaneously being helpful for evaluation.

Figure 1.2. Policy cycle




Source: UNEP, 2009

### 1.3.1. E-government, policy integration and sustainable development

E-government provides a useful tool to enable policy integration for each dimension and across all of the three dimensions of sustainable development and between different sectors or sub-sectors. In the environment field, the Hammarby Sjostad project in a city-district in Stockholm is an example of sustainable urbanism in the world. The strength of the Hammarby model is its holistic approach to otherwise separate functions such as waste and energy management. Available e-government tools have been used in a very conscious way to model environmental sustainability and environmental policy development.

The Hammarby Model uses a computerised environmental assessment tool called the Environmental Load Profile (ELP) to assess the environmental load from a whole city district. ELP is based on two concepts - environmental systems analysis (ESA) and life cycle assessment (LCA). The purpose of the LCA is to evaluate the total environmental impact of the whole life-cycle of a product, process or activity. Here, e-government was adopted to enhance collaboration among decision-makers and support the coordination of sustainable development policies across different urban organisations and stakeholders (Gaffney, 2007). In fact, effective coordination and engagement within city departments, as well as between city departments and stakeholders, has been the hallmark of Hammarby's success (Navara and Bianchi, 2013). The example of Australia's joined-up, integrated service delivery of social security and health, illustrates how e-government enables policy integration in the social area (Box 1.5).

**Box 1.5. Australia: e-government and integrated social policy implementation**

The significance of e-government for integrated policy implementation is evident in the co-joined service delivery of the Australian Government's Maternity Immunisation Allowance and Child Care Benefit service delivery. Child benefits are made conditional on a child being fully immunised. Due to this conditionality, social protection (with its goal of reducing child poverty) becomes co-joined with public health. Moreover, e-government – in the form of automatic electronic data exchange between computer systems in two government agencies – provides the means with which to efficiently administer the family payments, which are conditional on childhood immunisation status.

The networked nature of e-government has given rise to a growth in the conditionality of policy, whereby eligibility for a government service or policy in one policy domain becomes conditional upon the policies and data that fall within another policy domain.

Source: Henman, 2005

In the economic field, a relevant policy integration case is OECD countries' utilisation of e-government, which has proven helpful for dealing with the 2008 economic and financial crisis. It is estimated that e-government has allowed several OECD governments (e.g., Hungary, Ireland, Luxembourg, Mexico, the Netherlands and the United Kingdom) to focus on transforming the public sector into a more effective whole, more people-focused and more responsive in service delivery. To better respond to the financial and economic crisis in 2008, these countries prioritised the implementation of e-government activities that enhanced coherence in service delivery. Foremost, this included back-office integration, which required major structural and organisational changes that challenged existing responsibilities and divisions of labour within and across levels of government (OECD, 2009).

While there are successful cases of sectoral policy integration between services in the social, economic or environmental area, such integration is still challenging. Moreover, these challenges only grow when integrating policy and WoG service delivery across the three dimensions of sustainable development, as more is required than just coordinating sectoral interventions (UNESCAP, 2015). This is particularly the case with policy issues that have a strong cross-cutting and interconnected nature, such as food security and climate change (Dominic and Meijers, 2004).

Achieving the effective integration of the three dimensions of sustainable development goes beyond merely "aggregating" independently formulated policies across the different domains (United Nations, 2014b). Integrated policymaking is thus seen as different from "policy coordination". The OECD observes that policy integration is quite distinct and more sophisticated than policy coordination (OECD, 1996). Policy integration requires more inter-sectoral interaction with cross-cutting objectives than policy coordination, which is when organisations essentially have the same sectoral objectives. Good policy integration occurs when one joint policy is developed and implemented by all relevant sectors.

Achieving sustainable development requires governments to reach new levels of effectiveness and to develop new capacities for integrated policymaking around a clear vision. As the Government of Singapore puts it, this is actually part of the challenge of moving "from integrating services to integrating government" (Government of Singapore, 2006). To meet this challenge, the Government took a WoG approach with its "Sustainable Development Blueprint". This cross-sectoral approach brought together all relevant ministries to analyse and identify emerging sustainable development challenges and determine how to tackle them (Clark, 2012).

Rio de Janeiro (see Section 1.2.3) presents an interesting case of policy integration. In this example, thirty different city agencies have become fully integrated into a single operations centre, resulting in a significant organisational shift from the previously segregated and "siloed" city departments. Thanks to ICT, including Big Data analytics, the city can now pursue more integrated policymaking. The operation centre is a manifestation of a major cultural change for the city which is working towards a strategic, coordinated vision for integrated service delivery across the three dimensions of sustainable development.

At the same time, it is also important to note that such policy integration successes at the local and municipal levels may also be partly attributable to the fact that local governments have an inherent advantage in policy integration in certain contexts. At the local level, the fragmentation of sectoral ministries in charge of delivering services can be mitigated by the smaller number of actors and greater overlap in practice. For example, given the overlapping responsibilities of local government staff, inter-sectoral committees to promote integrated policies for certain public services can have a fewer number of institutional representatives at the local level than the central government does. This can make the need for integration more apparent at the local level, and it can make coordination smoother and more efficient (UNDESA, 2015a).

### 1.3.2. Big Data analytics as a policy integration tool

The outcome of the Third International Conference on Financing for Development highlighted the importance of high-quality, disaggregated data for policymaking as well as for monitoring progress in implementing the 2030 Agenda (UN, 2015b). As stated above, e-government supports effective policy integration. The data system that is typically a corollary of e-government offers particular benefits for enhancing this integration and should be strengthened.

Some progress has been made in developing new methodological standards for official statistics, including more integrated systems of data compilation across sustainable development's three dimensions. Environmental accounting is one such example. However, given the scarcity of data reflecting the co-evolution and relationships of each dimension, developing an integrated view across dimensions remains a major challenge.

Indeed, data strengthens governments' capacities to formulate and carry out integrated policies and increases the potential for policy integration among government agencies. For example, the MAX tools are a web-based means to collect and share data across multiple areas of government in the United States of America. The MAX Community, a government-wide collaboration site, and MAX Collect, a data collection tool, together facilitate increased information gathering and

sharing, collaboration, and knowledge management across the US Federal government. Several Government departments use these tools to share information, including budget information, within their own departments and with other Federal agencies. They also use the US Federal MAX tools to collaborate on a number of initiatives (Government of the United States, 2014). In this instance, data are indeed very much the foundation of policy integration.

The significance of data use for the timely evaluation of alternatives and evidence-based policymaking in the post-2015 era cannot be overemphasised. According to the United Nations Independent Expert Advisory Group, the use of data that was boosted by the adoption of the Millennium Development Goals (MDGs) will only intensify, as the world implements the 2030 Agenda for Sustainable Development (United Nations, 2014d).

As emphasised at the Third International Conference on Financing for Development Conference (UN, 2015c), data access alone, however, is not enough. Without the proper tools, data itself is of little value. To fully realise data for achieving, monitoring and reviewing Sustainable Development Goals, governments need to be able to make sense of the flood of information, which requires analytic tools. Thus, broad access to the tools necessary to turn data into useful, actionable information is vital.

In this context, Big Data analytics offers particular benefits as a tool to strengthen policy integration for sustainable development. According to the United Nations (2012), Big Data analytics refers to tools and methodologies that help transform massive quantities of raw data into useful insights. These Big Data tools and methodologies build on powerful algorithms to detect patterns, trends, and correlations in the primary data, and they also utilise advanced visualisation techniques. Big Data analytics can help assess the impact of sectoral policies across the three dimensions, and thus support cross-sectorally integrated policies, which tend to face more complexities and uncertainties than single dimension policies. Predictive modelling and computer simulations are some of the techniques that can be used to analyse and manage the sectoral trade-offs (Dominic and Meijers, 2004).

The potential of Big Data analytics to transform information and data into useful insights and to support decision-making processes of complex, interdependent issues is recognised by an increasing number of governments. At the international level, this potential was highlighted in the report of the Secretary-General's High-Level Panel of Eminent Persons (United Nations, 2013) and the Secretary-General's Synthesis Report to the General Assembly (UN General Assembly, 2014a). Drawing on a report by the Secretary-General's Independent Expert Advisory Group on the Data Revolution for Sustainable Development (United Nations, 2014c), the latter emphasised the importance of good-quality data and sophisticated data analysis. The report noted that as the world's computing power continues to grow, these gains can help improve understanding of development contexts and the quality of development decision-making.

The significant potential of Big Data analytics for sustainable development hinges on an adequate understanding of the many interactions involved in policymaking, as well as the entirety of the impacts of a specific policy. Policymakers need to understand the various impacts of their individual agencies' policy decisions. The core benefit of Big Data analytics is that it offers the essential analytical capacities to support formulating policies based on an assessment of the whole range of impacts (UNEP, 2009). Its systematic use can lead to informed decision-making and provide a foundation for sustainability-focused policymaking.

The benefits of using Big Data analytics for policy integration and integrated service delivery can thus be significant and tangible. As seen in the case of Rio de Janeiro (see section 1.2.3), Big Data analytics technologies indeed represent a great opportunity for governments to bring disparate and relevant data together, from across various silos. Merging this data allows for a fuller picture of sustainable development challenges and opportunities from a WoG perspective, thereby helping to achieve more integrated policymaking (Paredes, 2013).

Despite the fact that combining data analysis efforts has resulted in some challenges, such as the differing ways the two agencies collect data and information, the US Department of Housing and Urban Development - US Department of Veterans Affairs (HUD-VA) collaboration has been very effective. Working together, the agencies have created information that allows programme managers to understand how veterans access services and to identify where there are overlaps between the agencies and service providers. Furthermore, through the use of strong analytics, agency staff and leaders can learn about problem spots and areas that require attention at every point in the process, from distributing vouchers to getting leases signed.

In view of the increasing importance of data and analytics, some governments like Australia recently established a new office to work on WoG service analytics. The Government set out to consolidate service data from across government agencies in order to assess the potential of delivering more people-centric services and to improve the total experience of dealing with government. To this end, the Government established the Australian Digital Transformation Office (DTO) within the Department of Communications so that agencies could adopt a coordinated WoG approach to service delivery. Starting from July 2015, the DTO acts as a digital champion across the government and helps agencies with limited digital expertise realise the benefits of digital government (Pearce, 2015).

Big Data analytics are used in both developed and developing countries– at least, for sectoral policy interventions. Some state governments in India have already embarked upon setting up an analytics systems (e.g., Rajasthan and Karnataka), which can help improve the efficiency of the Indian welfare programme and eradicate poverty (Thukral, 2014). In China, the Government is taking steps to deal effectively with the country's growing air pollution problem by deploying advanced analytics and other technological tools (Greengard, 2014).

These and other similar efforts often need to be supported with technical assistance so that developing countries, notably the Least Developed countries and SIDS, can build their data collection and analytical capacities, as underscored in the Addis Ababa Action Agenda on Financing for Development (UN General Assembly, 2015b).

At the national level, governments can contribute to policy integration and integrated service delivery by:

- Regulating data sharing – deciding what data need to be provided openly (e.g., financial transparency for publicly listed companies) and what data should be properly anonymized to protect the privacy of individuals;

- Adopting an Open Data policy for its own data;

- Promoting data standards that make sharing more effective; this should include awareness of data quality, provenance and ownership;

- Developing the data analysis and management skills of public servants and national statistical capacity;

- Strengthening national statistical agencies as providers of data, as most of the Big Data applications need to be calibrated against official traditional data; and

- Promoting the blending of traditional and alternative data sources in the production of official statistics to fully leverage the benefits of Big Data

Critical data to inform sustainable development policymaking are often missing in many countries, such as reliable geospatial data and information on trade-offs and synergies between SDG areas.

Governments may wish to explore practical solutions for data generation and use that could be adapted and scaled up. In Africa, there are innovative initiatives to collect and use data, often spurred by the rapid deployment of mobile phones. A good example is Nigeria's innovative data collection, integration and dissemination case. Nigeria's MDG Information System – an online interactive data platform – gives the location and status of health, water and education facilities. The data are freely available online and were collected by trained enumerators who compiled local information using Android-based smartphones and Global Positioning System (GPS). With this platform, all government health and education facilities, as well as water access points were mapped across Nigeria within two months (UNDESA, 2015b).

Data analytics solutions are also becoming economically viable due to the low cost of storage and processing in cloud infrastructures, as well as relatively cheap bandwidth (fixed and wireless), which permits the transmission of data sets from fields across nations and regions (Bilbao-Osorio et al., 2014). Increasingly, powerful and useful applications and services will be made available over the Internet and delivered via cloud computing models – with no up-front investment and a pay-as-you-go model (Hodgkinson, 2011).

## 1.4. E-government and institutional coordination

The cases presented in the previous sections showcase the role of e-government in advancing policy integration and institutional coordination – both within a particular sector and cross-sectorally. This section looks in more details at how e-government helps bring the various silos of government closer together in support of institutional coordination and change. The section furthermore looks at how the increasing demand for WoG integration, among other factors, cause changes in the coordination and development of e-government development itself.

### 1.4.1. Institutional coordination through e-government

As mentioned, e-government technologies provide opportunities for WoG government service delivery and policy integration, helping bring the silos of government closer together. This is partly because e-government makes institutional coordination among agencies technically easier, helps lower the coordination cost of working across agency boundaries, and facilitates better communication and sharing of information, data, operations and procedures (Fountain, 2013).

Another reason for this enhanced coordination is that the inherent technological attributes of digital systems influence institutional coordination. Among these attributes are norms of efficiency, streamlining, and a tendency towards standardisation and convergence as way of coordination (see Box 1.6).

It is important to note that effective institutional coordination through e-government and integration in service delivery at the policymaking level requires a profound shift that is generally difficult in practice. This represents a paradigm shift towards a connected and people-centred government, where agencies and levels of government share objectives, data, processes and infrastructures across organisational boundaries. Making it happen requires investing in cross-sectoral capabilities, robust infrastructures, transformational leadership, and e-government supported cross-agency coordination mechanisms (Hanna, 2011).

### 1.4.2. Institutional coordination of e-government development

As explained in previous sections, e-government helps institutional coordination and integration. At the same time, the structure and management of e-government itself is affected by growing demand for WoG integration and such factors as need for governments to deliver natural disaster relief, provide information security, and become more people-centric in delivering

### Box 1.6. The European Commission Office of Harmonisation of the Internal Market (OHIM): Breaking up silos internally and across Europe

The European Commission Office of Harmonization of the Internal Market (OHIM) is an example of how e-government can be used to break through silos and improve institutional coordination. Through the development of public services related to the Community Trademark, as well as networked relationships with national trademark offices, this programme gave rise to an integrated yet federated trademark system in Europe.

OHIM's portfolio of digital information, systems and tools indeed very much influenced OHIM's institutional set-up and coordination. Digitisation had powerful effects on communication and coordination by creating shared technical standards, data and communication channels, as well as a drive towards interoperability. New tools and systems gave rise to continued streamlining of work processes in the back office, breaking up silos and creating better integration within OHIM.

This new digitisation also helped strengthen connections to the network of national trademark offices in Europe. For example, the Trade Mark View tool was an important means of deepening harmonisation through shared resources and information. The tool focuses on developing and supporting a "common trade mark search engine tool". Overall, the new digitisation tools and systems helped further OHIM's mandate to move beyond mere coexistence with national offices to greater interoperability across the entire network of national trademark and design offices in Europe.

Source: Jane Fountain (2010): The Office of Harmonization in the Internal Market: Creating a 21st Century Public Agency. National Centre for Digital Government. Paper 38; Jane Fountain (2011): Disjointed Innovation: The Political Economy of Digitally Mediated Institutional Reform. Paper prepared for presentation at the 2011 Annual meeting of the American Political Science Association, Seattle, Washington; Jane Fountain (2014): On the effects of e-Government on Political Institutions. Routledge: New York.

services. The result is a trend towards more integrated management of e-government through the creation of new Chief Information Officer (CIO) roles and authority bodies, or an equivalent arrangement. Such a position or entity is designed to improve coordination and cooperation both at the ministry and government-wide level.

According to the *2014 United Nations E-Government Survey*, there is an increasing number of countries with a government-wide CIO institution or equivalent authority body for coordinating national e-government development—starting from 29 countries in 2008; 32 countries in 2010; 60 countries in 2012 and up to 82 countries in 2014. The CIO offices are at different institutional levels and have varying functions and responsibilities. Some of the countries that established CIO roles, offices and/or key e-government authority bodies between 2013 and 2014 include: Bhutan (2014), Ireland (2013), Jamaica (2014), Japan (2012) and Kenya (2013) (Kim, 2014). The number of CIO offices has now increased to 111 countries in 2016 (see Table 1.1).

### Table 1.1. Increasing number of countries with Chief Information Officers (CIO) or equivalent role

| Year | Number of countries | % of 192/193 UN Member States |
|---|---|---|
| 2008 | 29 | 15% |
| 2010 | 32 | 17% |
| 2012 | 60 | 31% |
| 2014 | 82 | 42% |
| 2016 | 111 | 58% |

Sources: Kim, Ran (2014): *Role and Positioning of E-government Leadership: Trends and Issues* New York: United Nations; UNDESA (2012): *United Nations E-Government Survey. E-Government* for the People. New York: United Nations; UNDESA (2014): *United Nations E-Government Survey. E-Government for the Future We Want.* New York: United Nations; UNDESA (2016; refer to the Tables in Annex): *United Nations E-Government Survey: E-Government as an Enabler of Sustainable Development*. New York: United Nations.

The expectation is that the presence of a national coordinating authority can help overcome internal barriers and focus on a WoG approach. The role of CIOs includes responsibilities such as "cross boundary broker" and policy leader; with the potential for government transformation highly dependent on the working relationship between CIOs and other ministries and agencies (Kim, 2014).

## 1.5. Conclusion

A number of lessons learned can be summarized as follows:

- The sustainable development challenge is fundamentally a challenge of integration. To meet this challenge, governments should aim to deliver integrated services, not only between economic, social and environmental areas but also between various sectors, subsectors and activities.

- Some governments have successfully integrated services in the three individual dimensions and across these dimensions, thus taking a WoG approach to service delivery. This has been accompanied by a trend to make public services as a whole, people-centered.

- Effective, integrated service delivery will inevitably require underlying policy integration. Such integration, however, presents a major challenge for many countries. For example, formulating integrated policies requires deep insight into a range of complex issues across the three dimensions of sustainable development.

- E-government (including Big Data analytic tools) serves as an enabler of policy integration. It provides governments with several of the elements needed for policy integration, such as increased insight into complex issues and analysis of a situation or policy. It also offers opportunities to re-engineer existing decision-making processes and information flows. Moreover, e-government will inevitably help "siloed" governments integrate — causing a change in the institutional set-up and coordination of the government. The automated systems used in e-government inherently require a certain level of standardisation, convergence and interconnectivity in order to work. This technological integration may then carry over into better institutional connectedness and integration.

- While e-government is clearly an enabler of WoG service delivery and policy integration, the opposite is also true. The development of e-government itself increasingly hinges on an integrated approach. Trends show an increasing number of countries with a government-wide CIO institution or equivalent authority body for coordinating national e-government development.

- The value of having reliable access to data and statistics, including related tools (e.g. Big Data analytics), is well established. Therefore, it is important to build developing countries' capacities in data collection and analysis for improved policymaking in pursuit of sustainable development, as emphasised in the Addis Ababa Action Agenda of the Third International Conference on Financing for Development and the 2030 Agenda.

# Transparency through open government data

## 2.1. Introduction

Turning the 2030 Agenda for Sustainable Development into action, requires accountable and transparent public administration institutions that can mainstream the Sustainable Development Goals (SDGs) into national development plans, and/or sustainable development strategies, in order to implement coherent policies and innovative initiatives.

Transparency and accountability of institutions can be enhanced by opening up government data. Open Government Data is a new approach that can help public sector institutions improve the quality of their decision-making processes and of public services. Open Government Data refers to "government information proactively disclosed and made available online for everyone's access, reuse and redistribution without restriction" (United Nations, 2014a, p.163). Open Government Data helps promote effective participation in decision-making processes, reduce waste of resources and unleash opportunities for innovation and economic growth. Combined with tools such as Big Data analytics, Open Government Data can also help public administration institutions anticipate future scenarios, including natural disasters.

This chapter highlights the strategies as well as the challenges that arise in implementing public sector open data plans. A holistic vision, political will, leadership capacities, regulatory and institutional frameworks and adequate strategies are required to maximize the benefits of Open Government Data. Data security and privacy also need to be addressed.

The chapter also examines ways to promote demand driven approaches to bridge the digital divide between those who are able to access and fully utilize government data and those who are left behind, in what is an increasingly data-driven society.

## 2.2. Using open government data to drive progress towards sustainable development

### 2.2.1. Effective, transparent and accountable government institutions: critical for sustainable development

According to a recent United Nations survey "My World," an "honest and responsive government" was voted as the fourth highest priority right after education, good healthcare and jobs. Respondents agreed that: "People should have a say on what the government's priorities should be, and confidence that they will implement those priorities competently. Governments should agree and implement standards for making information available to all people on how public money is spent".[1]

[1] For details see MY World Analytics website. Available from: http://data.myworld2015.org/

Photo credit: Sergey Nivens/Shutterstock.com

In this chapter:

The experience of the Millennium Development Goals (MDGs) showed that progress towards poverty eradication, education for all, and access to healthcare is undermined when public institutions[2] lack capacity or lack transparency and accountability. According to the Millennium Development Goals Report 2015, evidence from 44 countries shows that a serious challenge, such as slum reduction "requires a combination of complementary approaches, from raising awareness to increasing funding to providing basic services, along with policy reforms and institutional strengthening" (United Nations, 2015b, p.61). An analysis of the data of the World Bank on fragile states also indicated that there is a correlation between the conditions of fragility of state institutions and lack of progress towards the MDGs (Hartgen and Klessen, 2010, p. 12).

Weak government institutions impede the effective use of resources for development and undermine the fundamental values of a democracy: freedom, political equality, justice, respect for human rights and human dignity. Furthermore, the absence of effective, transparent and accountable government institutions makes citizens cynical and apathetic towards public affairs, erodes their confidence and trust in both the government and its elected officials, and generally leads to low levels of government legitimacy. The suspicion of government is reflected in the difficulties of attracting competent and idealistic people in public service, and in the general inability of the government to deliver services to its people. As highlighted by a recently published joint report of the United Nations and the International Organization of Supreme Audit Institutions (INTOSAI), "bad governance, corruption, abuse of power, weak institutions and lack of accountability corrode States from within. In some cases, this has brought about the collapse of institutions" (United Nations and INTOSAI, 2013, p. 1).

The 2030 Agenda acknowledges that "democracy, good governance and the rule of law, as well as an enabling environment at the national and international levels, are essential for sustainable development, including sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and hunger" (United Nations 2015c, para. 9). Goal 16 of the 2030 Agenda specifically calls for effective, accountable and inclusive institutions at all levels. The Agenda also encourages Member States to "integrate the SDGs into their national development strategies and plans, taking into account levels of development and capacities, and to devise a robust monitoring and review framework" (United Nations 2015c, para. 21). Public administration institutions are directly responsible for these tasks, and will therefore play a central role in the implementation of all goals and targets of the 2030 Agenda.

Access to information collected and generated by governments is an important pre-requisite to the exercise of other rights, including the right to fully participate in the political process; which is a condition for achieving inclusive and participatory decision-making, as called for in the 2030 Agenda. The rights to freedom of opinion and information are enshrined in the Universal Declaration of Human Rights of 1948 (article 19). In 1946, the United Nations General Assembly adopted Resolution 59(I), stating, "Freedom of information is a fundamental human right and ... the touchstone of all the freedoms to which the United Nations is consecrated" (United Nations, 1946). United Nations Member States also reaffirmed the right of the public to have access to information, at the turn of the millennium (United Nations 2000, sect. Vol. para. 25). More recently, they recognized "the importance of the free flow of information and knowledge, as the amount of information distributed worldwide grows and the role of communication becomes all the more important". Member States also recognized "that information and communications technologies have shown their potential to strengthen the exercise of human rights, enabling access to information, freedom of expression, and freedom of assembly and association" (United Nations 2015g, para.42).

[2] Institutions are generally defined as "the rules of the game in economic, political and social interactions." From a narrower perspective, they equate to "the formal (e.g., the constitution and party systems) and informal rules and procedures (e.g., distribution of power and social norms) governing human behavior.", DESA Technical paper on "Challenges and Perspectives in Reforming Governance Institutions, 2005

Goal 16 (Target 10) encourages countries to ensure public access to information and protect fundamental freedoms in accordance with national legislation and international agreements. The right to freedom of information, which includes data, is particularly important for ensuring a transparent and accountable government. It is only through access to the information held by public authorities that people can understand what is happening within governments, how decisions are made and how funds are spent. Access to information empowers people to hold governments accountable for the actions that they ultimately take on their behalf. As highlighted by the United Nations Committee of Experts on Public Administration, at its fourteenth session, "access to information and open data, improvement of public procurement, strengthening of citizen and parliamentary oversight bodies, enhanced civic education and access to government by civil society are essential tools in activating citizens' ability to oversee government administration and in confronting and limiting the impact of corruption" (United Nations, 2015d).

### 2.2.2. Open government data as an enabler of transparent, accountable and effective public administration institutions in support of the 2030 Agenda for Sustainable Development

The use of ICTs in government has allowed people to access data that was previously difficult to obtain unless one would visit a government office in person. Governments produce and collect vast amounts of data on numerous issues from expenditures for national education or the military, to the number of hospitals, quality of the air, transcript of judicial hearings, vital records, traffic congestion and weather to name a few. Providing government information online in open standards[3] makes this information readily available for anyone to know or use. Today, government data can be found on regional, national and local online portals in many countries across the globe.

Open access to publicly held information is critical to sustainable development for a number of reasons. First, Open Government Data supports policy integration and institutional coordination by improving data sharing across ministries and levels of government (see Chapter 1). This, along with Whole-of-Government (WoG) approaches to service delivery, enhances the effectiveness of governments' response to complex and multidimensional development challenges.

Second, Open Government Data contributes to the effectiveness of public institutions in fighting poverty, reducing hunger, providing essential social services and responding to the needs of women and vulnerable groups. Further, access to timely and reliable data about public sector policies, allocation of tax revenues and international aid provides people with the information they need to hold their governments accountable. As highlighted in a recent United Nations report, "data are the lifeblood of decision-making and the raw material for accountability. Without high-quality data providing the right information on the right things at the right time, designing, monitoring and evaluating effective policies becomes almost impossible" (United Nations, 2014b).

Third, Open Government Data can enhance collaboration and partnerships across sectors in planning and decision-making processes, and in the design and delivery of services; therefore increasing value to the public. The availability of data for different government sectors and services can also be used to benchmark different services and thereby increase the performance of the public sector. Access to information about national priorities, policies, action plans and expenditures in support of the SDGs can also ensure that government institutions deliver on promises made. Moreover, quality, accessible, timely and reliable disaggregated data is critical to measure progress made in the implementation of the SDGs and ensure that the

[3] "Open Standards", as defined by the ITU, are standards made available to the general public and are developed (or approved) and maintained via a collaborative and consensus driven process. "Open Standards" facilitate interoperability and data exchange among different products or services and are intended for 4

goals are making a difference for the poorest and most vulnerable and that no one is left behind. Secure and reliable data to monitor development requires effective, strong, and sound national statistical systems (Montiel, 2016). As information empowers people to hold their governments accountable and creates incentives for a more efficient use of public resources, Open Government Data can help follow-up and review the implementation of the SDGs. While this chapter does not focus on how to improve data collection for the implementation of the SDGs per se, disclosing the information once collected is vital for transparency and accountability purposes.

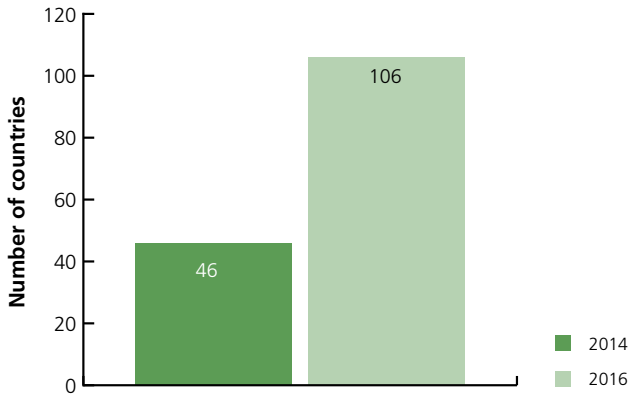
Readily available government data provides people with the tools to effectively participate in public affairs because they are more informed and better able to offer opinions and ideas in deliberative processes. For example, Kenya has developed an Open Government Data portal which enables citizens to suggest what data to disclose.[4] Government data sets can also be used to produce services that better target people's needs and solve problems in innovative ways.

Fourth, making data available online allows the public to reuse and remix freely available data for any purpose, leading to new services, innovation and enhanced economic opportunities. The 2030 Agenda "is new to all of us and there is no paved way to follow, every country needs to find the solution that fits its own national context". Innovation in policies, institutions and practices will be a key ingredient (Wu, 2015).

## • Open Government Data in the 2016 *Survey*

Overall, the *Survey* shows that the availability and use of Open Government Data initiatives vary around the world, not only in terms of number of datasets released and how they are presented and organized, but also in terms of the tools provided to increase usage of data. Many countries have established dedicated portals to share data, which are known as "Open Government Data portals". Many also have Open Government Data catalogues, which are lists of all datasets available, usually organized by theme (e.g., environment, spending, health, etc.) and/or by ministry, and available on the national portal or Open Government Data portal. As highlighted in Figure 2.1, the number of countries with Open Government Data catalogues has more than doubled in 2016 compared to 2014, with 106 out of 193 countries offering Open Government Data catalogues, compared to 46 countries in 2014. This is a significant increase and shows that many countries are investing in releasing open government data.

Figure 2.1. Countries with Open Government Data Catalogues in 2014 and 2016




[4] For details see: Kenya Open Data website. Suggest Data section. Available from: https://opendata.go.ke/nominate

- **Tracking the money spent on sustainable development through open budgets**

The 2030 Agenda envisions "a just, equitable, tolerant, open and socially inclusive world in which the needs of the most vulnerable are met" (United Nations, 2015b, para.8). One of the most critical factors that will determine successful implementation of the SDGs will thus be whether resources, including aid, will be spent to eradicate poverty and ensure the well-being of all (United Nations, 2015e).

Increased transparency and financial accountability are also critical to prevent corruption, which diverts vital resources that can otherwise be allocated to addressing the needs of vulnerable groups. In addition, transparency gives people in developing countries the information they need to improve their lives. When farmers have access to timely and comprehensive information on prices, they can make better investment decisions for the future (United Nations, 2015f). When people can track whether tax revenue is being used to provide quality services for the benefit of all, they have greater trust in their own governments (United Nations, 2013).

The key pillars of budget accountability include budget transparency, public participation and formal oversight. According to the *Open Budget Survey 2015*, "the public needs access to budget information and opportunities to participate throughout the budget process. Coupled with oversight by legislatures and audit institutions, this contributes to a more accountable use of public money. A growing body of evidence indicates such budgetary checks and balances yield better outcomes for people, especially those who are poor or vulnerable."[5] According to the 2016 *Survey*, 128 out of 193 Member States of the United Nations provide open data about government spending, which is essential to holding governments accountable. This, however, does not show the degree of people's participation in budget design or the effectiveness of oversight institutions at the national level.

Providing information online about government spending is essential for people's participation in budget design and implementation, as well as in monitoring revenue expenditure through Supreme Audit Institutions (SAI).[6] This requires the existence of appropriate policies and mechanisms to engage people in budgetary matters (see Chapter 3). According to the *Open Budget Survey 2015*, "in the vast majority of countries assessed, there is either, insufficient budget transparency, little or no opportunities for public participation in budgeting, weak formal oversight bodies, or some combination of these conditions. The prevalence of weak budget accountability ecosystems ultimately threatens national development outcomes and the success of global initiatives like the sustainable development goals and" agreements on climate change.[7]

In the Addis Ababa Action Agenda, the United Nations Member States reaffirmed the need to increase transparency and equal participation in the budgeting process, and promote gender responsive budgeting and tracking (United Nations, 2015e, para.30). They also committed to strengthening national control mechanisms, such as supreme audit institutions, along with other independent oversight institutions, as appropriate.

- **Promoting accountability and transparency of parliaments through open data**

National parliaments play an essential role in keeping governments accountable and in providing oversight of public expenditure. The 2030 Agenda acknowledges "the essential role of national parliaments through their enactment of legislation and adoption of budgets and their role in ensuring accountability for the effective implementation of … commitments"

5 For details see: *Open Budget Survey 2015* at: http://www.internationalbudget.org/

6 Supreme Audit Institutions are national agencies responsible for auditing government revenue and spending.

7 For details see: International Budget Partnership website. *Open Budget Survey 2015*. Available from: http://internationalbudget.org/opening-budgets/open-budget-initiative/open-budget-survey/publications-2/rankings-key-findings/key-findings/

(United Nations, 2015c). As such, access to timely, reliable and relevant legal information can help implement the 2030 Agenda (Gass, 2015).

By publishing laws and other legal information online, parliaments can help people access justice and the rule of law and support public involvement in the legislative processes and in monitoring the work of parliament. This in turn, can make parliaments more transparent, accountable and effective.

According to the World e-Parliament Report 2012, the use of open data standards in parliament can support the legislative processes by facilitating the search, exchange, analysis and cross-referencing of legislative documents. For example, a section of a proposed bill could be automatically linked to the portion of an existing law that it would amend.

Open data standards in parliament can also ensure that documents are available in various formats (e.g. in electronic or printed form), thus providing flexibility to the user in terms of access. Among other advantages, such open standards can help to prepare legislations, amendments and other documents, preserve non-proprietary documents and ensure long-term access to legislative documents. For example, the United Kingdom established legislation.gov.uk, an online portal providing access to legislation documents which is designed around open standards. It also developed an online petition system to enable people to raise, sign, and track petitions online.[8]

Over the past few years, there has been growing interest in open parliaments. For example, a session in the recent Open Government Partnership Global Summit hosted by the Government of Mexico in October 2015, focused on open parliament action plans, which aim to strengthen transparency of the legislative process and to increase public involvement. A number of initiatives were discussed in this session, including those of Chile, France, Georgia and Mexico.

Furthermore, parliamentary networks on issues related to open standards are also being established. In particular, Latin America has launched the Network of Open Parliaments which is composed of the national legislatures of the 35 independent states, and supported by *ParlAmericas.*[9]

Several countries have also implemented a complete digital law making system, often called "e-Law" or electronic law making process. This system provides access to data in open standards for all stages of the legislative process (from the first draft to the promulgation of the law). The result is often greater transparency, collaboration, efficiency and public participation. The United Nations developed an initiative to support country efforts in Africa to make parliaments more open and accessible to citizens through the Bungeni Parliamentary and Legislative Information System. Bungeni (the Kiswahili word for "inside parliament") is based on open standards and open source applications which aim to provide solutions for drafting, managing, consolidating and publishing legislative and other parliamentary documents. People are virtually allowed "inside parliament".

### • Access to justice through open government data

Access to judicial information enhances transparency of the judicial system as well as trust in the legal system of a country. Such access can also help to inform policies on the judiciary, track performance and ensure effective access to justice. Yet, access to judicial records and to information about the judiciary has been often overlooked (Open Society Justice Initiative, 2009, p.I). While there are many open government data initiatives for the executive and

[8] For more information on this initiative and open standard principles in the United Kingdom, see Open Standards Principles, United Kingdom, 2012 available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/78892/Open-Standards-Principles-FINAL.pdf

[9] For details see Parliamentarians for the Americas website. Members section. Available from: http://www.parlamericas.org/en/about/members.aspx

increasingly for the legislative branch of government, there seem to be less for the judiciary. This, in part, could be related to the nature of its functions.

While not all information can or should be disclosed, there is plenty of information that people need for improved judicial transparency. The first type of information is about adjudicative work of the courts, including transcripts, documents filed with the court, trial exhibits, recordings, settlements, opinions and finally dockets,[10] that are the most readily available to the public. The second type is about administrative processes, and includes data covering a number of areas such as court budgets, personnel and human resources, contracts between the court and third parties for construction, maintenance, office supplies, etc.; and organizational matters. The third type of information is about judges, including data about their salaries, personal finances (such as debts and investments), vacancies, disciplinary matters and selection of judges (ibid), which is not often provided.

In some countries, courts are adopting open government principles to build people's trust in the judicial process. Courts are also using social media tools to engage the public and promote collaboration. For example in the United States, according to the National Centre for State Courts, 34 states along with Guam, Puerto Rico and the District of Columbia use some form of social media to share information. This includes 30 courts that use Twitter. In a 2012 survey by the Conference of Court Public Information Officers, 46.1 percent of responding judges stated they use social media profile sites (McLaughlin, 2015).

A comparative study conducted in 2014 in Argentina, Chile and Uruguay shows that the only data that is presently open is about judicial outcomes. The study concluded that "making data public occurs out of the conviction that judicial services should be transparent, as opposed to the belief that it can lead to better outcomes; the result is that data is not used systematically in the design of quality judicial policies" (Elena, Aquilino, and Pichón Rivière, 2014). Furthermore, data was not used for innovation or economic opportunities.

### 2.2.3. Open Government Data initiatives in support of Sustainable Development Goals (SDGs)

Open government data initiatives can contribute in many ways to the achievement of the SDGs.

#### Goal 1: End poverty in all its forms everywhere


By providing online information about available public services, governments can facilitate access to basic services for people living in poverty. In addition, Open Government Data platforms can provide information to social innovators and entrepreneurs in order to help them generate innovative ideas that aid in fighting poverty and empowering the poorest. For example, the MapAfrica project was launched by the African Development Bank (AfDB) to support statistical development in Africa. This information is used for designing and managing effective development policies to reduce poverty. The project has a geocoding tool that allows the institution to improve the geographic allocations of its resources, and provides stakeholders with a better understanding of the Bank's activities, as well as its impact on local development.

[10] Lists of cases awaiting action in court

## Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture


Open Government Data promotes better education of farmers and consumers about agriculture and nutrition and raises awareness of vulnerable groups' needs. For example, the Plantwise Knowledge Bank is a comprehensive knowledge bank of data, which has brought together a number of organizations to partner in providing data, data points and information resources. Combined with data from the Centre for Agriculture and Bioscience International (CABI), a not-for-profit organization, users can access plant health information, pest diagnostic search tools, maps of pest locations and customized alerts on pest news. This information will allow users for the first time, to predict where and how fast plant diseases spread, so that farmers can be given timely advice to spot and prevent outbreaks.

## Goal 3: Ensure healthy lives and promote well-being for all at all ages


Providing data about health and health services can assist people in more rapidly accessing health care facilities and can help address health epidemics in a more effective way. Some examples of relevant data include: the number, location and availability of health service facilities, information about the spread of health epidemics across regions within a country; and facts about where and how to access medicines. The Mobile Alliance for Maternal Action (MAMA), which extends to 70 countries world-wide, is an example of how governments can partner with other stakeholders to improve the well-being of new mothers and their babies. The programme provides pregnant women and new mothers with essential information that can also help them connect to local health services. The result is fewer complications in pregnancy, as well as fewer childhood deaths. MAMA comprises a multi-disciplinary team that "brings together leaders from across corporate, non-profit and government sectors. The initiative gathers data from clinical records, self-reports, phone surveys, enrolment data and data from government clinics.

Another example comes from the Government of Uruguay which won in 2015 an Open Partnership Award for its website "ATuServicio.uy." This initiative allows direct access to key performance indicators of every health care service in Uruguay, and includes official and updated data on average wait times for treatment, user satisfaction and fee structures by providers, among others. The program's objective was to drastically increase access to the indicators of 100% of the health care providers in Uruguay.[11]

## Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all


Open Government Data can lead to increased access to public education. Data about schools' performance can also help improve the quality of education through better policies and management of educational institutions. For example, South Africa's Centre for Higher Education Transformation (CHET) project has developed an online open data platform providing data on the performance of the Higher Education system in South Africa. The intention is to assist university planners and councils in making assessments that contribute to evidenced-based management and governance. This platform is enriched by data from the government (education sector) but also from other stakeholders and their own surveys.[12]

[11] For details see Open Partnership Award. Available from: https://www.opengovawards.org/data/OGPBooklet2015.pdf
[12] For details see CHET website. Available from: http://chet.org.za/data/

## Goal 5: Achieve gender equality and empower all women and girls


Open Government Data can help empower women by making information on a host of services available in open standards. Data can help improve gender sensitive policy-making; it can ensure better access to and quality of key services and help address the needs of women in under-privileged areas. For example, The Girl Impact Map platform in Rwanda allows organisations to identify girls' needs and challenges in a more strategic, informed manner, focusing specifically on where girls are physically located. This leads to more effective and efficient distribution of resources. The platform includes behavioural and attitudinal data from the National Census, Demographic and Health Survey and surveys commissioned by Girl Hub Rwanda. In addition, the government also provides data about the locations of public resources that are useful for girls (e.g. schools, hospitals, police stations).[13]

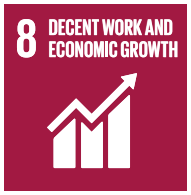
## Goal 6: Ensure availability and sustainable management of water and sanitation for all


Open Government Data can support the sustainable management of water and sanitation for all by ensuring better access to information about water facilities and quality of water, and disseminating data about water-borne diseases in specific locations. It can also help to map water shortages and droughts, as well as water and sanitation needs of vulnerable groups, particularly in slums and dwellings in cities. For example, the Lawa Project is a web-based platform that holds a large amount of information and scientific data on land, air and water in New Zealand. It helps local communities find the balance between using natural resources and maintaining their quality and availability. Focusing on four different topics, including lakes, water quantity, coastal regions and river quality, people are more aware of the urgent need to preserve their environment.

## Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all


By disseminating data about household energy consumption, governments can help better monitor and manage energy. In addition, government data can improve investments in renewable energy infrastructure and educate people about the importance of conserving energy. For example, the city of Amsterdam in the Netherlands has developed the initiative "Energy Atlas", which is available as open data via an interactive map. Its purpose is to stimulate the use of renewable energy as citizens and businesses become more aware of the usage of energy in their neighbourhoods and find out where both renewable sources of energy and energy infrastructure are located.[14]

## Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all



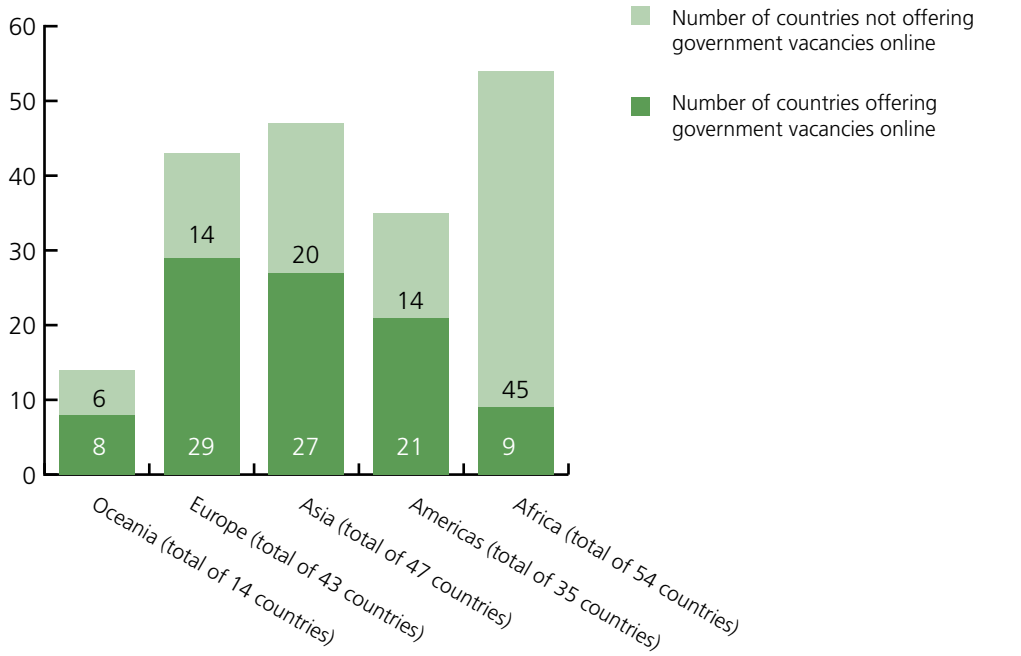

Opening up government data can lead to significant economic gains. It can help to transform every sector of the economy and to promote innovative services in order to increase employment and public value. In fact, a recent study conducted by McKinsey, indicated that, globally, seven sectors, including education, transportation, consumer products, electric power, oil and gas, health care and consumer finance alone could generate more than $3 trillion a year - and perhaps as much as $5 trillion a year – as a result of open data provided by governments (McKinsey, 2013). Other similar studies conducted by the European Union and by specific governments have also shown that the re-use of government

[13] For details see Girl Impact Map website. Available from: http://www.girlimpactmap.org/
[14] For details see Energy Atlas. Available from: http://amsterdamsmartcity.com/projects/detail/id/71/slug/energy-atlas

data can lead to considerable economic gains, and that the full potential of open government data is still untapped (Chui, Farrell, and Jackson, 2014). Additionally, there is evidence that start-ups and Small and Medium Enterprises (SMEs) are benefitting from the re-use of government data (World Bank, 2014). Making data available that can be re-used, allows people to develop new commercial services, thus generating new employment opportunities and facilitating the creation of start-ups (e.g., new apps for public transportation). For example, GovHack of Australia is an event that draws together people from government, industry, academia and the general public to mashup.[15] reuse and remix government data. GovHack focuses on building better democracy through innovation, participation and the development of a strong community of civic innovators. The lead agency, the Digital Transformation Office of the Government of Australia, awards prizes to the best innovators.[16]

By putting government vacancies online, governments can share information about employment opportunities in the public sector. Based on the 2016 *Survey*, Figure 2.2 shows that such features are offered in 21 out of 35 countries in the Americas; in 29 out of 43 countries in total in Europe; in 8 countries out of 14 in Oceania; and in 27 out of 47 in Asia. 9 out of 54 countries in Africa offer online information about job vacancies.

Figure 2.2. Government vacancies online, by region




[15] A mashup, in this regard, refers to the use of content from more than one source to create a single new dataset or service.
[16] For details see GovHack website. Available from: https://www.govhack.org/

## Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation


Open Government Data can promote innovation through the development of new services. It can also help increase access of SMEs to business opportunities. For example, India's FinInclusion Lab provides a list of business correspondents (BCs) and microfinance institutions (MFIs) at the state and district level. By uniting these two important datasets against a backdrop of demographic and development data, the user can gain a more comprehensive view about the access point and supply of financial services to low income households and their businesses. The data gathered come from different sources, including MFIs and supporting organizations, which share institutional data in order to increase transparency and gain visibility. Currently, the FinInclusion platform provides data for 4 Asian, 15 African and 3 Latin American countries.[17]

## Goal 10: Reduce inequality within and among countries


With reference to reducing inequality within and among countries, Open Government Data can play an important role by providing information in open standards about vulnerable groups. This can support decision-making and provide national and local communities with appropriate tools to work more effectively with vulnerable groups. For example in Canada, the initiative "Imminy" uses data related to climate, labour industries and crime and unemployment rates, to provide city suggestions for immigrants moving to Canada.[18] It connects immigrants to communities that match their life preferences and offer job opportunities. Using datasets from Employment and Social Development Canada, Statistics Canada, the Canada Revenue Agency and others, Imminy asks users to complete a simple survey. From there, individuals are matched with cities that provide them with the greatest potential for success based on their skills and preferences.

## Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable


Open Government Data can have several positive impacts in support of sustainable cities, providing information about local urban planning, finance, job availability, times and arrivals of transportation and access to education, healthcare and other facilities. Unleashing open government data, especially at the city level, promotes innovation and co-creation of public value[19] in service delivery (see Chapters 3 and 4). For example, many cities in the People's Republic of China provide online open data government portals and encourage people's collaboration in developing new applications (see Box 2.1.)

### Box 2.1. People's Republic of China: Initiatives of open government data

Beijing, Shanghai, Chongqing and many other cities have opened "data. gov. cn" websites in order to allow citizens to freely access government data. Beijing's open government data contains over 400 datasets, including tourism, education, transportation, land use zoning and medical treatment. Providing free information about maps, bus lines and other services, the availability of data helps people spend less. The website also provides a special "APP" column where people can upload an App developed based on the available government data, so that others may download and use it. At present, there are many examples of newly developed apps, such as for example, applications for "Food security", "I love health", and "Travelling in Beijing" among others.

Source: E-government Research Centre, China Academy Governance

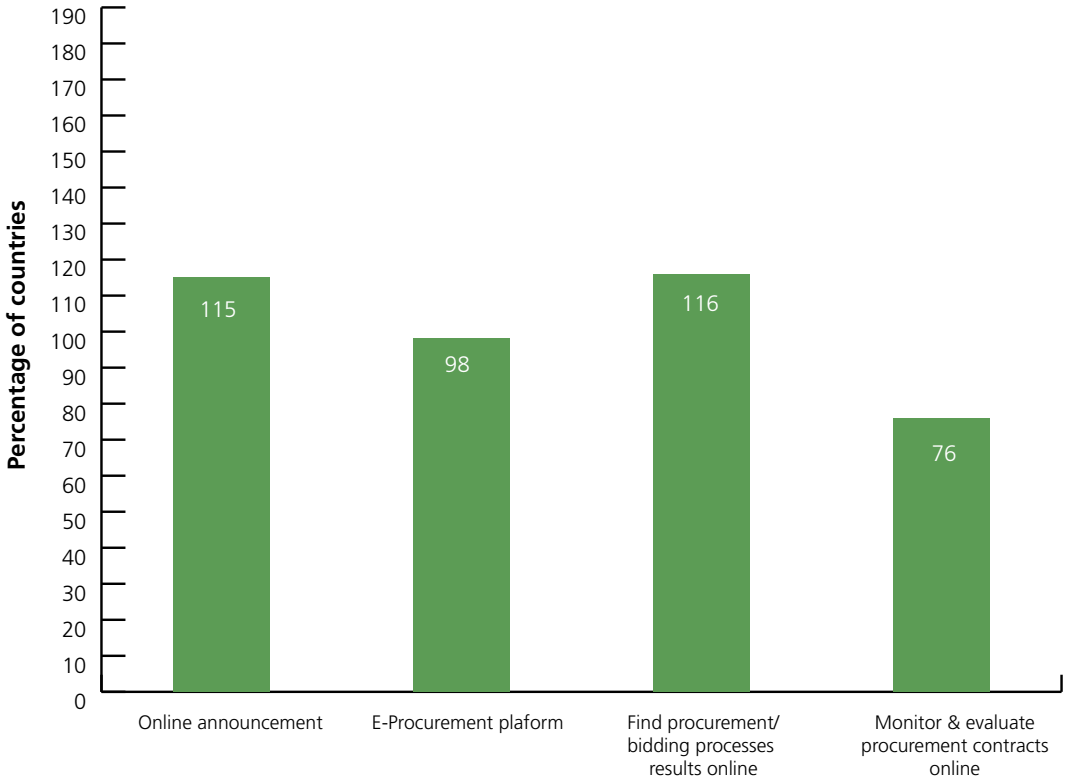
[17] For details see FinInclusion Lab website. Available from: http://finclusionlab.org/
[18] For details see Imminy website. Available from: http://imminy.com/
[19] Co-creation of public value can be understood as the involvement of people in the design and delivery of a service.

## Goal 12: Ensure sustainable consumption and production patterns


Open Government Data can help inform people about consumption and production patterns and raise awareness to encourage more responsible behaviours. For example, Carbon Culture is an initiative based in the United Kingdom, which encourages both companies and governments to publish their energy and carbon performance in real time. Ideas and feedback are encouraged from both employees and the public, about how to get better results.[20] Target 12.7 encourages the promotion of "public procurement practices that are sustainable, in accordance with national policies and priorities". Providing online information about bidding processes and results through an e-procurement online platform is an example of how governments can increase transparency and efficiency, ensure sustainable production patterns as well as unleash economic opportunities for all. This is particularly relevant for Small and Medium Enterprises (SMEs) since they can easily access information regarding public tenders and monitor bidding processes. E-procurement can also increase economic growth, cut costs by producing State savings and improve market competitiveness in a country.

The 2016 *Survey* shows that 98 out of 193 countries provide an e-procurement platform compared to only 63 countries in 2014 (see Figure 2.3). National portals providing information about results of procurement/bidding processes are available today in 116 countries compared to 55 in 2014. The number of national portal(s) that offer information about monitoring and evaluation of existing procurement contracts is 76 compared to 33 in 2014. An increasing number of countries thus give importance to disclosing online information about procurement processes.

Figure 2.3. Number of countries offering tools related to e-procurement out of 193




[20] For details see Carbon Culture website. Available from: https://platform.carbonculture.net

Of particular relevance to the SDGs is the recent practice of green e-public procurement. This refers to the "purchase of environmentally friendly products and services, the selection of contractors respectful to the environment and the setting of environmental requirements in a contract".[21] By providing businesses with incentives to undertake practices that, while ensuring profits, take into account preserving the planet, this information can help reduce negative impacts on the environment and promote eco-innovation. The European Union for instance, is promoting the concept of green public procurement on a voluntary basis and has published a compilation of best practices from across the region (European Commission, 2012). Tanzania has also devised a sustainable public procurement initiative which includes sensitization and raising people's awareness about the importance of both, sustainability in public procurement, as well as preserving the environment.[22] There are also initiatives to compile information about green purchasing in one place on national portals.[23] There is need for further developing initiatives related to the social impact of procured goods and services.

## Goal 13: Take urgent action to combat climate change and its impacts


Open Government Data on climate, weather, land and other natural resources, combined with Big Data analytics (see section 2.2.4) and the Internet of Things (see Chapter 4), can help preserve the planet by tackling environmental issues in a more effective way. For example, the White House in the United States recently launched an initiative to expand the use of climate data nationwide, which is hosted on "Data.gov" at "climate.data.gov." The goal is to help communities cope with the impacts of global warming. Further, data-driven analysis can help devise comprehensive strategies to address flooding challenges, and thus lead to significant government savings in the long-term. InfoAmazonia provides timely news and reports about the endangered Amazon region. A network of organizations and journalists deliver updates from each of the nine countries of the Amazonian forest. The data collected is freely available for download and is renewed frequently. Comparing various experiences and data among these countries leads to better public knowledge about and interest in issues of the Amazon region. This is very important as the Amazon region is one of the most biodiverse in the world, and helps to keep climate change in check by absorbing $CO_2$.[24]

## Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development


Open Government Data can help monitor and better manage ocean pollution. By disseminating data about fishing patterns, governments can also help monitor compliance with national regulations and better manage this essential resource. Depletion of fisheries is an alarming challenge, and some countries have started to take concrete measures to halt this process. For example, the Caribbean Open Institute seeks to facilitate the emergence of a Caribbean Knowledge Economy and help governments implement open government data principles.[25] It also helps communities to better use the data that is available. The Fisheries project of Trinidad and Tobago, which won an Award on Digital Innovation, develops mobile services and applications for Caribbean communities that live in poverty by providing useful data to fishers.

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21 For details see Sustainability Concepts website. Green Procurement. Available from: http://www.gdrc.org/sustdev/concepts/14-gproc.html

22 For details see United Nations Sustainable Development Knowledge Platform website. Available from: http://www.un.org/esa/sustdev/sdissues/consumption/procurement/clemencec.pdf

23 For details see: US General Services Administration website. Green Procurement Compilation. Available from: http://www.gsa.gov/portal/content/198257

24 For details see InfoAmazonia website. Available from: http://infoamazonia.org/about/

25 For details see Carribean Open Institute website. Available from: http://caribbeanopeninstitute.org/content/open-data

### Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss


Open Government Data can help disseminate information about natural resources with a view to enhancing preservation and management. Combined with Big Data and other types of data, open government data can support the development of knowledge networks and innovative services. For example the World Resources Institute (WRI), Google and a group of more than 40 partners launched Global Forest Watch (GFW), a dynamic online forest monitoring and alert system that empowers people everywhere to monitor the situation forests. This initiative brings governments, businesses and communities to work together toward forest preservation. Global Forest Watch unites the latest satellite technology, open data and crowdsourcing to guarantee access to timely and reliable information about forests.[26]

### Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels


As shown in the present report, Open Government Data can support access to justice for all and building effective, accountable and inclusive institutions at all levels in many ways. For instance, the Uzbek Open Government Data Portal[27] launched in 2015 offers more than 500 datasets to the public and promotes government agencies' cooperation through 25 visible hyperlinks that connect to the websites of other government bodies. Initiatives on opening up and sharing data about campaign finance are also important to promote a more transparent and accountable government.[28]

### Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development


Open Government Data can also support the management and delivery of aid. For example with the "Aid Transparency Portal" which was developed in Timor-Leste, the government had a wide variety of aims: to improve aid management; to make aid reporting more accurate and predictable; to assist in preparing quality State Budgets that respond to the needs of people; to enable better coordination between development partners and Government; to encourage better coordination between development partners operating in Timor-Leste; and to reduce overlap and address development priority areas more effectively.[29]

## 2.2.4. Open government data and Big Data for increased institutional performance and effectiveness

New technologies like Big Data and the Internet of Things, combined with advanced use of geospatial information systems and predictive analytics (see Chapters 1 and 4) are powerful tools for anticipatory governance, which is a way to deal with complex changes by providing tools to anticipate various possible future scenarios. Predictive analytics "is the practice of extracting information from existing data sets in order to determine patterns and predict future outcomes and trends. Predictive analytics does not tell you what will happen in the future". It uses technology and statistical methods to review vast amounts of data to predict outcomes in different fields of application. Predictive analytics and environmental innovation

[26] For details see Global Forest Watch website. Available from: http://blog.globalforestwatch.org/
[27] For details see Uzbekistan Open Government Data Portal. Available from: http://data.gov.uz/uz/frontend
[28] For details see example of the Campaign Finance Institute, http://cfinst.org/data/2014_House_Independent.aspx
[29] For details see Timor-Leste Aid transparency website, Available from: https://www.aidtransparency.gov.tl/

can, through e-government solutions, improve water management, reduce land degradation, decrease energy consumption and promote early warning and disaster management systems. In addition, new data-mining techniques are enabling governments to devise new solutions in every field of public concern, from managing traffic to measuring performance and identifying and pre-empting problems by providing more options based on intelligent analytics.

Anticipatory governance can help improve effectiveness and transparency of government institutions, particularly in regards to service delivery; and further progress in the three dimensions of sustainable development. At the same time, combining transparency of information with Big Data analytics can help track performance in service delivery and lead to gains in efficiency. Anticipatory or predictive governance through data analytics, if managed well, has the potential to allow governments to focus more on prevention than reaction. It can also help to enhance disaster risk management through better planning.

Though Open Government Data and Big Data (see Chapter 1) are two distinct concepts, Big Data can also be released as open government data. Governments collect Big Data from multiple sources and make it available to the public. This information can be related to weather and satellite data, geospatial data, some kinds of data on health, finance, energy and the environment. There is in fact a blurring between open government data and Big Data since much of the data that governments have is "inherently also Government Big Data due to the size of government operations and of the population and economy they serve and regulate" (World Bank, 2014, p. 8). "The expansion of open data, combined with advances in Big Data analytics is freeing information that was once trapped inside the dusty pages of overlooked reports" (Chui, Fareell and Jackson, 2014, p. 8).

"Nowcasting", which describes present weather conditions and forecasts weather changes that are immediately expected,[30] is becoming especially important to warn citizens about imminent disasters. Nowcasting can save many lives as in the case of earthquake early warning systems. In Japan, authorities established a "Nowcast" earthquake information system to provide information such as the times of seismic wave arrivals and estimated seismic intensities for areas where seismic waves have not yet come.

The National Disaster Management Information System in the Republic of Korea is an information system that offers comprehensive and timely data about each stage of disaster management procedures (prevention, preparation, response and recovery). Dissemination of disaster status information between local governments and related institutions currently takes only one minute, compared to the 35 minutes that were needed prior to the system's development. Data is collected from 3,800 closed-circuit televisions (CCTV), which are used for disaster management in an open system. The public can also receive SMS messages on disaster information.

The city of Boston has developed an initiative called "Boston about Results", which uses open government data combined with analytics to design effective strategies for weather hazards and emergency preparedness (see Box 2.2).

According to a recent study, "harnessing Big Data in the public sector has enormous potential. The same study shows that more than $300 billion could be saved by using Big Data to drive efficiency and quality in the healthcare sector in the United States. In the developed economies of Europe, government administrators could save more than €100 billion ($149 billion) in operational efficiency improvements alone by using Big Data (not including using Big Data to reduce fraud and errors and boost the collection of tax revenues)".[31] Several issues, however, need to be addressed to truly capture the potential of Big Data. Appropriate regulatory frameworks and policies (including on privacy and security issues), capacities to

[30] For details see http://www.oxforddictionaries.com/us/definition/american_english/nowcast

[31] For details see The McKinsey Global Institute. (2011). "Big Data: The next frontier for innovation, competition, and productivity".

### Box 2.2. Boston About Results (BAR)

Source: http://www.cityofboston.gov/BAR/

"Boston About Results" is a performance management system, which was launched in 2006 in the City of Boston, United States. It was designed to help policy-makers make more informed decisions on the delivery of public services and to provide citizens with information on services, programme outputs and resource allocation. The system was set up to accomplish three missions: (i) ensure that citizens receive the best possible public services in all areas, (ii) identify opportunities for performance improvement and (iii) share performance information. The city publishes information about the performance of sixteen of its departments, as well as cross-departmental efforts, according to targets and priorities set by the Mayor. "Boston About Results" assesses service delivery performance by analysing the entire city's data during regular meetings with department heads, management, budget and policy analysts, cabinet chiefs and the Mayor's Chief of Staff. As such, the initiative improves the accountability and transparency of Boston's public administration and strengthens the management of the city's programmes by measuring their outputs.

use and analyse the data, as well as appropriate technology are all important considerations. Governments also need to learn how to validate and integrate data from different sources.

## 2.3. Open government data implementation: challenges and strategies

The issue that many governments face today is not whether to open up their data, but how to do so. Proper governance and careful consideration of both opportunities and challenges is needed. Opening up government data poses a number of challenges, including issues related to legal frameworks, policies and principles, data management and protection, identity management, privacy and cyber security. A UN-DESA project[32] identified nine key factors as necessary for a successful Open Government Data implementation plan, including:

- Government commitment
- Policy/legal frameworks
- Institutional structures
- Responsibilities and capabilities within government
- Government data management policies and procedures
- Demand for open data
- Civic engagement and capabilities for open data
- Funding an open data program
- National technology and skills infrastructure

While opening up data can increase public sector transparency and accountability, it is only one of the key ingredients. A host of other mechanisms are also needed to promote effective public accountability, such as well-designed civil servants' codes of conduct, human resources development and training, effective Supreme Audit Institutions, among others. Thus, open government data should not be seen as a panacea for making institutions more transparent and accountable, but rather as one key element. Accordingly, it is important to devise multiple strategies that complement one another in promoting transparent and accountable public sector institutions.

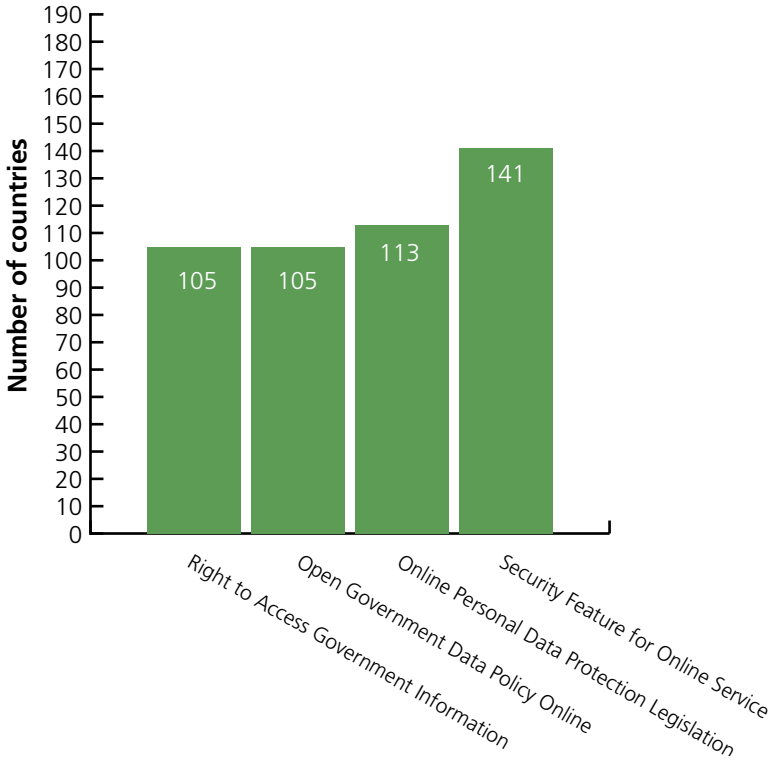
[32] UN-DESA/DPADM is implementing a capacity development project on "Strengthening of Capacities of Developing Countries to Provide Access to Information for Sustainable Development through Open Government Data". Information available from: https://publicadministration.un.org/en/projects

### 2.3.1. Leadership, regulatory frameworks and institutional coordination

Harnessing political will across different levels of government is a key challenge to providing open government data. In fact, opening up government data is above all a political decision about how much information the government is willing to share with people and to what extent it is willing to invest in capacity development for data literacy within government and society.

Access to information or freedom of information usually begins in constitutions as a political or civic right. A 2015 study conducted by the United Nations showed that provisions granting the right to information are contained in the constitutions of 118 out of 193 United Nations Member States, or 62% (United Nations, 2015f). Legislation on the right to information is usually contained in Freedom of Information Acts (FOIAs) or an equivalent. The 2016 *Survey* findings highlight that 105 out of 193, or 54% of Member States have such legislation on the right to access government information. On the one hand, this number is relatively low given the importance of freedom of information. On the other hand, while having the right to access information is an important first step, a study has shown that such laws do not guarantee the right to information in practice.[33] 105 countries also offer online policies on open government data and 113 countries offer online personal data protection legislation, namely Data Protection Acts or an equivalent. In addition, 141 offer security features for online services (see Figure 2.4) which allow users to access national portals in a secure way.

Figure 2.4. Number of countries offering Open Government Data related legislation




The Sunlight Foundation, a non-partisan organization based in the United States of America, has created a living set of open data guidelines to address what data should be public, how to make data public, and how to implement policy (see Box 2.3).[34]

[33] For details see http://worldjusticeproject.org/sites/default/files/ogi_2015.pdf105
[34] For details see http://sunlightfoundation.com/opendataguidelines

### Box 2.3. How to implement open government data policy

- Create or appoint oversight authority
- Create guidance or other binding regulations for implementation
- Incorporate public perspectives into policy implementation
- Set appropriately ambitious timelines for implementation
- Create processes to ensure data quality
- Ensure sufficient funding for implementation
- Create or explore potential partnerships
- Mandate future review for potential changes to this policy

Source: Sunlight Foundation

Having appropriate legislation and policies in place is critical to effectively open up government data; however, it first requires the development of a shared vision within government regarding the importance of promoting openness, transparency and accountability through data sharing. This shared vision needs to be bolstered by appropriate leadership capacities, organizational frameworks, resources and appropriate infrastructure.

One of the key challenges is instilling collaborative leadership, which is capable of ensuring that ministries and government agencies at all levels are willing to share their own information and make it publicly available. Collaborative leadership can be defined as the capacity of leaders to work across organizational boundaries to inspire, engage and motivate people and teams to work together in pursuit of common goals (United Nations, 2014a). Collaborative leaders have the task to exemplify the benefits of opening up data and demonstrating how society as a whole can use and reuse the data to its advantage. In this regard, civil servants need to be encouraged to break down organizational silos.

Another challenge is that public servants may not have data-driven mind-sets and capacities. They may not fully understand the great potential of opening up data and they may lack the necessary skills to open up data and manage open government portals, once made available. All of these issues require careful attention in terms of human resources planning, recruitment, training and development; as well as lifelong learning within the public sector. Government organizations may face a shortage of talent and capable employees who are able to manage open government data and use Big Data analysis. Data literacy among the general population is another critical challenge. In fact, only if people know how to access and use the data can they leverage it for increased participation and use it to hold governments accountable.

Clear data governance is also a must before opening up any data. To ensure better coordination of data governance within the public sector and to promote an overall strategy, some countries have put in place agencies that are responsible for Open Government Data, usually led by Chief Data Officers (CDO). The role of the CDO varies according to country-specific conditions, but in general, such a role is responsible for the design and implementation of an overall data governance strategy and structure, as well as for effective management processes, including data-flows across government. The CDO is responsible for setting standards, principles and monitoring mechanisms. It is also responsible for promoting a cultural transformation within government regarding perceptions about data. Through capacity development activities, public officials can come to view data as a valuable public asset that can be used for more effective decision-making and better public engagement.

In addition to institutional structures responsible for data governance in the public sector, some countries have also established Information and Privacy Commissioners. The latter are generally responsible for ensuring that government agencies comply with the right to information and privacy laws. They look into complaints of people who are denied access to

government information, they investigate privacy complaints about information managed by governments, and they provide advice on government legislation. The key elements of open government data regulatory and institutional frameworks are illustrated in Box 2.4.

**Box 2.4 Key elements of open government data institutional and regulatory frameworks**

- Provision in Constitution on Access to Information
- Legislation on Access to Information
- Provision in Constitution on Data Privacy
- Legislation on Data Privacy
- Legislation on Open Data
- Ratification of International Treaties on Access to Information & Data Privacy
- Open Government Data Policy

**Organizational Framework**

- Existence of Chief Data Officers
- Existence of Information (Privacy) Commissioner
- Information Commissioner or equivalent is independent of the Executive

Source: UNDESA, 2015

Recently, a number of countries have joined the new International Open Data Charter, which has an "overarching goal to foster greater coherence and collaboration for the increased adoption and implementation of shared open data principles, standards and good practices across sectors around the world". To ensure these principles are translated into reality – with data published openly and used by all – the Charter also includes specific actions, practical advice and guidance on implementation. A robust, independent measurement process will be put in place, ensuring adopting governments are held to their promises. The Charter's ongoing development is being overseen by a group of "lead stewards", drawn from the worlds of government, civil society and the private sector.[35]

### 2.3.2. Quality, relevance, accessibility, security and privacy of government data

In its recent report, the Secretary General's Independent Expert Advisory Group on the Data Revolution for Sustainable Development highlighted the need for a "global consensus on data." It called for the adoption of principles concerning legal, technical, privacy, geospatial and statistical standards which are designed to facilitate openness and information exchange while promoting and protecting human rights (United Nations, 2015b, p. 13). In fact, one of the critical issues that many governments face today is what data to open and how to open it, so that it is relevant, timely, accessible and usable. Some countries have adopted the principle that data should be "open by default". This means that governments should release all electronic data in open standard formats unless there are serious reasons to believe that doing so would infringe upon privacy rights or cause threats to security.

Data can be considered open government data when the information is released in machine-readable format, there are no legal barriers to access, it is free of charge and it is available in widespread type of files or in open standards.[36] Technical openness of an open government data catalogue means that it is available on the web (regardless of format, but with an open license); available as machine-readable structured data, in non-proprietary format, uses open standards from World Wide Web Consortium (W3C) and provides linked data.

[35] For details see Web Foundation, "Seventeen Governments Adopt the New International Open Data Charter", October 29, 2015. Available from: http://webfoundation.org/2015/10/seventeen-governments-adopt-the-new-international-open-data-charter/

[36] Types of files include XML, http, HTML, CSS and WAI, RDF, OWL, SKOS, SPARQL, CVS, Json.

According to the W3C organization,[37] there are three steps to publishing open government data, which include (a) release of data in raw form (e.g., an XML file of polling data from past elections) and in a well-known structure (such as XML, RDF, etc.); (b) creation of an online catalogue of the raw data, so people know it is available and can add information about the data; and (c) making data both human and machine-readable, following accessibility requirements (Daniel Bennett and Adam Harvey, 2009).

There are eight principles related to the properties of government data, namely that data should be complete, primary, timely, accessible, machine readable, non-discriminatory, non-proprietary and license-free (see Box 2.5). Data that is incomplete or provided in nonstandard formats cannot be used properly. The quality of data released also depends on whether it is provided as a complete dataset or whether only parts of data are shared.

### Box 2.5. Eight principles of open government data

1. Complete: all public data is complete;
2. Primary: data is collected at the source, that is to say it has a high level of granularity[38] and is not in bulk;
3. Timely: it is released as soon as possible to ensure that it is readily usable;
4. Accessible: it is available on the Internet and in a form that allows it to be reused;
5. Machine readable: it is in a format that is readable by a machine for it to be reused;
6. Non-discriminatory: anyone can access the data without having to register online;
7. Non-proprietary: no entity has exclusive control over the data nor determines how it will be used; and
8. License-free: it is not subject to property rights, trademarks, patents, etc.

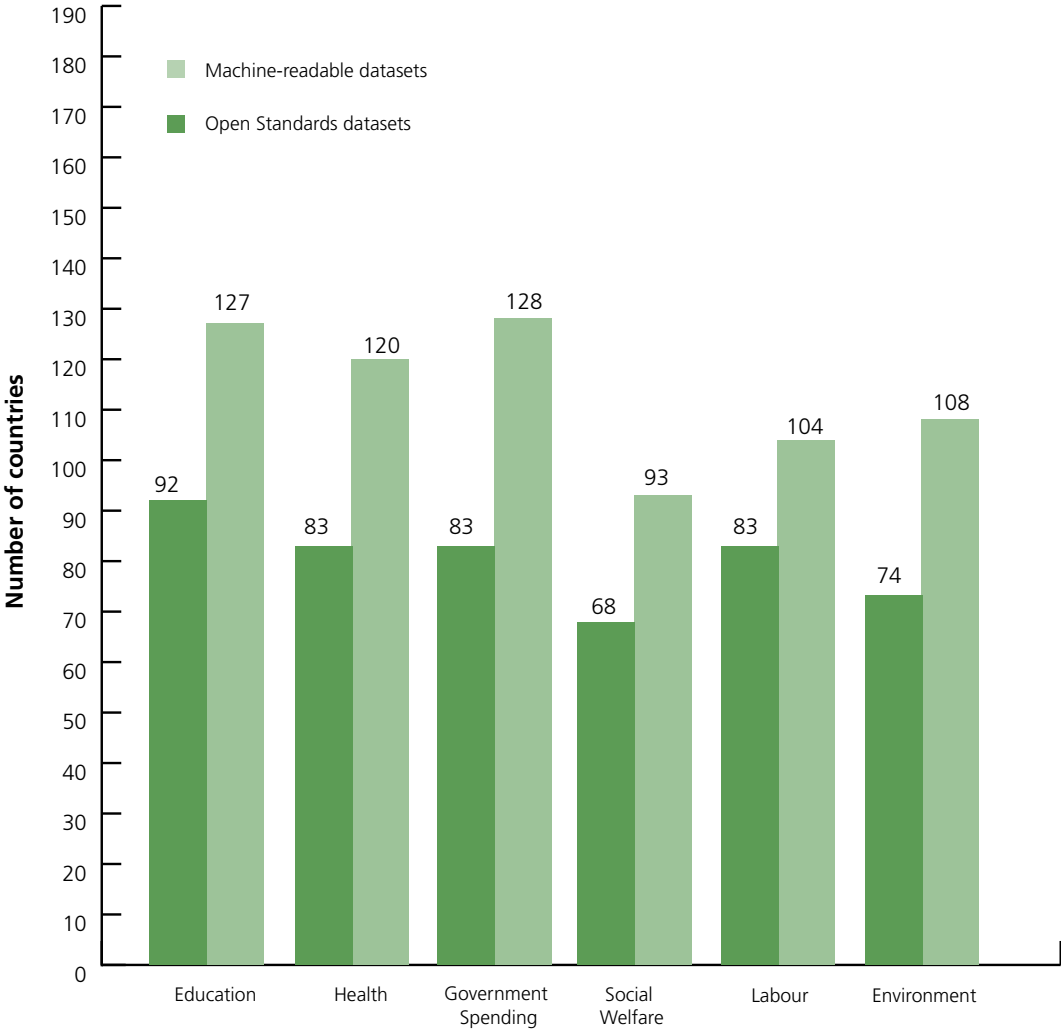
Source: http://opengovdata.org/

According to the 2016 *Survey* findings (see Figure 2.5), a higher number of countries release datasets about government spending in machine readable formats (128 out of 193 Member States) than about social welfare, labour and the environment. The latter datasets are released in open standards respectively by 83, 74 and 68 countries out of 193. These results indicate that much still needs to be done in these sectors to make them more transparent and to unleash the power of opening up government data.

[37] The World Wide Web Consortium (W3C) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards. Led by Web inventor Tim Berners-Leeand CEO Jeffrey Jaffe, W3C's mission is to lead the Web to its full potential. Contact W3C for more information. Available from: http://www.w3.org/Consortium/

[38] The granularity of data refers to the size in which data fields are sub-divided.

Figure 2.5. Number of countries offering machine readable versus open standards datasets, by sector




The regions with the highest percentage of countries that provide datasets in open standards are Europe, Asia and the Americas (see Figure 2.6.). In fact, 37 out of 43 countries in Europe offer open standards in education compared to 6 out of 14 countries in Oceania. According to the 2016 *Survey* data, there are 62 out of 193 United Nations Member States that provide datasets in open standards in 5 or more sectors. The countries that offer datasets in open standards in 5 or more sectors are in Europe and the Americas. Five countries in Africa provide datasets in open standards in 5 or more sectors: Ethiopia, Kenya, Malawi, Senegal and Uganda. Table 2.1 provides a list of countries that have open standards datasets in 5 or more sectors, by region.

Figure 2.6. Number of countries offering datasets in open standards, by region

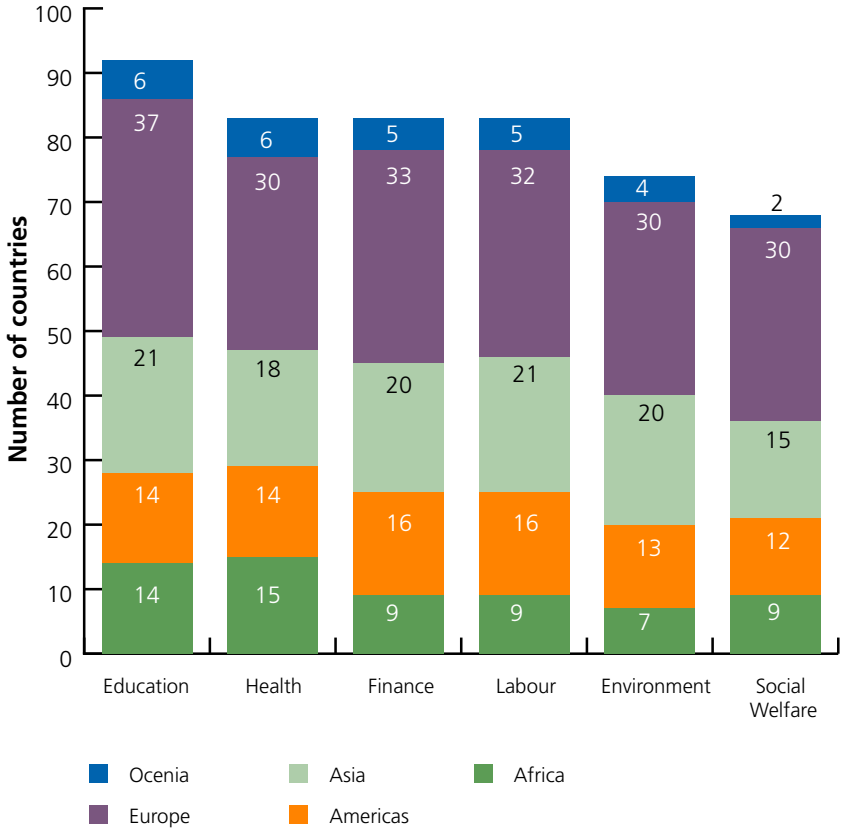



Table 2.1. Countries with open standards datasets in 5 or more sectors, by region (Education, Health, Government Spending, Social Welfare, Labour and Environment)

| Africa | Americas | Asia | Europe | Oceania |
|---|---|---|---|---|
| Ethiopia, Kenya, Malawi, Senegal, Uganda | Brazil, Canada, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Mexico, Paraguay, United States of America, Uruguay | Bahrain, India, Japan, Mongolia, Pakistan, Philippines, Republic of Korea, Singapore, Uzbekistan | Andorra, Austria, Croatia, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Norway, Romania, Russian Federation, Serbia, Spain, Sweden, Switzerland, Macedonia (TFYR), United Kingdom of Great Britain and Northern Ireland | Australia, New Zealand, Tonga |

While opening up government data has many benefits, it is important to tackle the issues of privacy and data protection, which in recent years, have concerned many countries and people. Due to growing disquiet over digital surveillance and improper use of personal data, the United Nations General Assembly has recently adopted a resolution on the "Right to privacy in the digital era" backing the right to privacy, and calling on countries to take measures to end activities that violate human rights. The resolution underscored that the right to privacy is a human right, affirming for the first time that the same rights people have offline must also be protected online. It called on Member States to "respect and protect the right to privacy, including in the context of digital communication" (United Nations, 2015). The United Nations General Assembly also emphasized that "legal systems should protect the confidentiality, integrity and availability of data and computer systems from unauthorized impairment and ensure that criminal abuse is penalized" (United Nations, 2001, sect. I, para. e). Once more, it is essential that people trust that the government, while opening up data, will protect privacy and the confidentiality of personal data.

On 21 October 2015, the Inter-Parliamentary Union (IPU) also adopted a resolution on "democracy in the digital era and the threat to privacy and individual freedoms" (Inter-Parliamentary Union, 2015). It calls on parliaments to "enact comprehensive legislation on data protection, for both the public and private sectors providing, at the minimum, for strict conditions regarding permission to intercept, collect, analyse and store data, for clear and precise limitations on the use of intercepted and collected data, and for security measures that ensure the safest possible preservation, anonymity and proper and permanent destruction of data. It also recommends the establishment of independent and effective national data-protection bodies with the necessary power to review practices and address complaints, while further urging parliaments to ensure that their national legal frameworks on data protection are in full compliance with international law and human rights standards, making sure that the same rights apply to both offline and online activities".

Security of government data is high on the agenda of many governments due to hacking and other malicious activities. Member States have reaffirmed that "building confidence and security in the use of information and communications technologies for sustainable development should be a priority, especially given growing challenges, including the abuse of such technologies for harmful activities from harassment to crime to terrorism" (United Nations 2015g, para. 41). Breaches of data security, which can be related to governments mishandling confidential information, are closely linked with cyber-security, which refers to malicious behaviours and activities on the Internet. United Nations Member States recognized the leading role for Governments in cyber-security matters relating to national security (United Nations 2015g, para. 50). They also recognized the important roles and contributions of all stakeholders, in their respective roles and responsibilities and reaffirmed that building confidence and security in the use of information and communications technologies should be consistent with human rights. They called for existing legal and enforcement frameworks to keep up with the speed of technological change and its application. In addition, they called for renewed focus on capacity-building, education, knowledge-sharing and regulatory practice, as well as multi-stakeholder cooperation at all levels (ibid).

## 2.4. Improving usage of open government data for social inclusion and citizen participation

### 2.4.1. Challenges of data access and usage for vulnerable groups

The Secretary-General's synthesis report on the 2030 Agenda emphasized the importance of a shared responsibility for the successful attainment of development goals. The report in particular stated: "If we are to succeed, the new agenda cannot remain the exclusive domain of institutions and governments. It must be embraced by people" (United Nations, 2014, p. 37). The 2030 Agenda underlined that: "People who are vulnerable must be empowered. Those whose needs are reflected in the Agenda include all children, youth, persons with disabilities, people living with HIV/AIDS, older persons, indigenous peoples, refugees and internally displaced persons and migrants" (United Nations, 2015c, para.23).

Availability of disaggregated data will be essential to help measure progress made in improving the situation of the various segments of the population, including the poorest and most vulnerable. It is also critical to shape more cohesive and inclusive policies, particularly to lift people out of poverty. Access to public information is a vital first step in promoting people's empowerment and citizen engagement in public policy decision-making processes to "leave no one behind". Access to public information is essential for democratic governance and social inclusion (United Nations, 2015f). However, if governments open up their data, but people are unable to access and use it or are unaware of its availability, this endeavour has little impact in terms of enhanced accountability and opportunities for innovation and economic growth. It is a fact that data on its own has no value. The added value comes from how people re-use the data in innovative ways.

Access to the Internet is crucial in order for people to be able to obtain online government information. As of 2015, only around 43 per cent of people globally had Internet access, only 41 per cent of women had Internet access and an estimated 80 per cent of online content was available in only a few languages. "The poor are the most excluded from the benefits of information and communications technology" (United Nations 2015g, para. 22). Bridging the digital divides between developed and developing countries and between men and women, and promoting affordable access to ICTs is therefore paramount to enabling access to government information and to reaping the full benefits of Open Government Data.

Even when people have access to the Internet, confidence in the data provided is essential to ensure data usage. In fact, "access to data alone is not enough to enable civic participation. Citizens need a belief in the quality of the information, and a trust in government responsiveness, and prior experiences often leave citizens sceptical about their ability to create change even when equipped with data" (Jesuit Hakimani Centre, 2014).

Furthermore, data is valuable when it responds to specific needs and is useful to various groups in society. For example, in the case of vulnerable groups, if the data is not relevant to their needs or accessible to persons with disabilities or older persons, it will not enable them to access information or fully participate in decisions that affect their lives. In addition to opening up data that targets the needs of vulnerable groups, it is also essential to improve data literacy, which gives people the necessary skills to interpret and use data. Supporting implementation of "data literacy programmes, providing e-learning opportunities and including data literacy as a part of school curriculum can be useful tools in this respect" (United Nations, 2015b, p.13).

The 2016 *Survey* shows that while open government data initiatives have increased across the globe in the past two years, less attention has been paid to opening up data that is targeted toward vulnerable groups. According to the 2016 *Survey*, 51 per cent of countries offer open government datasets for at least one vulnerable group. Approximately 94 countries out of 193 do not release any datasets in open standards that target the needs of vulnerable groups.

### 2.4.2. Innovative approaches to enhancing demand-driven open government data

A number of channels and modalities exist to increase people's usage of data. Government data toolkits are a noteworthy example. For example, the World Bank developed a government data toolkit that offers guidance on how to design data strategies and platforms.[39]

As mentioned earlier, UN-DESA established in 2014 a capacity development initiative on how to use open government data, in pursuit of sustainable development. The project was designed to build awareness of the potential benefits of using Open Government Data in advancing transparency, accountability and sustainable development in selected countries of Latin America and East Asia, including in Bangladesh, Nepal, Panama and Uruguay. It also assists these countries with developing policy frameworks and technical infrastructure, as well as with building the necessary capacities, for implementing Open Government Data initiatives. As part of its methodology, the project has developed an Open Government Data Online Self-Assessment Tool,[40] which is designed to quickly assess the specific local contexts, including enabling factors and obstacles and their implications. Such an assessment helps identify opportunities and challenges when introducing Open Government Data initiatives to a country.

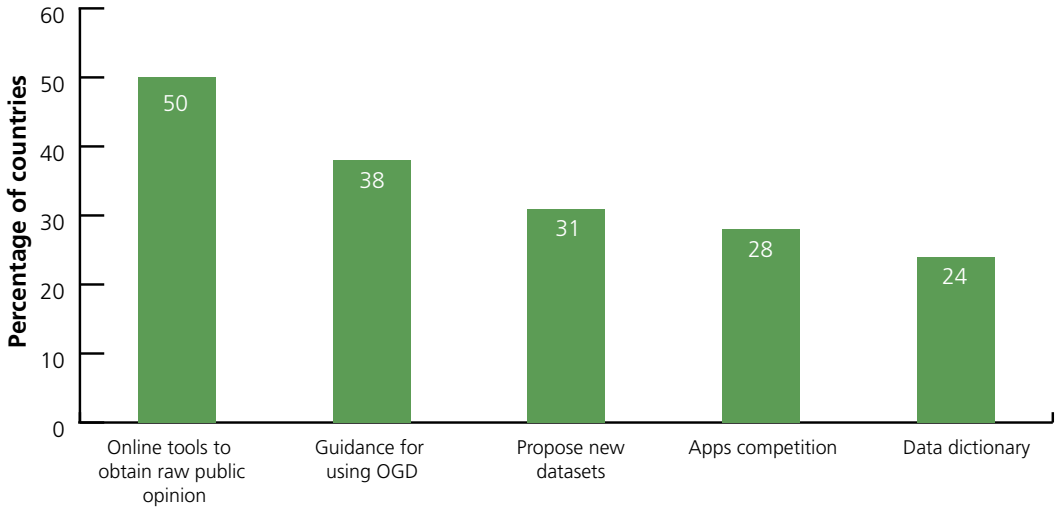
To facilitate ease of use and simplify the task of finding relevant datasets, many countries have established open government catalogues. Some governments also provide tools such as online guidance/tutorials, calendars to inform people about the release of datasets in real time, and to allow them to propose what datasets might be useful to them.

According to the 2016 *Survey* findings, 50 per cent of countries worldwide offer tools to access raw or unprocessed public opinion data and information (through online surveys and polls), which informs decision-making processes. Only 38 per cent of countries provide online guidance on how to use open government datasets, which means that greater efforts are needed to provide tutorials and information about what can be done with the datasets. Even fewer countries have mechanisms that allow citizens to propose new datasets that they might find useful. In fact, only 31 per cent of countries allow citizens to propose new datasets to governments.

Out of 193 countries, only 24 per cent provide data dictionaries, which are repositories for metadata (i.e. information describing the datas underlying concepts, methodology and structures) and help navigate complex databases to find data quickly. 28 per cent provide apps competitions, which encourage developers to compete for the best new app using specific data (see Figure 2.7). 31% of countries provide their citizens with the opportunity to propose new datasets.

[39] Available from http://opendatatoolkit.worldbank.org/en/index.html
[40] For details see http://bit.ly/DPADM-OGDProject-Methodology

Figure 2.7. Percentage of countries offering tools for Open Government Data usage




As mentioned, some countries encourage competition for the development of applications (apps competition), which incentivize people to innovate new services with data. For example, in 2014, Singapore launched a Data Visualization challenge inviting all citizens to become more aware of data and how it can be used. The premise of the challenge was for people to tell a story about the country using the data available on the national open government portal, as the country approached its 50th anniversary. Free workshops were organized so that citizens could learn from experts about how to work with data and use visualization tools; prizes were also distributed.[41]

As part of their data literacy campaigns, countries also offer workshops and training courses. Malawi for example, was one of the first countries to host a Data Literacy Bootcamp earlier this year to strengthen the capacity of media and civil society organizations to access and make effective use of open data. The country was also the first to engage policymakers at a workshop specifically designed around the use of open data (World Bank, 2013).

Awareness campaigns can be built around the concept of how open government data can help achieve the SDGs and empower people with new tools. For example, workshops and trainings can be organized at community centres, particularly for vulnerable groups, including people living in poverty, older persons, persons with disabilities, immigrants, the youth and others. Data journalism, as well as intermediaries such as grass-roots organizations, religious associations, community centres, are also playing an increasingly important role. Their re-use of government data provides information that is relevant to the needs of people living in poverty and is also easily understandable. By providing such access to information, governments will also ensure greater ownership of the SDGs since they will be better understood and known. All communication channels can therefore be utilized to reach out to socially disadvantaged groups, including through TV/Radio, the Internet, social and/or religious associations, community centres and kiosks. For example, the Kenyan Open Government Data Platform (KODI) launched in 2014, is another relevant example (see Box 2.6).

41 More details on E-citizens Ideas! available from: https://ideas.ecitizen.gov.sg/a/pages/visualisationchallenge-home

### Box 2.6. Kenya: Empowering Citizens with open government data

Kenya launched the Kenya Open Data Initiative in 2011, making government data freely available to the public through a single online portal. In 2013, a new constitution came into force, which included fundamental principles related to public participation and the promotion of a more open society. The Kenya Open Data Initiative (KODI) is geared toward increasing data availability and user accessibility for people's empowerment, especially vulnerable groups. The Data Release Calendar on the open data portal provides information on when government agencies produce and publish public datasets. The calendar is a working document to keep citizens informed about data availability. People can also request data through the 'Data Suggestions' section on the website. To target senior citizens and those with low literacy, Kenya Open Data Portal has been posting journals interpreting raw materials into graphs and simple language. The KODI team also organizes discussion fora with youth on education related issues. Research also shows that the Chief's Centres, Community Centres, Churches and Mosques can act as Intermediaries providing access to government data in urban slums and rural settlements. The open data initiative team is also developing tools to monitor the site's effectiveness. Finally, there is a blogpost section where journalists specialized in data analysis can upload information, thus highlighting data worth being considered by the public.

Source: http://opengov-data.org/

## 2.5. Conclusion

Promoting good governance and implementing the 2030 Agenda calls for effective, accountable and inclusive institutions. Not only is improving public institutions a distinct sustainable development goal, but sound public institutions are crosscutting and will underpin the achievement of all other goals. Opening up government data can be an essential measure to increase transparency and accountability, promote participation, and stimulate innovation in institutions. A number of lessons learned can be summarized as follows.

- The rights to freedom of information and open access to publicly held information are of paramount importance to ensure a transparent and accountable government.

- Increased transparency, accountability and effectiveness of public sector institutions can be enabled by e-government, particularly through Open Government Data. Providing government information online in open standards makes such information readily available for reuse by anyone.

- Open access to publicly held information may contribute to the advancement of the SDGs through better policy integration and institutional coordination, increased transparency, accountability and effectiveness of public institutions, enhanced participation and collaboration, and new opportunities for innovation and possibly, economic growth. Particularly important is data about public spending, policies and legislation to implement the SDGs, as well as information about judicial institutions in order to promote access to justice for all.

- The combination of new technologies like Big Data, the Internet of Things, geographic information systems and the use of predictive analytics are powerful tools for anticipatory governance, particularly for service delivery. Several issues, however, need to be addressed to truly capture the potential of Big Data, including appropriate regulatory frameworks and policies, notably on privacy and security issues. Also critical are the capacities to use and analyse the data and appropriate technology.

- Managing Open Government Data presents a number of challenges, including: (i) finding ways to increase political will in support of Open Government Data across different levels of government; (ii) having in place appropriate legal frameworks, policies and principles on publishing online publicly held data and allowing people to freely access information; and (iii) ensuring data management and protection, effective identity management,

privacy and cyber security. A government-wide vision, collaborative leadership, adequate human resources, appropriate legislation and institutional frameworks as well as clear data governance are essential to open up government data.

- Data on its own has no value. Innovative strategies to increase data use and to promote a demand-driven approach to data are needed, to ensure that Open Government Data has a positive impact in terms of enhanced accountability, transparency and participation in support of the SDGs. The special situation and needs of the poorest and most vulnerable people have to be addressed. Data accessibility, reliability, accuracy and usability, data literacy and trust in the data that governments share are also pre-requisites for data usage. Reaching out to the private sector, academia and civil society through multiple channels is essential. Communication channels, such as TV/Radio, the Internet, social and/or religious associations, community centres and kiosks, can all be used to inform people about the availability and many ways to use open government data. Innovative strategies, including capacity building programmes, tutorials, Open Government Data guidance tool-kits, data dictionaries, app competitions and data literacy campaigns, including awareness raising workshops for civil society, are essential to empower people to use government data. These tools should be employed to reach out to all people in society, including vulnerable groups. Ensuring access to the Internet and bridging the digital divides is critical.

# Engaging people through e-participation

## 3.1. Introduction

While e-participation is still an evolving concept, there is vast evidence that e-participation technologies expand opportunities for civic engagement, including increased possibilities for people to participate in decision-making processes and service delivery to make societies more inclusive. It helps connect "citizens with one another and with their elected representatives" (Macintosh, 2006). E-participation can be defined "as the process of engaging citizens through ICTs in policy, decision-making, and service design and delivery in order to make it participatory, inclusive, and deliberative" (UNDESA, 2013).

The Sustainable Development Goals (SDGs) call for participatory decision-making. Participatory policies and practices have expanded all over the world thanks to the use of e-information provision, e-consultation and e-decision-making. While developed countries still lead in global e-participation rankings, developing countries are also advancing and narrowing the gap, for example, in information provision. But countries are at different levels and the results of e-participation vary. In addition, these positive trends do not affect all people and societies equally. For more than 40 per cent of the world's population who lack access to the Internet, these innovative approaches are unavailable.

This chapter explores how e-participation can help promote more inclusive societies. It also provides a global and regional analysis of e-participation trends and offers an overview of existing e-participation models. It looks at the interdependence between e-information, e-consultation and e-decision-making by highlighting concrete examples from different regions. Challenges and opportunities of e-participation are also presented by examining the results relative to each level of e-participation. Innovative ways to mobilize people's ideas, as well as mobilize financial resources are also examined, including crowdsourcing and crowdfunding.

## 3.2. E-participation in support of sustainable development

The 2030 Agenda for Sustainable Development encourages governments worldwide to ensure responsive, inclusive, participatory and representative decision-making at all levels (Target 16.7). It also acknowledges that partnerships and all stakeholders will play an important role in promoting inclusive development. The UN General Assembly recognized "the potential of e-government in promoting transparency, accountability, efficiency and citizen engagement in public service delivery" (UN General Assembly Resolution 69/327, 2015c).

Photo credit: Infographic by DPADM

In this chapter:

In recent years, e-government has enabled enhanced public participation in government decisions in ways that were unthinkable in the past. The use of ICTs and the increased availability of open and innovative channels of communication between government and citizens, including social media, has made e-participation more widespread and pervasive than ever before. It allows people to interact more frequently with officials on an increasing host of issues. Today, ICTs allow the general population and non-governmental organizations "to collaborate in the design of public services and participate in their delivery to provide more coherent and integrated solutions to complex challenges" (OECD, 2014). In other words, e-participation goes beyond merely requesting people to provide their views about decisions and services proposed by the government. It mobilizes and shapes action.

Inclusive societies, environmental sustainability, and shared economic development "depend critically on effective governance capacities at national, local and municipal levels, including political commitment and leadership"; they also depend on the "legal and economic empowerment of people, especially those most excluded, and of their civil society organizations, to participate effectively in national and local decision-making" (UNDESA, 2012a).

Engaging people in decision-making is essential for the pursuit of sustainable development for a number of reasons. First, greater engagement and participation in policy-making has an intrinsic value in terms of deepening democracy and making governance more responsive and transparent.

Second, it can help realign national development strategies to meet the SDGs. In order to ensure economic growth while preserving the planet, greater participation is needed, for example on how taxes should be spent and on what services should be provided and where. In fact, engaging citizens in such processes, both at national and local levels, is instrumental to collectively deciding how to implement the SDGs, as well as redefining the missions of the State and of public administration. This is vital to ensure that people have a sense of shared ownership of the SDGs, as well as trust in their governments.

Third, people's participation in policy decisions leads to more informed strategies for poverty eradication and more inclusive societies by helping design targeted services, particularly for vulnerable groups (see Chapter 4). More targeted and inclusive e-services and e-participation can help empower women and youth and address the many challenges faced by vulnerable groups, including older persons and persons with disabilities. For example, the principle behind the current concept of "MyGov",[1] is to help provide personalized services to the people and to extend e-participation opportunities in decision-making, which in turn, helps to increase people's trust in government. In many instances, government portals provide a secure myGov individual account that allows people to access a range of government services with one username and password, all in one place. At the same time, it is critical to devise specific mechanisms and processes to include poor and vulnerable groups in decision-making at all levels.

Fourth, people's participation in policy decisions can promote effectiveness of public policy and service delivery. It can contribute resources to development efforts and cut unnecessary expenditure, since greater understanding of people's needs encourages innovative partnerships among government, businesses, academia, NGOs and the general population.

Fifth, participatory decision-making can mobilize new resources, capacities and ideas. In the past, the general public was seen as passive recipients of services and governments were the main providers of "solutions", today we witness a shift in how services are conceptualized, managed and delivered. Given the opportunity to actively participate in service delivery, people can contribute distinctive resources in terms of time, effort, ideas and expertise. As

[1] "Mygov" is a feature available on some national government web portals. It provides people with the possibility to select and save personalized services based on their individual needs.

they co-create public value through their own ideas and talents, people's participation and collaboration in service delivery promotes innovation for environmental sustainability, inclusive economic growth and social development.

The 2016 *Survey* reaffirms a growing positive trend in the relationship between people and governments towards more pro-active, people-oriented public administrations and towards a stronger focus on policy decisions that better reflect people's needs. There is a growing trend to transform the very nature of the relationship between the general population and public authorities. This shift is from the current people-centric model, whereby governments know and anticipate people's and businesses' needs, towards a people-driven model, whereby citizens and businesses determine their own needs independently from authorities and find solutions in partnership with governments. The vast networking opportunities opened up by new media channels are replacing the traditional 'upon-request' participation model (i.e. people are asked to participate when public authorities ask them to do so) with an 'on-demand' dimension whereby citizens do not wait for an invitation to contribute, but rather do so independently according to their own needs. This trend is already resulting in some countries in a shift of the role of government from service provider to solution enabler. There is a shift from a "government-to-you" approach to a "government-with-you" approach focusing on collaboration within and outside government. This is associated with an ever-increasing demand by recipients of public services to participate in public affairs, and the need to 'co-produce' policy and services. Government can also be thought of as an innovation platform that links different stakeholders and partners.

This shift in approach may have a significant positive impact on progress towards the SDGs globally and nationally. Member States have highlighted that the last decade's considerable increases in connectivity, use, creation and innovation have created new tools to drive poverty eradication and economic, social and environmental betterment. Fixed and wireless broadband, mobile Internet, smartphones and tablets, cloud computing, open data, social media and Big Data were only in their early stages in 2005, and are now understood to be significant enablers of sustainable development (UNDESA, 2015). In effect, all SDGs can benefit from the application of ICTs as long as they deepen and expand participation opportunities for all regardless of location and social status. At least four targets of Goal 1[2] "End poverty in all its forms everywhere" can directly benefit from the application of e-participation technologies that support mutual collaboration and coproduction, and increasingly, from crowdfunding mechanisms as well.

### 3.2.1. E-participation opportunities in developing countries

The priorities of the 2030 Agenda are closely aligned with the Agenda 2063 adopted by the African Union.[3] In this document, the issue of public participation, alongside poverty reduction, is put forward as central to the continent's transformation. Agenda 2063 includes three closely interrelated and important "Aspirations" that can benefit from, and be supported by e-participation. The first focuses on "A prosperous Africa based on inclusive growth and sustainable development" that sees Africa in 20 years as a continent free of poverty. This shall be achieved, inter alia, through science and technology-driven innovation. The second Aspiration focuses on "An Africa of good governance, democracy, respect for human rights, justice and the rule of law". It speaks to the commitment of Africa to strive towards democratic

[2] `See following four targets out of five of Goal 1: 1.2. By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions ; 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

[3] Note: See additional information at http://agenda2063.au.int/en/sites/default/files/06%20The%20Vision%20for%202063_.pdf.

governance, capable institutions and transformative leadership at all levels. The third Aspiration envisages an Africa whose development is driven by people, enabling all to be actively involved in decision-making at every aspect of development, including social, economic, political and environmental. Women and youth are fully engaged and empowered to play their rightful role in all spheres of life. The African Agenda 2063 also contains references and goals to improve ICT infrastructure that – when delivered – would provide the much needed tools for expanding e-participation communication channels and spaces. Several examples from African countries highlight the potential of e-participation for sustainable development, and the overarching goal of eradicating poverty. For example, Box 3.1 describes a case of successful public participation in monitoring pro-poor policies in the field of waste management, which is directly linked with Target 1.3 of Goal 1.

### Box 3.1. Mozambique: Engaging citizens in Maputo to monitor waste management services via web and SMS

Source: http://www.mopa. co.mz http://www.clubof-mozambique.com/solutions1/sectionnews.php?secao=social_development&id=2147491182&tipo=one

The Service Monitoring System or Monitoria Participativa Maputo (MOPA) is designed to support marginalized and under-served populations in overcoming barriers to entry in the urban services sector. The system is based on a software platform, Ntxuva, which is designed to collect information from people via SMS, a mobile app, and a web portal; a voice interface in local languages is used to enhance access by less educated, poorer populations. Members of the public can dial *553# or access the www.mopa.co.mz website and use a computer, smartphone or ordinary cell phone (via SMS) to report failure to empty waste bins, illegal dumping or inappropriate burning of garbage. The project involves people in the process of monitoring the quality of solid waste management services, especially when contracted to third parties (with the support of the World Bank and other bilateral donors). The system provides visualizations and statistics originated from public information about urban services. The system also promotes engagement among the local software development/innovation community. Users can add photos, comments and other clarifications for quick intervention by the city council. The Municipal Directorate of Hygiene and Cemeteries (DMSO), with the help of the municipal districts, manages and monitors the information.

The effectiveness of pro-poor policies is intrinsically linked to the level of participation of those affected by such policies. Wider use of digital technologies with more participation opportunities, for example through well-designed and purposeful online discussions, are the most widely used form of participation and are held on numerous digital networks locally, nationally and internationally. Using digitally enabled discussions in a meaningful way can help to achieve the poverty reduction targets of Goal 1. Its impact on reaching the poorest of the poor needs to be carefully assessed.

Addressing the special needs of vulnerable groups, as envisaged by the SDGs, requires collaboration in the design and delivery of public services, which have become increasingly digital. Technological approaches to open digital mapping, which require participation of many volunteers, will be important for implementing Targets of Goal 1 on "Ending poverty in all its forms everywhere" and Goal 11 on "Making cities and human settlements inclusive, safe, resilient and sustainable".

Creating digital maps of vulnerable and poor communities using for example OpenStreetMap (OSM)[4] instruments, has become an important e-participation tool when coupled with the benefits of open data. OSM – or Wikipedia of Maps – is a free and open map database of the entire world based on crowdsourcing principles.[5] This e-tool is participatory since the very success of OSM fully depends on the pro-active engagement of people in the highly collaborative process of mapping. Data are collected and uploaded by many thousands of active volunteers from all over the world and are licensed for re-use and re-distribution by anyone.

[4] Note: See more at http://www.openstreetmap.org.
[5] Note: See more at http://groundtruth.in/2014/03/25/open-community-collaborative-data-for-land-rights-and-tenure.

Such open mapping becomes indispensible in disaster response as was the case in 2010 Haiti earthquake, where OSM became the base map for the response. More recently, over 1,000 contributors helped map millions of features and damage points hit by Typhoon Haiyan in the Philippines for use by humanitarian and aid organizations. The work of the organization Humanitarian OpenStreetMap Team (HOT) illustrates the case of OSM for disaster response. For example in Indonesia, HOT collaborated with a large number of actors, including students and authorities, to collect data in OSM for disaster preparedness risk models.

Box 3.2 depicts two cases from Africa where the participatory potential of open mapping technologies has been valuable, in the context of the SDGs on poverty, availability and sustainable management of water and sanitation, infrastructure industrialization and innovation, cities and human settlements, and terrestrial ecosystems, forests, desertification, land degradation and biodiversity (General Assembly, 2015b).

### Box 3.2. Creating new models to engage people through media and community mapping

**Nairobi, Kenya.** Maps are created collectively by volunteer mappers, who are young community members living and working in disadvantaged areas, such as the slums of Nairobi. By surveying communities, they create new public information and lay out pathways, clinics, water points and markets with the goal of sharing that information as much as possible in the community, thereby creating an essential social and economic resource. In addition to providing useful information to the local government, volunteers acquire new professional skills in the field of cartography and Geographical Information Systems (GIS).

**Dar Es Salaam, Tanzania.** Since some parts of the city are prone to frequent flooding, many homes end up being abandoned and become fertile breeding ground for disease. The location of such homes was gathered for a community mapping excercise in Tanzania through OpenStreetMap (OSM) technologies. In August 2015, Dar es Salaam – especially Tandale – faced a rare cholera outbreak. The OSM-based maps helped in the response to the outbreak by identifying the most affected areas, locating victims, and providing other critically important information about water points and sanitation.

Source: http://ramani-huria.org/ focus-wards/ tandale/; https://hotosm.org/ updates/ 2015-09 23_community_map-ping_has_ long_lasting_ impact_in_tandale_dar_ es_salaam_tanzania

Experience, coming from many different countries, proves that communities, small and large, are becoming smarter in adopting digital policies. Moreover, digital information produced and disseminated in a collective and participatory manner, with the use of relevant technologies, has become an essential economic resource in its own right. Such an approach has led to new business models and more income generation for entire communities. It would be impossible to successfully achieve Goal 5 "Achieve gender equality and empower all women and girls" without effective participation of women (Target 5.5). New media technologies, along with technological skill and access will only become more critical.

Another model of collaborative participation is a "Living Lab approach" to promote local ICT-based innovations. A Living Lab is a real-life Public-Private-People Partnership (PPPP) for people-driven open innovation[6] wherein users and producers of public services co-create and co-design innovations. Living Labs are imbedded at the local level, which allows for identifying and empowering local talent. They take "research and development out of the laboratory and into the real world, engaging stakeholders, citizens and end-users in the collaborative design of new services" (Jarmo Eskelinen et al. 2015). The success of such partnerships is partly due to the improved acceptance of jointly designed and produced services. These new approaches

[6] Note: See more at http://www.openlivinglabs.eu/.

have found a responsive ground in Africa. AfriLabs is a pan-African network of technology innovation in 20 countries created with the mission to serve their communities through knowledge sharing and partnerships. Some of the new ICT development clusters include: iHub and NaiLab in Kenya, Hive CoLab and AppLab in Uganda, Activspaces in Cameroon and Kinu in Tanzania.

The success of Living Labs and other such coproduction schemes entirely depends on people's engagement and their entrepreneurial creativity, supported by local authorities and other stakeholders. Therefore, such initiatives can be instrumental to the implementation of Goal 8 "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

## 3.3. Global and regional trends of e-participation

### 3.3.1. E-participation concepts and features assessed in the *Survey*

As in previous *Surveys*, the 2016 *Survey's* E-Participation Index (EPI) measures e-participation according to a three-level model of participation that includes: (i) e-information – provision of information on the Internet, (ii) e-consultation – organizing public consultations online, and (iii) e-decision-making – involving citizens directly in decision processes. The *Survey* assesses the availability of e-participation tools on national government portals for each of the above uses. Table 3.1 summarizes the main e-participation features assessed in the 2016 *Survey*. New questions were introduced in 2016 to assess the participation of vulnerable groups through provision of targeted information, including in open formats, on policies, budget, and legal documents.

Table 3.1. Summary of assessed e-participation features

| |
|---|
| • Availability of sources of archived information (policies, budget, legal documents, budgets, etc.); use of digital channels (including mobile devices/platforms) and open data technologies in the areas of education, health, finance, social welfare, labour, environment. |
| • Availability of online information on citizens' rights to access government information (such as Freedom of Information Act or Access to Information Act) |
| • Evidence about government partnership/collaboration with third parties (civil society, private sector) to provide services |
| • Evidence about free access to government online services through the main portal, kiosks, community centres, post offices, libraries, public spaces or free WiFi |
| • Availability of open datasets (in machine-readable non-proprietary formats), related policies/ guidance |
| • Evidence about collaborative co-production, crowdfunding |
| • Evidence about engaging citizens in consultation/communication to improve online/ mobile services and raise citizens' satisfaction with them |
| • Evidence about engaging citizens in consultation/communication on education, health, finance, social welfare, labour, environment |
| • Availability of "personal data protection" legislation online |
| • Evidence about opportunities for the public to propose new open datasets to be available online |
| • Availability of e-participation policies/mission statements |
| • Availability of public procurement notifications and tender results online |
| • Availability of online tools (on the national portal) to seek public opinion and other input in raw (non-deliberative) form policy formation |
| • Evidence about decisions made that included the results of consultation with citizens online in the area of education, health, finance, social welfare, labour, environment |
| • Evidence about governments' publishing the outcomes of policy consultations online |

E-participation is enabled by three key conditions: (i) explicit focus on official policies, decisions and governance practices to ensure that they respond to people's needs; (ii) explicit focus on the means of interaction – people should be connected to communication channels in order to express themselves and communicate both among themselves as equal peers and with public authorities as equal partners; (OECD, 2001; Macintosh, 2006) and (iii) explicit focus on the content of the interaction process between citizens and government (OECD, 2001) to ensure the quality and legitimacy of e-participation outcomes.

There are different degrees of e-participation that move from more "passive" to "active" engagement (UNDESA, 2014). Active participation can be defined as "a relationship based on partnership with government in which citizens actively engage in defining the process and content of policy-making" (OECD, 2001). This definition captures the essence of public participation, both offline and online. People can be involved in public decisions and service delivery in many different ways and degrees. People can be informed of government decisions and availability of services, they can be consulted about certain decisions, or they can be asked to take part in decisions; again with varying degrees of involvement. For example, the Digital Agenda for Europe 2020 defines e-participation as an activity that "helps people engage in politics and policy-making and makes the decision-making processes easier to understand, thanks to Information and Communication Technologies (ICTs)".[7] The European e-Government Action Plan 2011-2015 titled "Harnessing ICT to promote smart, sustainable & innovative Government"[8] directly links e-participation with policy-making. The EU Member States are encouraged to use ICT-based governance and policy modelling tools for involving citizens and businesses in public consultations and debates to make policies smarter, well-focused and adaptive for greater cost-effectiveness and impact.

Other e-participation concepts follow the above mentioned three level-based approach with some variation. For example, the Inform-Consult-Empower approach places special emphasis on the reduction of technological, social, organisational, cultural, and political barriers (Lee et al, 2011). This model, which highlights the importance of active participation at all levels, is based on the availability of technological tools. It characterizes e-participation along three different levels: (i) e-enabling via informing, especially those who require special support to gain access to the right of information, (ii) e-engaging via consulting with citizens to enable deeper contributions and to support deliberative debate on policy issues, and (iii) e-empowering via supporting active participation and facilitating bottom-up ideas to influence the political agenda (Macintosh, 2004).

These models have one thing in common: they start with information provision, followed by public consultations, and end at the level where e-participation truly impacts on decision-making. In real life, however, these levels co-exist and overlap, forming numerous interactions between governments and people related to the prevailing socio-cultural and regulatory contexts of each country.

The existence of specific e-participation tools does not always imply that people's opinions and inputs will automatically be translated into actual policies. E-petition, for instance, is a stand-alone e-participation tool that is institutionalized and widely used by many people around the world. However, e-petitions are not typically preceded or accompanied by public consultations, at least on the same government-run website.[9] As a good practice, legislators will formally debate and consider those petitions that have been signed by a certain number of people.[10] Yet, such formal consideration of people's preferences does not necessarily translate into policy decisions.[11] Therefore, there is a broader and serious challenge when engaging

7 Note: See more at https://ec.europa.eu/digital-agenda/en/eparticipation, page 7.
8 Note: See at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0743:FIN:EN:PDF.
9 Note: The German Parliament's e-petition system provides the public with an opportunity to discuss the initiated e-petitions online – https://epetitionen.bundestag.de/epet/petuebersicht/mz.nc.html. In contrast, for example, this cannot be done on the website of the British Parliament.
10 Note: For example, by 100,000 as in the UK and Russia or 1,000,000 for EU-wide initiatives.
11 Note: For example, in Austria, a petition regarding financial issues of the nation was discussed by the Parliament but eventually rejected. http://www.parlament.gv.at/PAKT/VHG/XXV/SPET/SPET_00007/imfname_352653.pdf.

with petitioners. According to the findings of a report on e-petitions by the United Kingdom's Hansard Society, this tool is used more as a way to attract the attention of the public and the media, rather than to understand public opinion more deeply.[12] Nonetheless, e-petitions and the associated public debates can also be seen as an important entry point for a two-way dialogue with the public.

Likewise, the level of participation in e-decision-making does not always presume literally the direct enactment of policies and decisions. It greatly depends on the type of tool being used as well as on the intention of those using that particular e-participation tool. In the case of e-voting, where people choose political parties and candidates during elections or vote on referenda by utilizing online platforms, the inputs of citizens are translated into immediate tangible outcomes.

Overall, there is no one-size-fits all in the implementation of this concept, since each country has its own peculiar characteristics in terms of participation culture and preferred means of interaction between people and public authorities.

### 3.3.2. Global and regional rankings

According to the 2016 *Survey* (see Table 3.2.), the United Kingdom is ranked as global leader on the e-participation index while Japan and Australia share second place. Morocco, Estonia, Singapore and the United States have maintained high positions among the group of Top 25 countries, which according to both 2014 and 2016 *Surveys* include almost exclusively high-income countries.[13] China, Mexico, Montenegro and Serbia – have moved to the Top 25 performers from the Top 50 performers in the last two years. By utilizing online public consultations, they have consolidated and maintained their already solid rankings. The other countries in the Top 50 represent a more diverse group of upper and lower middle income countries, including such newcomers as Bulgaria, Mauritius, Vietnam, Ukraine, Azerbaijan, and Uzbekistan.

Table 3.2. Top 50 performers in e-participation in 2016

| Rank | Country | Rank | Country |
|---|---|---|---|
| 1 | United Kingdom | 27 | Germany |
| 2 | Japan | 27 | Norway |
| 2 | Australia | 27 | India |
| 4 | Republic of Korea | 27 | Sweden |
| 5 | Netherlands | 32 | Chile |
| 5 | New Zealand | 32 | United Arab Emirates |
| 7 | Spain | 32 | Bahrain |
| 8 | Singapore | 32 | Ukraine |
| 8 | Canada | 34 | Russian Federation |
| 8 | Italy | 37 | Brazil |
| 8 | Finland | 37 | Slovenia |
| 12 | France | 39 | Uruguay |
| 12 | United States of America | 39 | Mongolia |
| 14 | Austria | 39 | Ireland |
| 14 | Mexico | 39 | Saudi Arabia |
| 14 | Poland | 43 | Tunisia |

[12] Note : See in "E–petitions: a collaborative system". Third Report of Session 2014–15: Published on 4 December 2014 by authority of the House of Commons, Procedure Committee. London: The Stationery Office (page 17).

[13] See methodology on definition of income.

| Rank | Country | Rank | Country |
|---|---|---|---|
| 17 | Israel | 43 | Luxemburg |
| 17 | Morocco | 43 | Vietnam |
| 17 | Lithuania | 43 | Bulgaria |
| 17 | Montenegro | 47 | Malaysia |
| 17 | Serbia | 47 | Uzbekistan |
| 22 | Estonia | 47 | Azerbaijan |
| 22 | China | 50 | Portugal |
| 22 | Denmark | 50 | Sri Lanka |
| 25 | Malta | 50 | Republic of Moldova |
| 25 | Croatia | 50 | Mauritius |
| 27 | Colombia | 50 | Iceland |

To illustrate a recent programme that helped the People's Republic of China move up in ranking, Box 3.3 presents a case of public consultation on environmental issues, managed by the country's Ministry of Environmental Protection.

In the context of this *Survey*, the e-decision-making level is closely linked to e-consultation as the *Survey* assesses whether there is evidence of any decision made based on relevant online consultations. Public consultations, in the form of online deliberations, are a popular way of coordinating the formation of opinion among citizens for further decision-making processes by government.

### Box 3.3. People's Republic of China: Electronic participation in environmental governance

On the Chinese government's Ministry of Environmental Protection website, people can participate in public affairs by providing opinions on government document drafts. Among all issues, the government seeks the most opinions on "the environmental protection of cities," which reflects the government's commitment to encouraging more people to participate in decision-making about such priority items.

Source: http://english.mep.gov.cn

The top performing countries according to the E-Participation Index (EPI), utilize different approaches that allow the public to influence official decisions. The United Kingdom's engagement strategy has focused on maximizing openness and transparency in information provision in general,[14] and especially in relation to policy formulation.[15] Virtually all policy documents proposed by the government are published on Gov.uk.[16] Almost three thousand policy documents[17] were already deliberated with the public's participation or are in the process of consultation (open for both substantive and technical discussion).

At the phase of consultation, concerned individuals and organizations usually provide their inputs privately so that other participants cannot view their comments. However, at the phase of publishing the consultation results online, such inputs are usually included in the public outcome document. By doing so, the government can respond to comments and inform people of how these inputs will influence the originally proposed policies.

The Austrian government, for example, has created a directory of online consultations to inform people of the topics that are open for inputs.[18] Estonia goes further by using a

[14] Note: With as many as 83,885 publications were made public on https://www.gov.uk/government/publications (as of 9 November 2015)
[15] Note: There were 443 broad categories of government policies available for public scrutiny (as of 9 November 2015)
[16] Note: https://www.gov.uk/government/policies, https://www.gov.uk/government/publications, https://www.gov.uk/government/publications?publication_filter_option=consultations -
[17] Note: 2,876 documents as of 9 November 2015.
[18] Note: http://www.parlament.gv.at/PAKT/VHG/XXV/BI/BI_00002/index.shtml#tab-Zustimmungserklaerungen.

specialized portal, namely Osale.ee, to coordinate public inputs for policy debate. In doing so, the portal is linked to another web-based information system[19] that collects policy proposals for inter-agency coordination and subsequent presentation to the government. By using these systems, everyone can participate in public consultations online and monitor the progress of the submitted policy drafts.

The above examples are presented to demonstrate, firstly, that different approaches exist to implement e-participation activities; secondly, that such approaches depend on local contexts and circumstances; and thirdly, that while analytically it is important to distinguish between the three levels of e-participation, in practice these levels are interdependent and policy-making e-tools are effectively imbedded in public consultations. To progress in e-decision-making would inevitably mean advancing e-consultation, while doing so would require effective e-information.

Table 3.3 ranks countries according to the E-Participation Index (EPI) value, divided into four categories ranging from Low EPI (below 0.25) to Very High (over 0.75).

Comprehensive information about services delivered by the government (see Boxes 3.3 and 3.4) is key to making progress on e-participation and moving from lower to higher EPI categories since it allows people to express their opinion on salient public policies.

### Box 3.4. Uzbekistan: Improving communal and housing services online

Source: http://e-kommunal.uz/ru

This Uzbek Government website addresses issues related to the insufficient number of people paying for communal and housing services. While the reasons may vary for such underpayments, one of the key reasons is the lack of information about how much to pay and for what services. This site provides full information on these issues and includes, for example, a handy tariff calculator to check how much to pay and whether the bills are correct. There is an important feedback mechanism – a discussion forum where people can report problems they encounter in daily life. Government officials are charged with responding to queries and later informing the person who wrote about the solution. As of 10 December 2015, Uzbek people had sent 4,641messages, of which 67% were reported as being fully addressed.

Even though Europe's 43 countries constitute just 22% of the 193 member states surveyed, as many as 26 European countries account for half of the Top 50 best performers in EPI, followed by Asia (representing 28% of 193 UN member states) and the Americas (13% of 193 UN member states) (see Figure 3.1). Africa's 54 countries have a smaller presence in the Top 50 EPI performers accounting for only 6% of countries in that group. As compared to 2014, five more European countries joined the group of the Top 50. As far as sub-regional progress is concerned, Southern Europe has been the most successful in leaping towards the group of best performing countries: Croatia, Montenegro Serbia, and Slovenia.

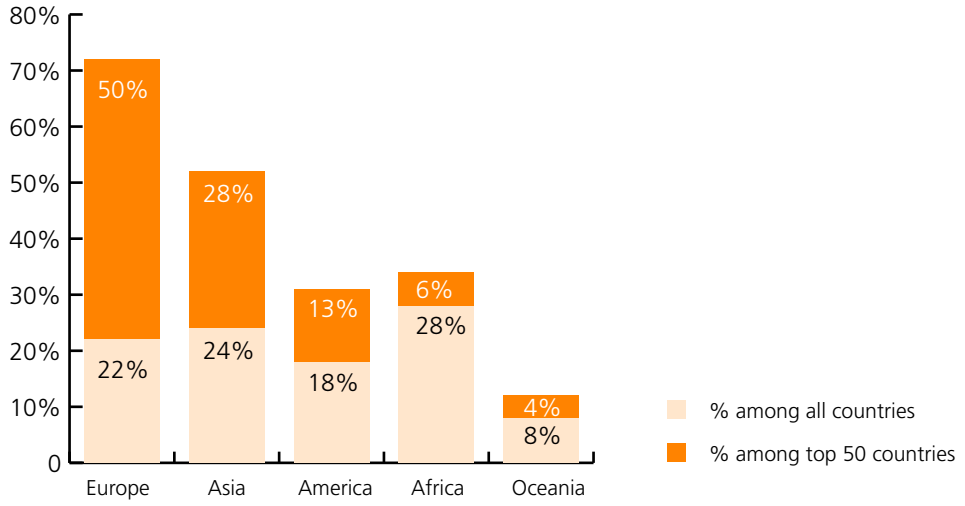
Tanzania has made the strongest progress in e-consultation reaching 63% out of 100% points possible. Box 3.5 here below describes how Tanzania has shared knowledge via online consultations. While there is progress in Africa regarding e-participation activities (as demonstrated in section 3.3.2), more resources, technologies, and capacities, and robust national policies encouraging the use of public engagement e-tools would be needed to accelerate progress. Morocco, Tunisia and Mauritius are the three countries in the African group in the Top 50, with eight more countries part of the 51- 100 Group: South Africa, Rwanda, Uganda, Cape Verde, and Ghana. Strong progress was also made by Azerbaijan (Western Asia), Ukraine (Eastern Europe), and Uzbekistan (Central Asia) as they entered the Top 50.

[19] Note: http://eelnoud.valitsus.ee/main#kL7ntnrp.

Table 3.3. Countries grouped by E-Participation Index (EPI) in alphabetical order

| Very High OSI (More than 0.75) | High OSI (Between 0.50 and 0.75) | | Middle OSI (Between 0.25 and 0.50) | | Low OSI (Less than 0.25) |
|---|---|---|---|---|---|
| Australia | Albania | Portugal | Afghanistan | Saint Vincent and the | Algeria |
| Austria | Argentina | Qatar | Andorra | Grenadines | Antigua and Barbuda |
| Bahrain | Armenia | Republic of Moldova | Angola | Samoa | Benin |
| Canada | Azerbaijan | Romania | Bahamas | Senegal | Burkina Faso |
| Chile | Bangladesh | Saudi Arabia | Barbados | Seychelles | Burundi |
| China | Belarus | Slovakia | Belize | Sudan | Cambodia |
| Colombia | Belgium | Slovenia | Bhutan | Suriname | Cameroon |
| Croatia | Bolivia | South Africa | Botswana | Swaziland | Central African Republic |
| Denmark | Bosnia and | Sri Lanka | Brunei | Syrian Arab Republic | Chad |
| Estonia | Herzegovina | Switzerland | Darussalam | Timor-Leste | Comoros |
| Finland | Brazil | Thailand | Cape Verde | Togo | Congo |
| France | Bulgaria | The former Yugoslav | Cuba | Tonga | Côte d'Ivoire |
| Germany | Costa Rica | Republic of Macedonia | Dominican Republic | Trinidad and | Democratic People's Republic of Korea |
| India | Cyprus | Tunisia | Egypt | Tobago | Democratic Republic of the Congo |
| Israel | Czech Republic | Turkey | Ethiopia | Uganda | Djibouti |
| Italy | Ecuador | United Republic of Tanzania | Fiji | Venezuela | Dominica |
| Japan | El Salvador | Uruguay | Ghana | Zambia | Equatorial Guinea |
| Lithuania | Georgia | Uzbekistan | Grenada | Zimbabwe | Eritrea |
| Malta | Greece | Viet Nam | Guyana | | Gabon |
| Mexico | Guatemala | | Honduras | | Gambia |
| Montenegro | Iceland | | Hungary | | Guinea |
| Morocco | Ireland | | Indonesia | | Guinea-Bissau |
| Netherlands | Kazakhstan | | Iraq | | Haiti |
| New Zealand | Kenya | | Jamaica | | Iran (Islamic Republic of) |
| Norway | Kuwait | | Jordan | | Lesotho |
| Poland | Kyrgyzstan | | Kiribati | | Libya |
| Republic of Korea | Latvia | | Lao People's Democratic Republic | | |
| Russian Federation | Liechtenstein | | Lebanon | | |
| Serbia | Luxembourg | | Liberia | | |
| Singapore | Malaysia | | | | |
| Spain | Mauritius | | | | |
| Sweden | Mongolia | | | | |
| Ukraine | Nepal | | | | |
| United Arab Emirates | Oman | | | | |
| United Kingdom | Paraguay | | | | |
| United States | Peru | | | | |
| | Philippines | | | | |

Figure 3.1. Distribution of Top 50 countries in e-participation, by region (compared with the regions' percentage among all surveyed 193 countries)




## Box 3.5. Tanzania: Partnership for shaping policymaking through online consultations

Source: http://www.taknet.or.tz/home.asp; http://www.taknet.or.tz/

Tanzania Knowledge Network (TAKNET) promotes knowledge and information sharing on various aspects of social and economic development of national interest to stimulate discussions by informing individuals about current development issues. Both the general public and experts take part in these discussions, which result in consensus building on policy issues of concern to Tanzanian society. Summaries of discussions covering the outcome of a particular topic are produced by moderators, which include recommendations and statements of best practices, and are shared with policymakers and the public. TAKNET is a joint initiative of the Government of the United Republic of Tanzania, United Nations and the Economic and Social Research Foundation.

All the countries that exhibited significant advances in their e-participation ranking have expanded their e-consultation activities, namely: from 5% to 74% in Azerbaijan, from 27% to 84% in Ukraine, and from 18% to 58% in the case of Uzbekistan. This was also coupled with moderate progress in e-information. Continued progress in the provision of public information still remains fundamental for progress in e-participation.

Table 3.4 provides the list of countries that have advanced 25 or more positions in the EPI ranking. Some of them include Small Island Developing States (SIDS), as well as other developing countries. The changes of EPI among these countries depend on a number of factors. For example, even though in 2008 Zambia was officially recognized as a country with no online presence, its leadership has focused in recent years on e-government development. Mexico has introduced some interactive channels like online web forums and feedback forms to encourage public engagement. Denmark has continued to develop e-participation mechanisms. For instance, the portal for citizens named "borger.dk" functions as a national debate and voting platform enabling different parts of society to participate in debates and votes. Moreover, it hosts blog services to create opportunities for foreigners to participate in the public life of the people of Denmark (Obi, 2010).

In Paraguay, there has been a drive to increase transparency in public management and open up new spaces for participation, including through virtual forums or bottom-up mechanisms of direct democracy. The strategic framework for e-government implementation was established by the Barbados Government in 2006 and has since continuously adjusted its strategy to cope

with the emerging challenges in service delivery. Bulgaria has also made significant progress by aligning its e-government strategy with the Digital Agenda for Europe.[20]

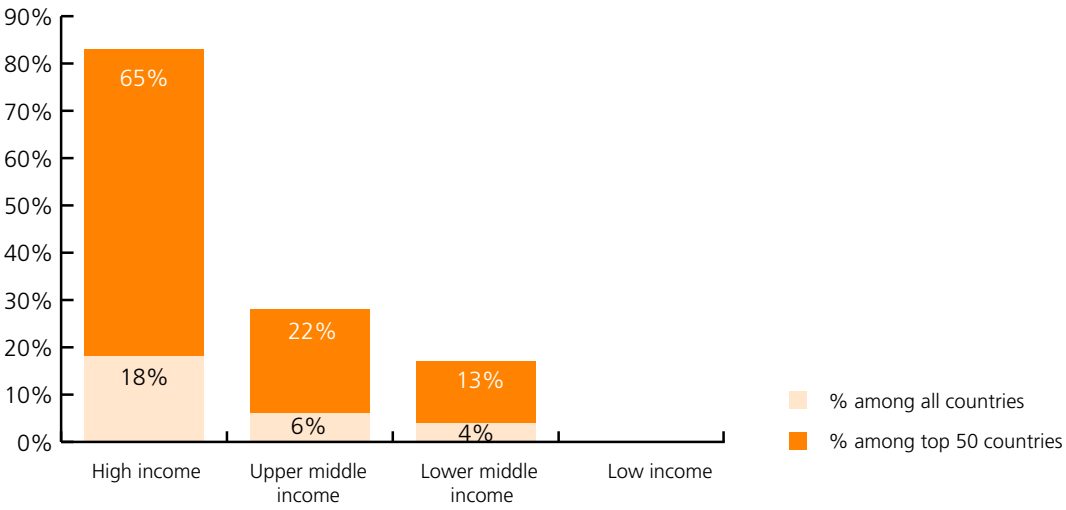
Table 3.4. Countries that have advanced more than 25 positions in the 2016 EPI ranking

| Country | Jumps | Ranking in 2016 | Ranking in 2014 |
|---|---|---|---|
| Saint Kitts and Nevis | 25 | 133 | 158 |
| Zambia | 25 | 118 | 143 |
| Austria | 26 | 14 | 40 |
| Solomon Islands | 26 | 146 | 172 |
| Angola | 28 | 101 | 129 |
| Guinea-Bissau | 29 | 157 | 186 |
| Azerbaijan | 30 | 47 | 77 |
| Suriname | 30 | 122 | 152 |
| Ethiopia | 31 | 91 | 122 |
| Liberia | 31 | 127 | 158 |
| Mexico | 31 | 14 | 45 |
| Denmark | 32 | 22 | 54 |
| Montenegro | 32 | 17 | 49 |
| Monaco | 37 | 127 | 164 |
| Bosnia and Herzegovina | 40 | 89 | 129 |
| Papua New Guinea | 43 | 149 | 192 |
| Ukraine | 45 | 32 | 77 |
| Czech Republic | 46 | 76 | 122 |
| Malta | 46 | 25 | 71 |
| Slovenia | 47 | 37 | 84 |
| Afghanistan | 48 | 104 | 152 |
| Iraq | 48 | 104 | 152 |
| Paraguay | 50 | 72 | 122 |
| Poland | 51 | 14 | 65 |
| Togo | 53 | 111 | 164 |
| Liechtenstein | 57 | 60 | 117 |
| Nicaragua | 57 | 107 | 164 |
| Barbados | 60 | 104 | 164 |
| Uganda | 61 | 91 | 152 |
| Serbia | 64 | 17 | 81 |
| Brunei Darussalam | 65 | 114 | 179 |
| Syrian Arab Republic | 66 | 98 | 164 |
| Cape Verde | 67 | 97 | 164 |
| The former Yugoslav Republic of Macedonia | 69 | 65 | 134 |
| Croatia | 72 | 25 | 97 |
| Guatemala | 77 | 60 | 137 |
| Bulgaria | 79 | 43 | 122 |

[20] Note: http://www.coe.int/t/dgap/localdemocracy/CDDG/Budapest/Contribution-Bulgaria.pdf)

Looking at income levels, two out of three countries among the top 50 performers are high income countries. No low income country features among the top 50 performers (Figure 3.2). However, having a lower income does not prevent a country from making progress in engaging people via online public consultation and deliberation tools, as is demonstrated above. Doing this and using social media does not require substantial financial resources.

Figure 3.2. Distribution of Top 50 countries in e-participation, by income level (compared with the regions' percentage among all surveyed 193 countries)




## 3.4. Trends by levels and sectors of e-participation

The most common e-participation tools and activities include but are not limited to (Panopoulou, Tambouris and Tarabanis, 2009):

- Information provision online, including Open Government Data
- E-campaigning, e-petitioning
- Coproduction and collaborative e-environments, including innovation spaces, hackathons, crowdfunding
- Public policy discourses, including crowdsourcing, online consultation and deliberation, argument mapping
- E-polling, e-voting

The success of the deployment of e-participation tools depends not only on how supportive the overall regulatory environment is, but also on whether governments enforce the actual use of e-participation tools by undertaking adequate measures to institutionalize civic engagement into organizational practices. Likewise, the effectiveness of such policies and technologies strongly depends on whether people are willing to be more active and engaged by using these tools, and whether they have the necessary digital skills and know-how to use them effectively. These new forms of engagement between government and people leave behind those who do not have access to the internet. It is essential to improve access to ICTs, especially broadband networks and services, and to bridge the digital divide in order to fulfill the potential of e-participation (see Chapter 4).

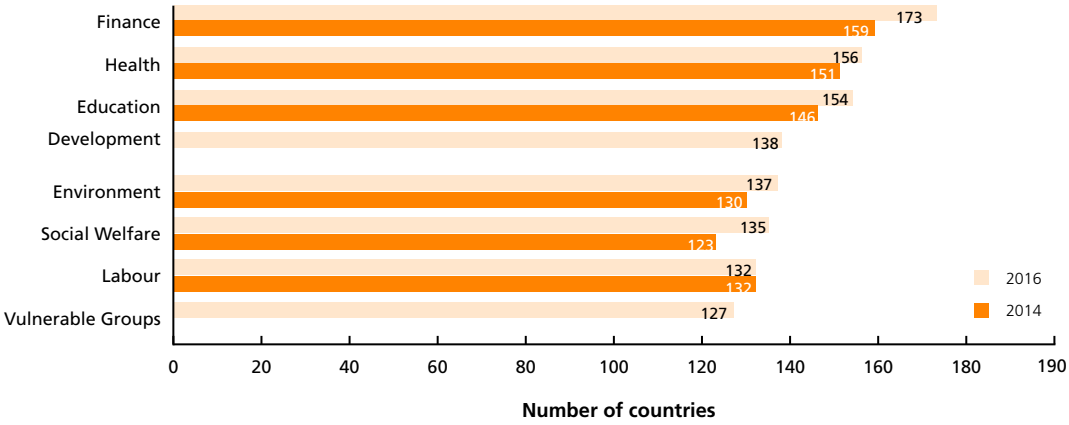
### 3.4.1. E-information

The first level of e-participation is e-information. Governments provide people with information via ICT channels in order to help them make informed choices at the next stage of consultation. E-information is critical because without access to publicly held information, participation cannot be evidence-based, fully relevant, or significant. Therefore, as outlined in Chapter 2, the right to access information is a pre-requisite for effective e-participation.

As many as 183 countries (95%) post information on the Internet in key areas such as education, health, finance, environment, social protection, and labour. Only nine countries[21] do not share such information (versus 22 countries that did not provide access to archived information on the six surveyed sectors two years earlier). The level of countries' income generally does not affect governments' ability to share some basic public sector information online. However, it influences their ability to provide specialized information and data.

The use of mobile technologies to access archived information is not yet a widespread practice. Less than one-third of countries (32%) provide an opportunity to subscribe to updates or alerts via e-mail or SMS-subscription about labour-related information. At the same time, almost half of them (47%) do so in the field of finance. The use of open government data technologies is better advanced than the use of mobile applications and platforms. More than half of the 183 countries publish open government data sets online and two-thirds release data on education and finance (Figure 3.3).

Figure 3.3. Number of countries offering archived information in 2014 and 2016, by sector and vulnerable groups



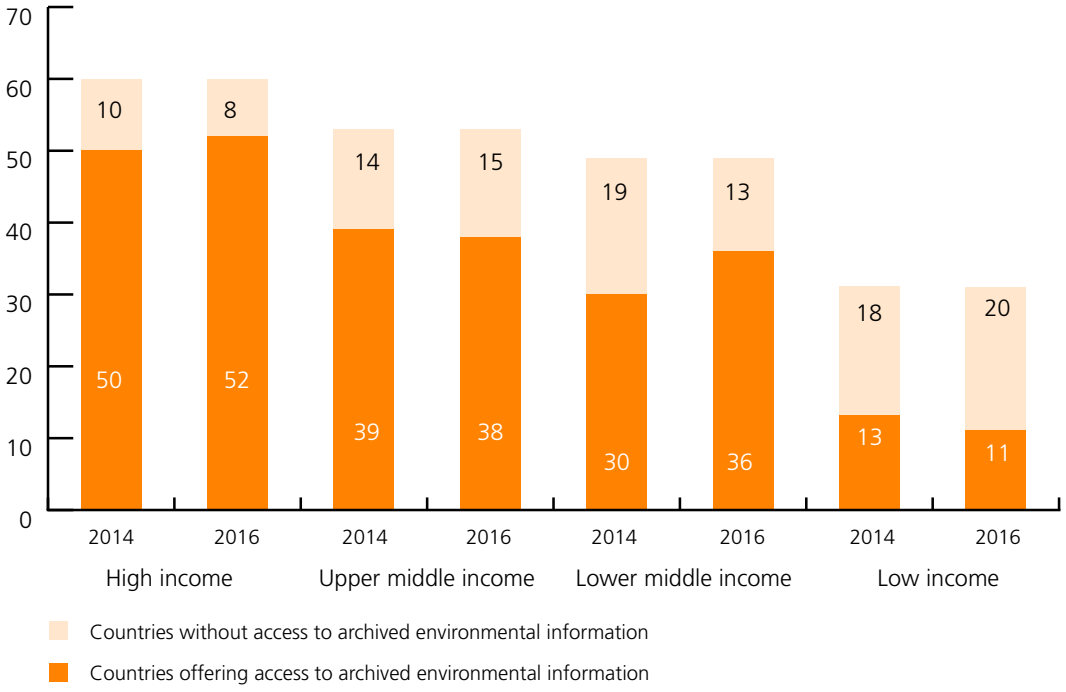

There has been progress in providing access to archived information in all of the above sectors with the exception of labour. Progress has been the greatest in finance, health, and education. As many as nine in ten countries now provide access to policies, documents and decisions in the field of finance, whereas only two in three indicate that they offer information in the field of social development (social welfare, labour, vulnerable groups[22]). Fewer opportunities exist to access public sector information about environmental protection. The provision of information targeting vulnerable and disadvantaged groups is the least advanced field.

Access to information held by public authorities in the field of environmental protection has become a normative requirement and civil right under the Aarhus Convention (UNECE, 1998). Figures 3.4 and 3.5 show that access to environmental information varies by both income and region.

21 Note: Central African Republic, Comoros, Democratic People's Republic of Korea, Eritrea, Nauru, Palau, Somalia, South Sudan and Tuvalu; and six countries – Congo, Djibouti, Gabon, Guinea, Mauritania, Sao Tome and Principe – share information in only one sector.

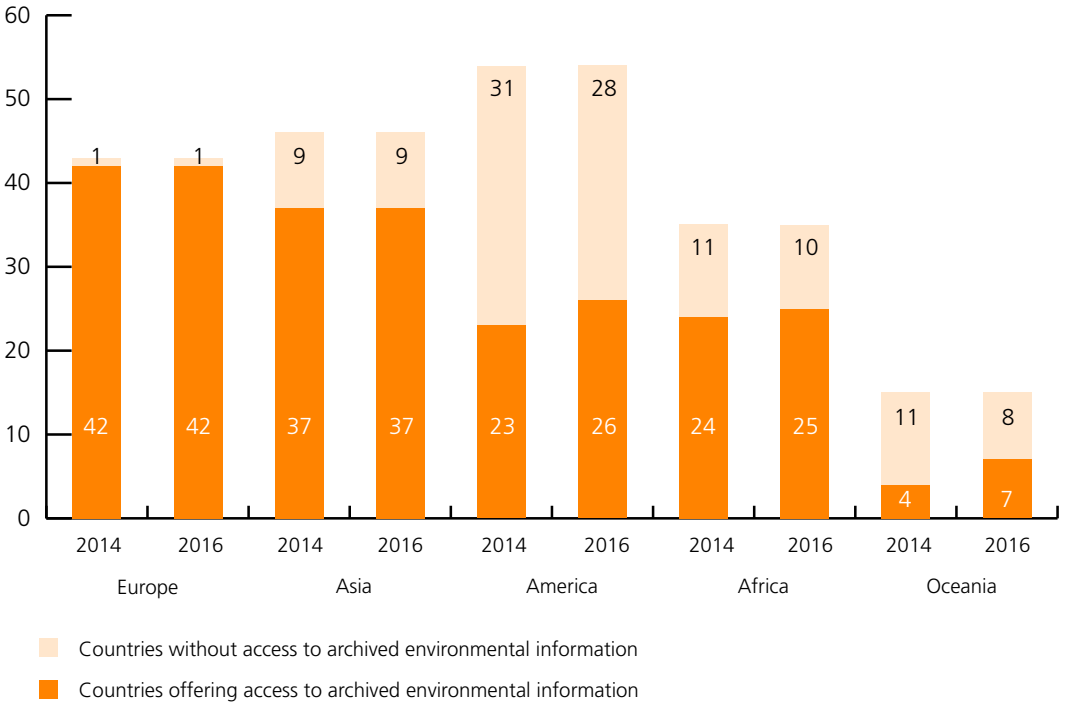
22 Vulnerable groups include children, elderly people, people with disabilities, migrant workers, minority groups and refugees.

Figure 3.4. Number of countries with and without access to archived information on the environment in 2014 and 2016, by income




Higher income countries remain more advanced in regards to informing the public about the state of the environment; however, the lower-middle income group showed the most progress, up from 30 to 36 out of a total of 49 countries that form this income group. One-third of lower-middle income countries upload open datasets on the environment. This is in contrast with the low-income group, which has slightly regressed since the last *Survey*.

Figure 3.5. Number of countries with and without access to archived information on the environment in 2014 and 2016, by region



High- and upper-middle-income European and some Asian countries are in the lead, but the number of countries offering environmental information on the web has not increased in these regions. Meanwhile, the number of countries on the African continent and in Oceania providing such information online has increased from 23 to 25 and 4 to 7 respectively. This represents a significant effort given the high level of poverty in Africa in particular.

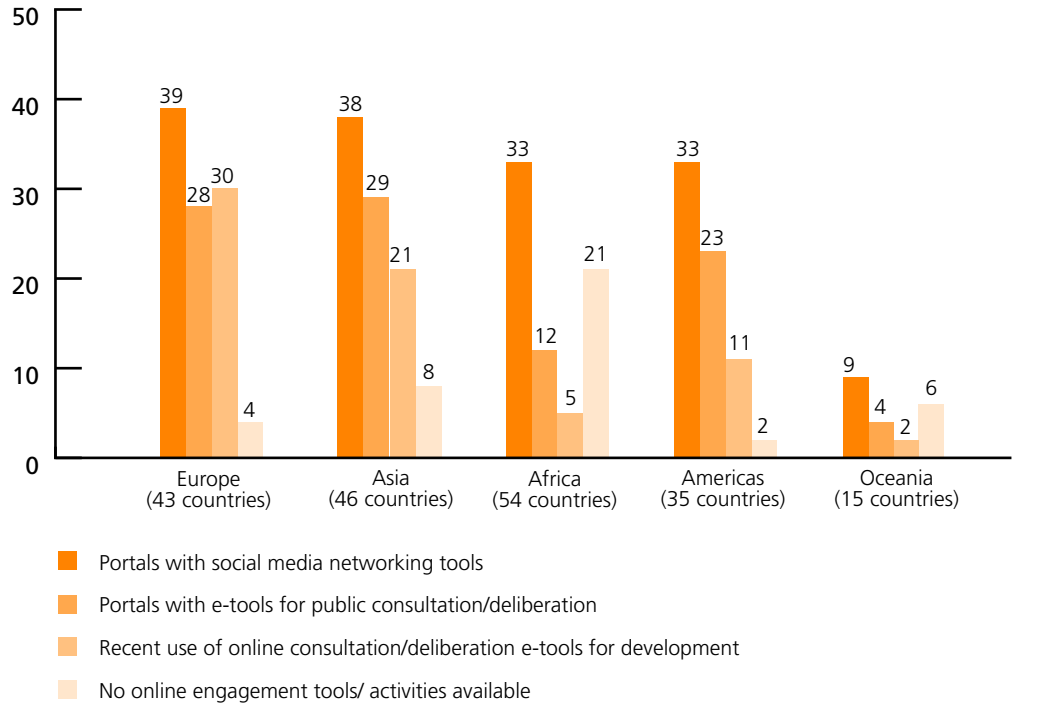
Overall, the gap between wealthier and less affluent counties is thus still substantial. This is evidenced by the fact that while 95% of the European countries share information online, only 48% countries from Africa and 33% from Oceania do so. Government portals refer to Freedom of Information laws in 38 out of the 43 European countries surveyed compared to only 14 out of 54 African countries.

### 3.4.2. E-consultation

The second level of the e-participation model is e-consultation. It means that people are consulted on a particular policy, service or project. Consultation however, does not mean that government has an obligation to use the inputs received in its policies or services. Rather, it can leverage the information received in order to better respond to the public's sentiments on a particular subject.

The interactive qualities of social media are essential for networked collaboration and conducting consultations that can reach desired constituencies that may otherwise not be reachable. Social media is easily accessible these days and does not cost much more than paying for internet connectivity and hiring a content manager. To benefit from such opportunity, many governments have established pages on social media to promote interactive networking and communication with the public. This is particularly important for those countries that do not have a dedicated portal for public consultation and deliberation online. The rise of social media has accelerated e-consultation progress – today, as many as 152 countries out of 193 (four out of five) offer social networking features, such as the "Like" button, on their national portals (i.e. there are links to, for example, Facebook, Twitter, Sina Weibo (in China), Odnoklassniki/VK in the Russian-speaking countries, etc.) As evidenced by Figure 3.6, there

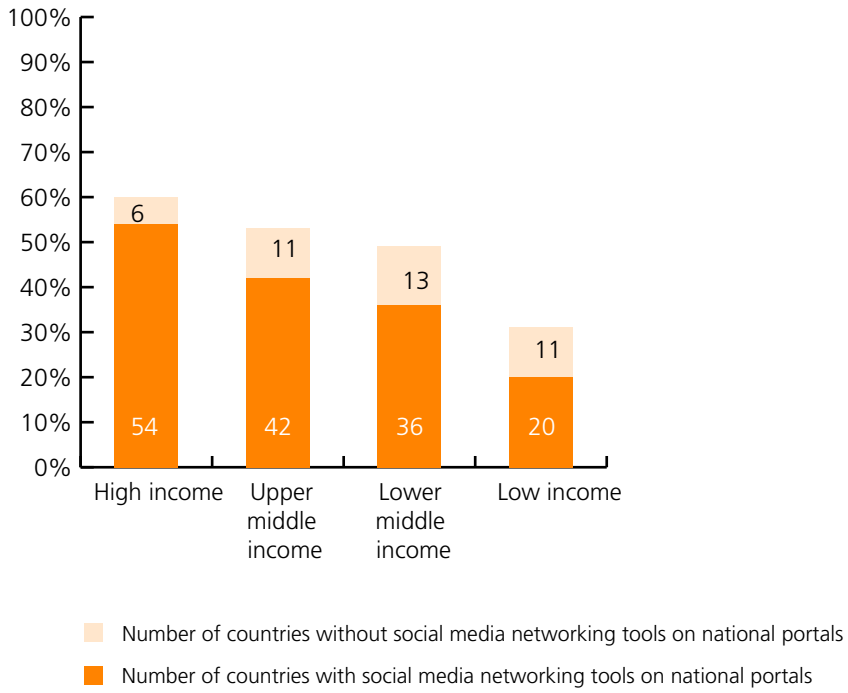
**Figure 3.6. Number of countries with online engagement tools on national portals and their usage, by region**



is no gap among the regions, which might be another manifestation of social media driven public engagement as a key trend of e-consultation. While Figure 3.6 shows that all regions offer social networking tools for public participation, the *Survey* does not provide information about their effectiveness.

Figure 3.7 shows that the availability of social media tools on national web sites and portals is becoming a routine practice for many countries, regardless of their income and development status. Yet the national portals in countries with higher income, as a rule, offer more opportunities for networking via social media.

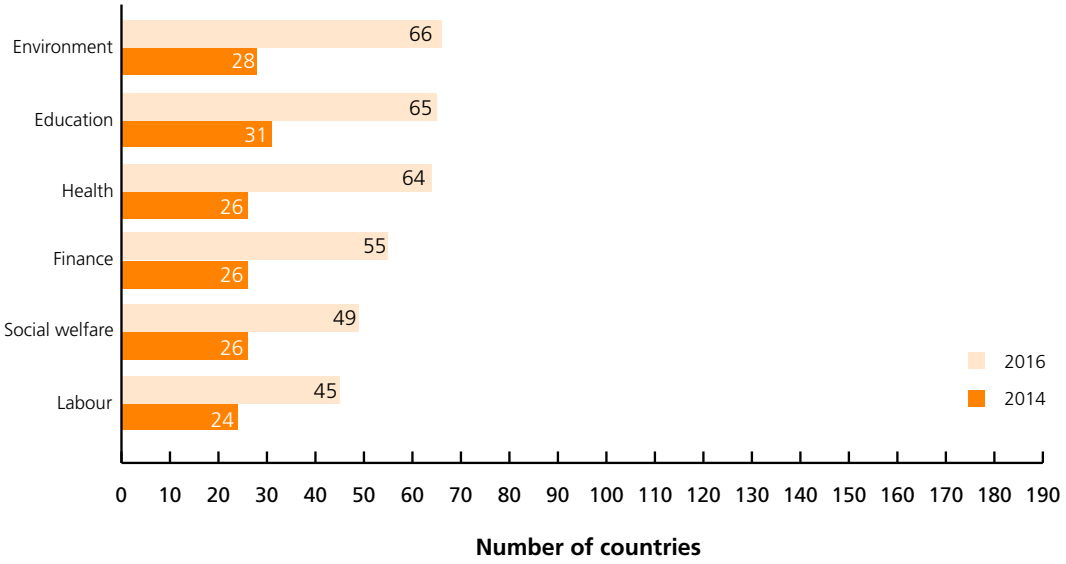
**Figure 3.7. Countries offering social media networking tools on national portals, by income**




Social media and e-tools in governance, such as online forums, polls, voting tools and petition tools provide opportunities to conduct online consultations on development issues. Since 2014, the number of countries that have adopted online consultations with citizens in key sectors has almost doubled (see Figure 3.8).

Issues related to environmental protection, education and health have been most often discussed online, with less debate regarding social welfare and employment. This mirrors the same pattern of social protection and labour services lagging behind that was seen in the provision of public information. Overall, the number of countries with web-based functionality that allows, on one hand, measuring people's satisfaction of online services and, on the other, seeking people's comments to improve public e-services provided by the government has been stable since the past *Survey*: 23% and 64% respectively in 2016 compared to 20% and 68% in 2014. The rise of e-consultation is an important sign of people engaging in a more active two-way interaction mode. It is a "reactive" form of consultation that takes place through comment seeking and satisfaction surveys, typically for assessing the up-take of e-services. Boxes 3.6 and 3.7 highlight the social media strategy of Morocco and Tunisia.

Figure 3.8. Number of countries undertaking online consultations in 2014 and 2016, by sector




## Box 3.6. Morocco: e-consultation for sustainable development policy

### Regional Development Models of the Southern Provinces

The objective of this open debate-forum, organized by the Economic, Social and Environmental Council of Morocco, is to expand participation and collect contributions from researchers and the public for a new model of integrated and sustainable development. It focuses on the administrative regions of Boujdour-Sakia, Laâyoune- Al Hamra, Oued, Ed-Dahab-Lagouira, and that of Guelmim-Es Smara and is designed to support them in fulfilling their aspirations to create more jobs and wealth.

Source: http://fr.almoubadaralakoum.ma/category/provinces-du-sud

## Box 3.7. Tunisia: e-consultation on vocational training policy

The goal of the website of the National Agency for Employment and Self-Employment (Ministry of Vocational Training and Employment) is to provide an opportunity for people to ask questions and make suggestions concerning professional education. There is also a possibility to discuss issues on the Ministry's Facebook page.

Source: http://www.emploi.nat.tn/fo/en/global.php? page=106; http://www.emploi.gov.tn/tn/; https://www.facebook.com/MFPE.GOV.TN/

The accelerated progress of e-consultation mirrors the current state of e-participation in general. However, the deployment of e-consultation tools – either via social media or specifically dedicated online deliberation instruments – is only the first step towards wider and more meaningful public engagement. The next step is to ensure that such tools make sure that truly participatory policymaking and public consultation e-tools are applied at all stages of the policy-making life-cycle. Another critical issue is to ensure that the benefits of e-participation work for the common good. This would require creating an environment of trust so that people using e-consultation tools see themselves as equal partners of the government working toward better policy development.

At the moment, many online consultation and deliberation tools are not used to their full potential, as people may not know about them, lack access or do not feel confident using them. Meaningful participation consumes people's time and effort and is therefore a public resource to be used carefully. In this regard, public authorities would need to demonstrate that they take such consultations seriously, as well as recognize people's contributions in an open and transparent manner. A best practice comes from the Gov.uk portal of the Government of the United Kingdom. Its home page invites the visitor to look at policies, check announcements and publications and engage in consultations; the site is also presented in a simple and accessible manner. By clicking, for example, on the "Consultations" button, visitors can select a policy topic proposed by the government, express an opinion and read the consultation's outcome when it closes, along with the government's position towards contributions provided by the public.[23]

### 3.4.3. E-decision-making

E-decision-making – the third level of the e-participation model – remains a serious challenge. E-decision-making refers to a process in which people provide their own inputs into decision-making processes. Two examples are: (i) direct e-voting via secure systems and (ii) identifying preferred (popular) options and proposals by rating them through social media's "Like/Dislike" or "plus/minus" functions. While policy-making is the logical pinnacle of the preceding public engagement activities, information provision and consultations are equally valuable participation forms in their own right.[24] Recently, policy discourse has gained special attention as new software tools are creating complex and sophisticated systems of deliberation online.

The *Survey's* findings provide evidence that progress in participatory decision-making is closely linked with progress in public consultation. Discussing policies and decisions with the public is becoming an increasingly common practice, as described above. The portal Gov.uk interlinks all three e-participation domains into one process. Publishing policy drafts – also supplying other relevant documents and information – for public consultation (e-information) allows for constructive and informed feedback. The Government then publishes it position on the feedback received from the public and explains any changes in the proposed policy options taken as a result of consultation by highlighting what has been taken into account and what has not and why. Such a holistic approach to e-participation expands the scope and meaning of participatory decision-making.

However, only 38 countries out of 193 Member States (20%) indicate that e-consultation outcomes have resulted in new policy decisions, regulation or service, according to the 2016 *Survey*. More countries (53) have used online consultations tools in at least one thematic area of development even though these consultations have not necessarily resulted in an actual change or the adoption of new regulation. Figure 3.9 shows that there has been a significant expansion of decision-related consultations, with education, health and environment in the lead, while the area of employment is lagging behind.

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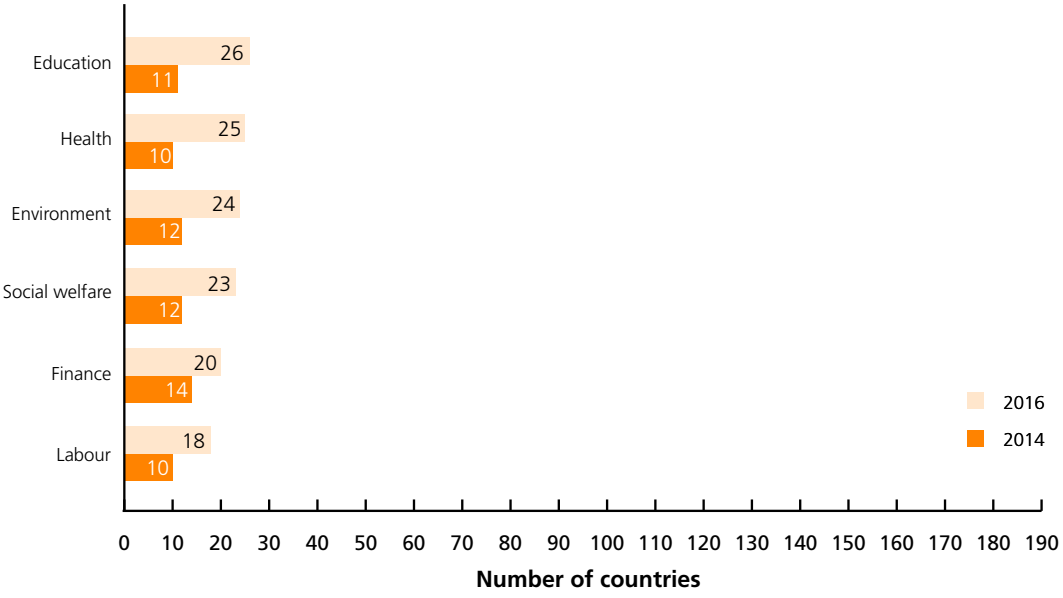
[23] Note: See more here https://www.gov.uk/government/get-involved.

[24] Note: The term 'e-participation' was used alongside 'e-engagement' and 'e-consultation'; see, for example: *Promise and Problems of e-Democracy: Challenges of Online Citizen Engagement.* Paris: OECD, 2003.

Figure 3.9. Number of countries using online consultations on policy decisions in 2014 and 2016, by sector




At the same time, these data also indicate that only one country out of ten actually made decisions following consultations with the public about development priorities. Despite the growing practice of online consultations, most consultations are not yet sufficiently institutionalized in policymaking processes. In many instances, it is not clear how well online public debate was planned and executed, which objective it pursued and what the outcome was. Further, the feedback of the public was often scarce and infrequent. Much ongoing online consultation and deliberation is still ad-hoc and in its infancy, with plenty of untapped potential.

To unlock this potential, firstly, public authorities should have a clear e-participation strategy which strikes a balance among the e-information, e-consultation, and e-decision-making domains. This obviously includes ensuring that the necessary e-tools are available. Secondly, there should be clarity with regard to the targeted population groups and regional audiences, complemented by explanations about the consultation and decision-making procedures to be used. Thirdly, public authorities should have clear rules and procedures in place to process the received contributions. They should have sufficient analytical capacity to review them and a process to report back to the public about the outcome of the consultation and its impact on policymaking. At the moment, as mentioned, only 41% of all surveyed countries have formulated their e-participation mission statements and placed them on national portals; and just 27% announced upcoming e-participation activities.

## 3.5. Challenges and opportunities of e-participation

The traditional fields of citizen participation have been effectively re-invented over the past two decades. The public and private spheres are also fundamentally changing with the advent of new ICTs, including social media. Many governments across the globe continue transforming how they engage with people by deploying new public engagement e-tools to expand and create new opportunities for potentially much deeper and wider participation. The European eParticipaiton Summary report points out "… there is a surge of grass-root, often single issue engagement in policy making... supported, and in fact driven forward, by new ICT tools" (European Commission, 2009). However, mainstreaming such e-tools into governance processes and explaining their benefits to people could pose a challenge for institutional policy making. There are a number of challenges in developing strategies to implement e-participation activities.

First, countries wishing to embark in e-participation practices need to first analyse and have a clear vision of the purpose of engaging people and what public participation tools are best suited to achieve expected results. They also need to reach out to all groups in society, including vulnerable groups. Once there is a clear understanding of the broader issues of public participation, both in terms of opportunities and challenges, then different digital technologies can be explored to fit the specific needs of a country.

Second, to ensure the effectiveness and impact of e-participation initiatives, policy-making processes should be open and inclusive and appropriate regulatory and legal frameworks should be in place. Citizens' participation in political, civic and cultural activities is important to promoting inclusion (UNDESA, 2016). "ICT can help improve governance by providing information and helping coordinate the demands of those striving for more inclusive institutions. Clearly though, ICT usage translates into meaningful change only if broad segments of society mobilize and organize in order to effect such change" (UNDESA, 2016)

Third, there is a strong need to reignite among public officials a service-oriented mentality i.e. to build or upgrade human resources capacity in this particular area. This requires a shift in the organizational culture of the public sector; one that embraces change and welcomes participation of all people. It also requires digital literacy of public officials and new skills to deal with e-tools for participation, including social media. In fact, it is not enough to place the tools on the national portal if the inputs received are not fully used because of a lack of capacity.

Fourth, countries that are willing to embrace digital technologies to implement participation in its different forms and manifestations should be prepared to anticipate and be equipped for the inevitable emergence of new challenges that are likely to arise with its adoption. There is in fact growing evidence –both from developed and developing countries– that viewing digital technology as a mere tool becomes increasingly problematic as "... once new technologies are introduced to solve old problems, the problems themselves change"( Bach and Stark, 2003). This leads to the next challenge.

Fifth, promoting effective citizen participation requires creating multiple entry points, spaces and online and offline channels to (re)connect the networked civil society with the traditionally organized hierarchies of governing institutions. The ubiquity of networked relationships creates "new modes of democratic accountability and expectations for civic efficacy", which also requires adaptation, change and innovation in the way that governments interact with people and all stakeholders.[25]

Sixth, digital literacy of people and quality access to ICTs is very important to ensure the full potential of e-participation. "While the growth of Internet users in developing countries is robust, with an increase of about 10 per cent in 2015, only 35 per cent of people in developing countries are estimated to be using the Internet, as compared with 82 per cent of people in developed countries" (UNDESA, 2015b: p. 16). This is truly the "new frontier" of e-participation.

Seventh, there has to be the political will and the processes and workflows to ensure that consultations contribute to decision-making.

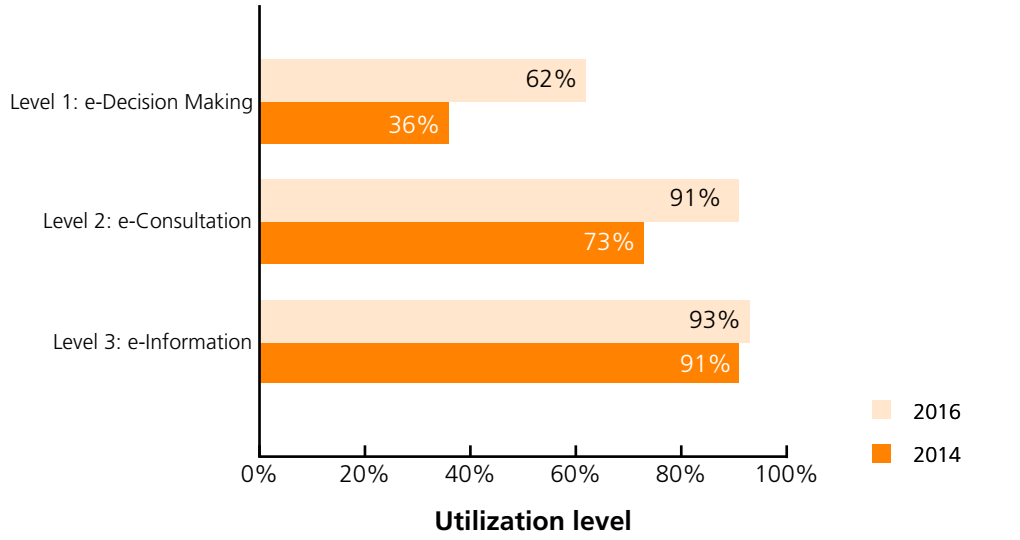
As shown in Figure 3.10, e-decision-making, perhaps the most challenging aspect of public participation (as discussed above), rose substantially among the top 25 countries in EPI, from 36% in 2014 to 62% in 2016. Such a breakthrough over just two years is an indication of the fact that the entire e-participation paradigm is becoming more mature, at least in some countries. This comes after many years of focusing primarily on information provision

[25] Note: Coleman, Stephen The Internet as a Space for Policy Deliberation pp 149-179 The argumentative turn revisited edited by Frank Fischer and Herbert Gottweis 2012 Duke University Press Books, p.152, 169.

(e-information level), which technically, is easier to implement. At the same time, it also shows that the practice of e-decision-making has expanded so much that it is becoming an important part of the policy-making cycle rather than an ad-hoc experiment.

The very notion of policy making has expanded well beyond the boundaries of decisions taken solely by governments. Now it also seeks to support the process through which people form an opinion as they deliberate on common positions using, for example, technologies of collective moderation and preferential voting within the 'liquid feedback/democracy[26] concept to ensure maximum transparency of the decision-making process. The traditional meaning of decision making, as a government-only-run-business within the constraints of public administration processes, is being transformed into an open and complex process of collaboration and decision-shaping realized both between authorities and people, and increasingly among the latter as well.

**Figure 3.10. Percentage of e-participation levels within the top 25 countries in 2014 and 2016**




As the lines between information provision, public consultation and policymaking become less visible, there is a need to increasingly consider all three e-participation levels at once, instead of one after the other. Yet, e-decision-making is still visibly below the 90% mark which was achieved in the areas of e-consultation and e-information. E-consultation has seen remarkable growth in 2016 topping 91% from 73% in 2014. E-information has achieved a maturity stage at the level of over 90%. Accelerated progress in the field of e-decision-making is facilitated, to a large extent, by the continued rise of e-consultation activities. E-consultation can be viewed as the main feature of overall e-participation progress, as shown by the top 25 countries. Public consultations on policy options and documents have become both the backbone and driver of e-participation.

### 3.5.1. E-participation divides

To obtain deeper insights into existing divides among countries, four main ranking groups may be formed according to countries' individual rankings (Table 3.5). Group 1 can be considered the best performers (Very High EPI level); this Group contains 31 countries, with ranking between 0.75 and 1 in the EPI. The second Group, i.e. High EPI, contains 59 countries, with

[26] Note: LiquidFeedback.org 'embeds a deliberative process where proposals are voted on, supported, debated and written in a collaborative way; alternative options are voted on with the Schultze algorithm. Liquid Feedback was born to support democratic deliberation within political movements (e.g., German Pirate Party) and experimented with as a way to gather ideas from the public; it is extensively practiced, for example, in Italy, De Cindio, F. and Stortone S. (2013). Experimenting liquid feedback for online deliberation in civic contexts. Electronic Participation, Springer, 147–158.

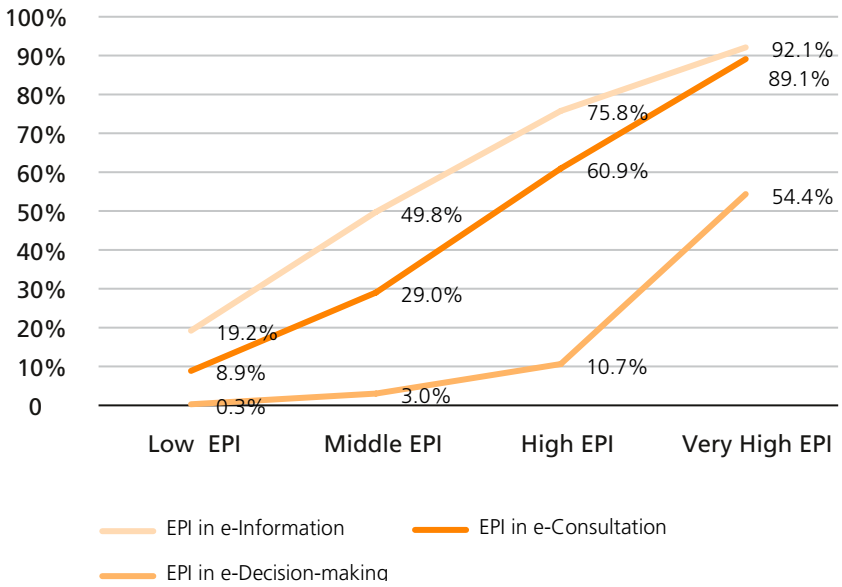
rankings between 0.50 to 0.75. The third Group, i.e. Middle EPI, consists of 52 countries with ranking between 0.25 to 0.50; and the fourth Group, i.e. Low EPI, contains 51 countries that rank from 0 to 0.25 in the EPI.

**Table 3.5. Countries grouped by EPI levels in 2016**

| | | |
|---|---|---|
| Group 1 | Very high EPI: 0.75-1 | 31 countries |
| Group 2 | High EPI: 0.50-0.75 | 59 countries |
| Group 3 | Middle EPI: 0.25-0.50 | 52 countries |
| Group 4 | Low EPI: 0-0.25 | 51 countries |

Figure 3.11 illustrates the extent to which countries have used public participation e-tools for the purposes of information provision, citizen consultation and decision-making grouped by four EPI levels (percentages indicate to which extent such tools were available at each of the three e-participation stages).

**Figure 3.11. Percentage of countries by EPI level that use public participation tools**




The findings show that the widest gaps are within the groups with Middle and High EPIs, especially between e-consultation and e-decision-making. In contrast, the groups with Low and Very High EPI levels are more homogenous, although disparities are more visible in the former with regard to the gap between e-consultation and e-decision-making. This data provides important insights into possible forward-looking strategies that could help close the existing gaps.

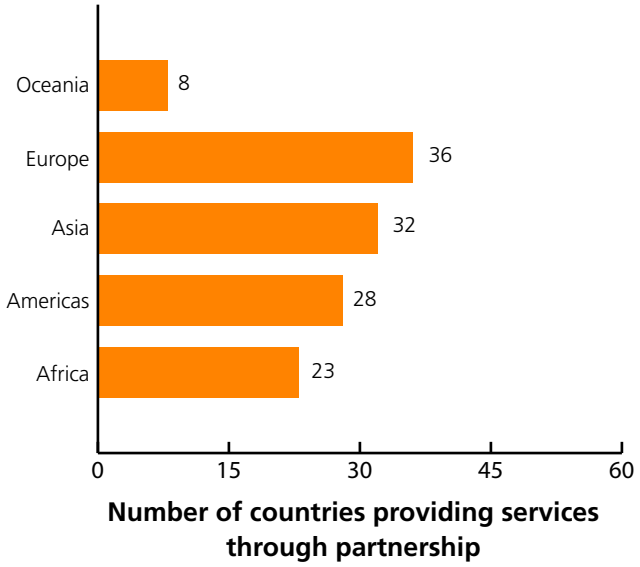
In general, to start advancing in e-participation requires progress in e-information. This should be followed by strong advancement in e-consultation. This typically leads to the High EPI group. For example, moving from Group 4 with Low EPI to Group 3 (Middle EPI) would require prioritizing e-information and e-consultation instruments so as to reach the utilization levels of 50% and 30% respectively; whereas entering Group 2 (High EPI) would require making sustainable progress in the field of e-decision-making. Joining Group 1 of Very High EPI implies the need for continued focus on deploying e-tools aimed at engaging people in policymaking. It also requires maintaining steady progress in e-information and e-consultation, while reaching at least 50% of the maximum performance level feasible in e-decision-making. Overall, it is generally easier – relatively speaking – to make progress at the e-information

stage by uploading public information online, particularly by using Open Government Data approaches and technologies. E-consultation and e-decision-making are more challenging. Yet at the same time, they are also critical to bridging e-participation divides and ensuring more inclusive societies. Again, the digital divide between countries at various development levels is a major concern.

### 3.5.2. Innovative partnerships, crowdsourcing, and crowdfunding

According to the 2016 *Survey*, a number of countries provide online services in partnerships with civil society and/or the private sector. In Europe, 36 countries have adopted innovative partnerships, 32 countries have done so in Asia and 28 in the Americas. There are also now 8 countries with innovative partnerships in Oceania and 23 in Africa (see Figure 3.12).

Figure 3.12. Number of countries providing online services in partnership with civil society or private sector, by region




Innovative Public-Private Partnerships (PPPs) have emerged as models for the provision of public services and social entitlements in areas such as education, health and environmental sustainability. Recent advances in technology, connectivity, collaboration tools, as well as improvements in management practices in both the public and private sectors, may significantly contribute to the development of PPPs. "The private sector can be a valuable partner for Governments that can in turn provide regulatory systems which are transaprent and just" (UNDESA, 2015). There is also increasing awareness among the business sector that profit is possible while undertaking socially beneficial programmes. Some companies have started to rethink their business models by turning social and global development issues into business opportunities.

Such initiatives are taking place in different parts of the world. For example in India, e-Mitra is a project that was undertaken by the government of the State of Rajasthan and local service providers. Its goal was to deliver e-government services (e.g., forms, birth certificates, information) to Indian people via dedicated centres and kiosks. In Egypt, the Egypt Smart Village is a technology park/Public-Private-Partnership (PPP) between Egypt's Ministry of Information and Communication Technology and a private consortium designed to remove obstacles for ICT firms that want to invest in the country (Witters, Marom and Steinert, 2012). The collaborative production of services via social networking and interactive web-based tools enable people to play a more active role in the design and production of public services within the context of Public-Private-People Partnerships (PPPP). The new European eGovernment Action Plan for

2016-2020 reiterates the principles of collaborative and participatory governance advocated by the Organization for Economic Cooperation and Development (OECD), as well as the continued commitment to use digital technologies for open and consistent dialogue between the public and decision-makers.

The use of ICTs in government not only offers the opportunity to improve service delivery and citizen engagement, it can also help mobilize additional resources from both the public and private sectors, which enhances collaboration of stakeholders and innovation. Multi-stakeholder partnerships can harness the resources, knowledge and ingenuity of the private sector, civil society, the scientific community, academia, philanthropy and foundations, parliaments, local authorities, volunteers, and other stakeholders. This collective power is important to generate ideas, mobilize, and share knowledge, expertise, technology and financial resources; complementing the efforts of governments; and supporting the achievement of the SDGs, in particular in developing countries (UN General Assembly, 2015a).

Leveraging the potential of ICT tools can thus supplement traditional forms of government financing, in responding to complex societal challenges. One way that ICTs can help governments in this endeavour is by utilizing crowdfunding, through social media networks, to attract funds that can support sustainable development projects and initiatives. Crowdfunding can be defined as a method of collecting many small contributions through an online platform to fund or capitalise a popular enterprise (Freeman, Nutting 2015). Crowdfunding allows citizens to fund projects they like through dedicated online platforms. In this way, crowdfunding is a form of alternative finance, which has emerged outside of the traditional financial system (Collins, Swart and Zhang, 2013).

The advent of crowdfunding provides developing countries with access to non-traditional funding mechanisms from the general public and even venture capital, as outlined in the World Bank's document "Crowdfunding's Potential for the Developing World". The Report estimates that crowdfunding could represent a $90 billion market as soon as twenty years from now, and it could be a significant factor in the developing world. According to this Report, the greatest potential lies in China, followed by the rest of East Asia, Central Europe, Latin America and the Caribbean, and the Middle East and North Africa region (World Bank, 2013). The private sector, civil society organizations and some governments are using crowdfunding as a tool to drive innovation, particularly in social development, by engaging people in projects where they may choose to invest their money. Initiatives such as Citizinvestor in the United States offer an example of how crowdfunding can be used to encourage public-private partnerships to achieve community goals and civic participation at the local level. South Africa is another country that focuses on leveraging crowdfunding to ensure social and economic development. In 2015, the South African Department of Arts and Culture and Thundafund.com, South Africa's leading crowdfunding platform for innovators and creatives, have become partners. The partnership aimed at bringing the 'Crowdfunding Creative Economy Development Programme' to the country.[27]

In the last ten years, crowdfunding has moved from supporting small ventures into supporting public services in crucial sectors, such as health and education, with financial contributions coming from the overall population. The potential of its use remains relatively high, as such financial resources remain largely untapped, especially in emerging economies. At the same time, caution is needed about properly utilising crowdfunding for public service delivery. Particularly as a tool to mobilize ideas and funds, crowdfunding poses challenges. First, social media has been successful in attracting funding for various non-governmental projects (such

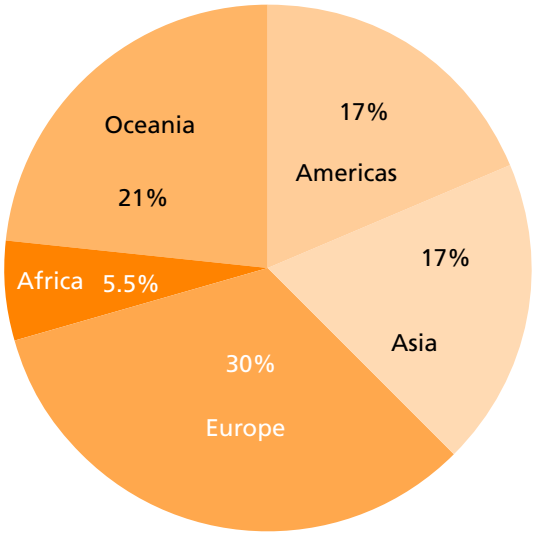
[27] Note: A draft version for public consultation; accessed on 10 December 2015 at ropa.eu/smart-regulation/roadmaps/docs/2016_cnect_006_e_government_action_plan_en.pdf"http://ec.europa.eu/smart-regulation/roadmaps/docs/2016_cnect_006_e_government_action_plan_en.pdf.

as Kiva[28]), but it has not been extensively used by governments to meet the challenges of sustainable development. The second challenge of government crowdfunding relates to effective implementation, which requires adequate public policies and regulatory frameworks at all levels. Third, increased transparency and accountability of financial institutions, as well as oversight on how the funding is used, are essential for proper financial management and to avoid misuse of funds.

The Addis Ababa Action Agenda, highlights that "blended finance instruments including Public Private Partnerships (PPPs), serve to lower investment specific risks and incentivize additional private sector finance across key development sectors led by regional, national and sub-national government policies and priorities for sustainable development" (UN General Assembly, 2015a). It also emphasizes that for "harnessing the potential of blended finance instruments for sustainable development, careful consideration should be given to the appropriate structure and use of blended finance instruments, including …. Who should share risks and reward fairly, include clear accountability mechanisms and meet social and environmental standards" (UN General Assembly, 2015a).

According to the 2016 *Survey*, 33 countries have a government policy on crowdfunding (Figure 3.13 and 3.14). Europe is leading in government policies on crowdfunding with almost 30% of countries in the region with a government policy on crowdfunding. It is followed by Oceania, which is composed of 14 countries and has 21% of overall countries in the region with government policy on crowdfunding. This is followed by Asia and the Americas both with 17% of countries to have adopted such government policies. The leading role of Europe may be attributed to well-elaborated and widely implemented policies of co-creation and co-production. In Africa, 5.5% of countries have a crowdfunding policy with 3 governments out of 54 of the region.

**Figure 3.13. Percentage of governments offering online policies on crowdfunding, by region**




[28] Note: Art of Crowdfunding for SA Artists, available at www.afai.org.za/art-crowdfundi

Despite the fact that there is a large pool of resources in many developing countries, the literature review highlights the fact that most of the lessons learnt on the initial applications of crowdfunding come from developed countries. The 2016 *Survey* shows that crowdfunding is still largely a developed-world phenomenon. Out of 193 countries total, 29 countries in the high and upper middle income groups have a government policy on crowdfunding. Only 4 countries have such a policy in the lower middle income tier, and no country has one in the low income group (see Figure 3.14).

Figure 3.14. Government policy on crowdfunding, by income

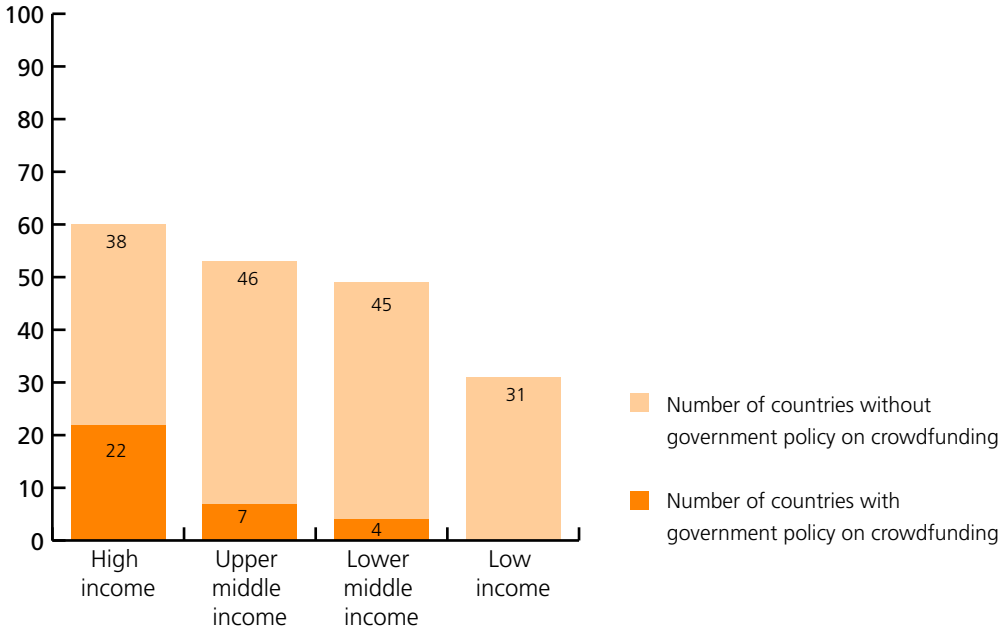



Table 3.6. Countries that have a government policy on crowdfunding, by region

| Americas | Europe | Africa | Asia | Oceania |
|---|---|---|---|---|
| Argentina | Austria | Nigeria | China | Australia |
| Canada | Bosnia and Herzegovina | Seychelles | India | New Zealand |
| Chile | Spain | South Africa | Iran (Islamic Republic of) | Samoa |
| Uruguay | Denmark | | Japan | |
| United States of America | Finland | | Lebanon | |
| | France | | Republic of Korea | |
| | Germany | | Singapore | |
| | Italy | | Sri Lanka | |
| | Netherlands | | | |
| | Serbia | | | |
| | Slovenia | | | |
| | United Kingdom | | | |

### 3.5.3. Measuring and evaluating civic participation and e-participation

Engagement and participation practices - both online and offline - help expand participatory governance and thus make sustainable development policies more people-centric and effective. Particularly important will be a better understanding of the factors that determine the level of preparedness for successful e-participation activities. Those should be measured, coded and widely shared. It is important to view e-participation holistically at every stage of the policy-making life-cycle, ranging from agenda setting to implementation to monitoring. Advancing e-participation in general will increasingly depend on progress made in devising participatory and democratic decision-making institutional frameworks and processes.

In order to assist Member States in assessing and strengthening the e-participation development process, the United Nations Department of Economic and Social Affairs (UNDESA) has developed the Measurement and Evaluation Tool for Engagement and e-Participation – METEP, which was successfully tested in Azerbaijan (2013), Kazakhstan (2014), Kenya (2015) and Uzbekistan (2015). It is an interactive application designed to measure and qualitatively assess the level, performance and further development of civic engagement and participation through ICT use at national and local levels (see http://METEP.com). The tool can assist government officials, representatives from civil society, academia and the private sector to:

- raise awareness about e-participation benefits for public administrations, and the broader expert community interested in enhancing participatory and accountable governance;

- support and improve decision-making processes at national, regional and municipal levels by assisting respective authorities in better understanding the effectiveness of their efforts to engage with people as partners;

- develop practical roadmaps of well-targeted recommendations to widen and deepen e-participation policies and practices.

## 3.6. Conclusion

The traditional approach to public participation has been substantially re-thought over the past two decades. There has been new focus on adapting existing governance processes to the rising civic activism, which has been enabled by the benefits of networked interactive digital media. The 2016 *Survey* results point to the continued increase of e-participation activities across the globe. Such increase is driven, on the one hand, by the growing volume of government-held information supplied via digital channels, especially in open data formats; and on the other hand, by the strong uptake of e-consultation activities by public authorities at all levels, due to a steady rise in the use of social media's networking opportunities. The lessons learned from this Chapter can be summarized as follows:

- The 2016 *Survey* shows that, while the more affluent countries have the highest rankings – especially European countries that are among the Top 50 performers – many developing countries have made good progress in e-participation overall, especially lower-income developing countries. Lower income levels do not hamper posting basic public sector information online and using social networking for engaging with people on a broad range of development-related issues. Yet, income levels matter when it comes to developing more technically sophisticated specialized e-participation portals. African countries generate a lot of good practices by using low-cost (open code source) ready-made solutions that facilitate collaboration among people. As shown in section 3.3.2, the use of open digital maps for pro-poor community development has been especially successful.

- In general, the actual use of e-participation tools deployed by governments is not easy to measure and even more challenging to assess in quality terms. Equally difficult is evaluating the quality of feedback people provide to government and how best to structure its content to fit the procedural aspects of decision-making. Deeper insights are needed to meet these challenges and eventually raise the efficacy of public participation so that ordinary people can have greater control over the policies that affect their lives.

- Ultimately, e-participation highly depends on strong political commitment, collaborative leadership, vision and appropriate institutional frameworks that ensure structured ways of engaging people, and guarantee that inputs provided become a meaningful part of the policy-making process.

- There are different approaches for implementing e-participation activities depending on the local context. Accordingly, there is no one-size-fits-all solution applicable for every context and at each e-participation stage. Local needs and circumstances will impact the choice of e-tools, their design features and modes of access, target audiences, forms of citizen feedback and the way such information is processed by public administrations.

- Despite the importance of local contexts, all countries can make progress in participatory decision-making by partaking in the e-consultation domain. Various forms of online deliberation and collaborative actions are integral parts of the decision-making process. However, access to and use of ICTs is essential to increase people's empowerment, including vulnerable groups. Therefore, countries should aim at providing quality access to ICTs in order for societies to fully benefit from e-participation.

- As the *Survey* suggests, public participation will be inseparably intertwined with digital media and networks. On the one hand, a stronger and consistent effort is needed to better utilize, and include in national development strategies, the opportunities of increased communication and cooperation offered by new digital networks. On the other hand, there is a need to put in place e-participation policies and strategies across key development sectors, both at national and local levels. This aims to maximize the use of existing e-participation tools, such as social media, and develop new easy-to-use civic engagement instruments dedicated to addressing specific development challenges. Enabling universal access to e-participation tools and increasing the capacity of governments at all levels to include the results of public participation into decision-making should become a strategic goal of public management innovation across the board.

- To accomplish the above objectives, e-participation will require capacity development and training programmes for government leaders, public officials and for civil society, including digital literacy for vulnerable groups, and those who represent them. However, while there has been progress in using digital media for online deliberation for participatory policymaking, the number of both developed and developing countries that do so regularly is still relatively small (for example, there are many more countries that merely contact and consult their citizens via social media or on national portals regarding non-policy issues such as the design and usefulness of the portal itself). There is significant evidence showing that e-participation technologies and related social practices can support the realization of many Sustainable Development Goals, especially those aimed at promoting pro-poor economic growth and social services. The focus on decision-making processes in key sustainable development areas should be substantially sharpened.

- But e-participation is not a panacea. Efforts to ensure transparent and accountable institutions that are focused on responding to the need of the people, are critical. As reiterated by the World Bank (World, Bank, 2016), public investment in digital technologies "in the absence of accountable institutions amplifies the voice of the elite, resulting in greater control". A major international effort is also needed to keep the Internet open and safe, and protect privacy. The 10 year review of the implementation of the World Summit on the Information Society signalled a commitment to continue addressing those concerns. It must be translated in concerted action at national and international levels. The divide between those who have access to the Internet and those who do not brings back the importance of reaching the targets of Agenda 2030 to strive toward providing universal and affordable access to the Internet in least developed countries by 2020.

# Advancing online services and bridging divides

## 4.1. Introduction

Governments are increasingly utilizing digital technologies to deliver advanced electronic and mobile services aimed at bringing benefits to all people. All sectors have seen an increase in the provision of such services, albeit to varying degrees. A major trend is the increase in mobile technologies and applications. It entails new development opportunities for the poorest and the most vulnerable, and it is driving initiatives to promote sustainable development and new ways of providing services.

As is the case for other aspects of e-government, the major challenge for the future will be to bridge the digital divides between countries and people. This requires policies in the social and economic areas, mobilizing technologies and providing services to the poorest and most vulnerable; while ensuring adequate attention to environmental aspects.

This chapter describes and analyses global trends in electronic and mobile public service delivery and sheds light on the distribution of online services by income level and sectors. It also looks at the accessibility and availability of broadband, which is a vital enabler of economic, social, and environmental progress. Furthermore, the chapter presents an integrated approach to overcoming the digital divides and looks at the trends of online government services for vulnerable groups. It also examines the concept of the Internet of Things (IoT) and the use of Geographic Information Systems (GIS) for better service delivery.

## 4.2. Progress in online service delivery

### 4.2.1. Global trends

The online services component of the E-Government Development Index (EGDI) is a composite indicator measuring the use of ICT by governments to deliver public services at national level. It is based on a comprehensive survey of the online presence of all 193 United Nations Member States. The *Survey* assesses the technical features of national websites as well as e-government policies and strategies applied in general and by specific sectors for delivery of services. The results are tabulated and presented as a set of standardized index values on a scale from zero to one, one corresponding to the highest rated online services and zero to the lowest. As with the EGDI itself, the index values are not intended as absolute measurements. Rather, they capture the online performance of countries relative to one another at a particular point in time. Because the index is a comparative tool, a high score is an indication of best current practice rather than perfection. Similarly a very low score, or a score that has not changed since the last edition in 2012, does not mean there has been no progress in e-government development. The distance between scores conveys the gap in online service delivery *(2014 UN E-Government Survey)*.

Photo credit: nmedia/Shutterstock.com

In this chapter:

As all nations of the world had an online presence during the assessment, the 2016 *Survey* provides 100 per cent global coverage. In the 2016 *Survey*, 32 countries (17%) have a very high Online Service Index (OSI) (more than 0.75). This is 10 additional countries compared to 2014. Likewise, there is an increase from 43 to 56 countries with high-OSI values (between 0.50 to 0.75). The positive trend continues as more countries reach higher levels of online services (see Figure 4.1).

Figure 4.1. Number of countries grouped by Online Service Index (OSI) levels in 2014 and 2016

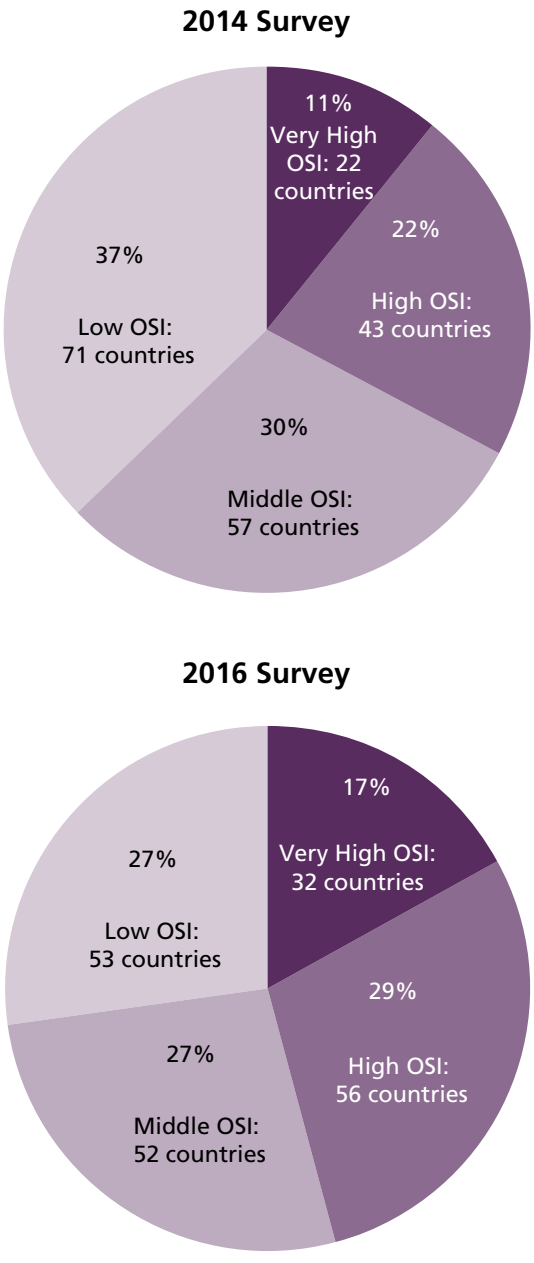



Table 4.1 provides a list of 193 countries in alphabetical order and their respective range on the OSI scale from very high (0.75 to 1) on the left of the table to low OSI on the right (less than 0.25).

## Table 4.1. Countries grouped by level of Online Service Index (OSI) in alphabetical order

| Very High OSI (More than 0.75) | High OSI (Between 0.50 and 0.75) | Middle OSI (Between 0.25 and 0.50) | low OSI (Less than 0.25) |
|---|---|---|---|
| Australia | Albania | Afghanistan | Algeria |
| Austria | Andorra | Angola | Antigua and Barbuda |
| Bahrain | Argentina | Armenia | Benin |
| Canada | Azerbaijan | Bahamas | Burkina Faso |
| Chile | Bangladesh | Barbados | Burundi |
| China | Belgium | Belarus | Cambodia |
| Colombia | Brazil | Belize | Cameroon |
| Denmark | Brunei Darussalam | Bhutan | Central African Republic |
| Estonia | Bulgaria | Bolivia | Chad |
| Finland | Costa Rica | Bosnia- Hercegovina | Comoros |
| France | Croatia | Botswana | Congo |
| Germany | Cyprus | Cape Verde | Cote D'Ivoire |
| Israel | Dominican Republic | Czech Republic | Cuba |
| Italy | Ecuador | Dominica | Democratic People's Republic of Korea |
| Japan | Ethiopia | Egypt | Democratic Republic of the Congo |
| Kazakhstan | Georgia | El Salvador | Djibouti |
| Lithuania | Greece | Fiji | Equatorial Guinea |
| Malta | Guatemala | Ghana | Eritrea |
| Mexico | Hungary | Granada | Gabon |
| Netherlands | Iceland | Guyana | Gambia |
| New Zealand | India | Honduras | Guinea |
| Norway | Ireland | Indonesia | Guinea-Bissau |
| Republic of Korea | Kenya | Iran (Islamic Republic of) | Haiti |
| Serbia | Kuwait | Iraq | Kiribati |
| Singapore | Latvia | Jamaica | Lesotho |
| Slovenia | Lebanon | Jordan | Liberia |
| Spain | Liechtenstein | Kyrgyzstan | Libya |
| Sweden | Luxembourg | Lao People's Democratic Republic | Madagascar |
| United Arab Emirates | Malaysia | Monaco | Malawi |
| United Kingdom of Great Britain and Northern Ireland | Mauritius | Namibia | Maldives |
| United States of America | Mongolia | Nepal | Mali |
| Uruguay | Montenegro | Nicaragua | Marshall Islands |
| | Morocco | Nigeria | Mauritania |
| | Oman | Pakistan | Micronesia (Federated States of) |
| | Paraguay | Panama | Mozambique |
| | Peru | Romania | Myanmar |
| | Philippines | Rwanda | Nauru |
| | Poland | Saint Kitts and Nevis | Niger |
| | Portugal | Saint Lucia | Palau |
| | Qatar | Saint Vincent and the Grenadines | Papua New Guinea |

| Very High OSI (More than 0.75) | High OSI (Between 0.50 and 0.75) | | Middle OSI (Between 0.25 and 0.50) |
|---|---|---|---|
| | Republic of Moldova | Samoa | San Marino |
| | Russian Federation | Senegal | Sao Tome and Principe |
| | Saudi Arabia | Seychelles | Sierra Leone |
| | South Africa | Slovakia | Solomon Islands |
| | Sri Lanka | Suriname | Somalia |
| | Switzerland | Swaziland | South Sudan |
| | Thailand | Syrian Arab Republic | Sudan |
| | The Former Yugoslav Republic of Macedonia | Togo | Tajikistan |
| | Trinidad and Tobago | Tonga | Timor Este |
| | Tunisia | Venezuela | Turkmenistan |
| | Turkey | Zambia | Tubalu |
| | Uganda | Zimbabwe | Vanuatu |
| | Ukraine | | Yemen |
| | United Republic of Tanzania | | |
| | Uzbekistan | | |
| | Vietnam | | |

The highest performing countries in OSI include 15 countries from Europe, 8 from Asia and 6 from the Americas. These countries stand out, among other reasons, for adopting innovative approaches to transform public sector and the delivery of services. Highlighted in Table 4.2 below, among the 32 top performing countries (OSI from 0.75 to 1), the United Kingdom of Great Britain and Northern Ireland ranks first in online service delivery in 2016, followed closely by Australia. As illustrated in Box 4.1, a number of reforms over the years have put the United Kingdom of Great Britain and Northern Ireland in the leading position in the 2016 OSI.

### Box 4.1. United Kingdom of Great Britain and Northern Ireland: progress in online public service delivery

Source: http://www.e-service-expert.com/e-Government-UK.html

The United Kingdom of Great Britain and Northern Ireland takes the top place in the 2016 Online Service Index, as the country scored well in all areas and stages of online service delivery. Its early adoption of e-government and the considerable evolution since, including many course corrections to integrate lessons learned, contributed to this achievement. In the last decade, the government worked continuously to establish the needed infrastructure; and secure government gateways, interoperability standards, authentication and broadband availability, while also deregulating the telecommunications sector.

With the basic infrastructure in place, attention was turned to ensuring faster and more innovative adoption of new technologies for online service delivery. The e-government service progression went from simply publishing information to offering basic interactions, (e.g., e-forms), to full transactional capability (e.g., filing and processing tax returns, welfare benefits, passports, etc.) and to a more complete transformation and reform of public sector online operations and public service delivery.

The governance of online public service delivery was changed with the introduction of Chief Information Officers (CIOs) Council and between the e-Government Unit of the Cabinet Office and the Office of Government Commerce. This team was set to transform online service delivery and make it citizens centred, self-service, accessible and enabling.

This marked a Whole-of-Government approach in online service delivery, where services are available in a more integrated fashion from various departments; local and central governments. Digital authentications, as well as secure access to the full spectrum of services are being ensured along with efforts to promote digital inclusion.

The European Union has established a very solid record for delivering consistent and trusted public services to its businesses. Its Single Market strategy aims to design and deliver public services to better serve citizens and businesses, while reducing costs, opening up digital opportunities, and enhancing Europe's position as one of the world leaders in the digital economy.

## Table 4.2. Top performing countries in Online Service Index (OSI), 2016

| Country | Online Service Index OSI |
|---|---|
| United Kingdom of Great Britain and Northern Ireland | 1 |
| Australia | 0.9783 |
| Singapore | 0.9710 |
| Canada | 0.9565 |
| Republic of Korea | 0.9420 |
| Finland | 0.9420 |
| New Zealand | 0.9420 |
| France | 0.9420 |
| Netherlands | 0.9275 |
| United States of America | 0.9275 |
| Austria | 0.9130 |
| Spain | 0.9130 |
| Estonia | 0.8913 |
| United Arab Emirates | 0.8913 |
| Sweden | 0.8768 |
| Japan | 0.8768 |
| Italy | 0.8696 |
| Israel | 0.8623 |
| Slovenia | 0.8478 |
| Mexico | 0.8478 |
| Germany | 0.8406 |
| Lithuania | 0.8261 |
| Bahrain | 0.8261 |
| Serbia | 0.8188 |
| Norway | 0.8043 |
| Malta | 0.7971 |
| Colombia | 0.7899 |
| Denmark | 0.7754 |
| Uruguay | 0.7754 |
| Chile | 0.7754 |
| China | 0.7681 |
| Kazakhstan | 0.7681 |

In Asia, Singapore and the Republic of Korea are among the top five countries globally. The Republic of Korea continues to implement its new vision for government operations, called "Government 3.0," placing emphasis on openness, sharing, communication and collaboration (see Chapter 1). Under this new vision the government is undergoing a paradigm shift to move away from a government-led approach to a more people-oriented approach. The holistic Government Portal integrates all major administrative services provided by individual government institutions to facilitate more effective delivery of e-government services. From one portal, people can conveniently find all the services provided by the Korean government. Efforts are continuously being made to improve operational and managerial capabilities of the portal and to provide services, such as integrated searches and individually customized services, in order to create more efficient service delivery.

The Government of the People's Republic of China has made special efforts to leverage the Internet and online services for public service delivery, bearing in mind that China has the largest number of Internet users in the world. Innovative measures in China underscore the prominence of ICT as a national priority, including the government's goal of growing e-commerce and the use of social media in citizen engagement. For example, the "WeChat" tool can be used as a means for anti-corruption or whistle-blowing purposes, while microblogging for social inclusion has become increasingly sophisticated.

Kazakhstan has been working to improve its public administration in recent years. The "100 Concrete Steps to Implement Five Institutional Reforms" was launched by the President during the 2015 Astana Economic Forum. With its innovative, holistic and Whole-of-Government approach, this initiative has the potential to support the establishment of a modern, professional and independent public service that ensures high-quality implementation of economic programmes and delivery of public services.

In North America, Canada and the United States have experienced a transformational change by providing customized services to people through greater service integration, Whole-of-Government approaches, and by continuing to release open government data and develop policies that advance co-production and co-creation of online public services.

In Latin America, Chile, Colombia, Mexico and Uruguay have adopted e-government systems for enhanced service delivery. These countries' online presence features a strategic design, aspects of open government, as well as efforts to improve institutional coordination, transparency, and ease of access.

### 4.2.2. Distribution of Online Service Index (OSI) values by income group

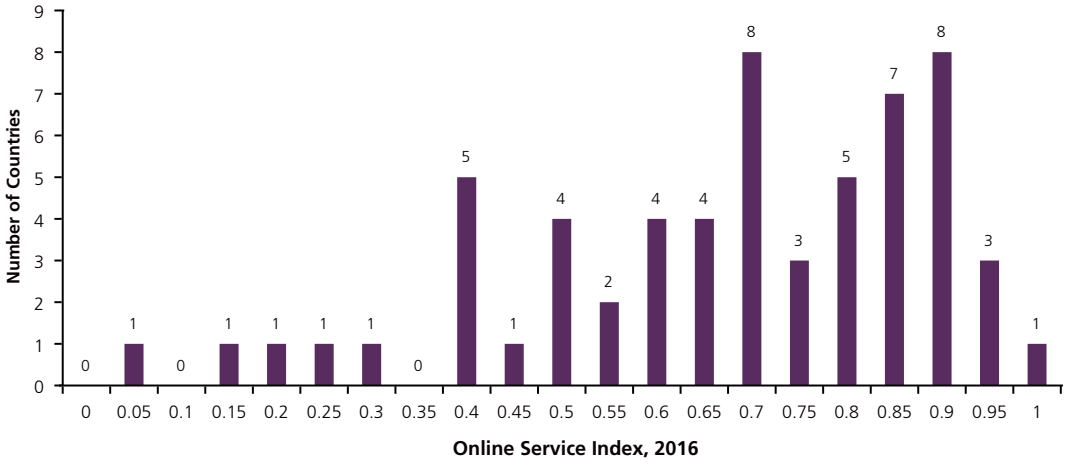
A country's level of technological advancement is positively correlated to income levels. However, a considerable variation is present within income groups (World Bank 2010). According to a number of studies such variation reflects the nature of technology, the characteristics of overall institutional and policy frameworks, and the extent to which the government has prioritized and successfully implemented delivery of public services with a strong technological component.

- **High income countries:**

  As shown in Figure 4.2.a., out of the 59 high income countries, 27 have very high OSI values (see Table 4.1). However, there are still 11 high income countries that remain with OSI values below 0.5, with the majority of those (7 out of 11 countries) being small islands states, including Barbados, Bahamas, Seychelles, Saint Kitts and Nevis, Antigua and Barbuda and Equatorial Guinea.

  The *Survey* shows that since 2014 there is a positive trend in the online service delivery of high income countries: in 2016, the number of countries with low OSI values dropped from 4 to 3; the number of countries with middle OSI values dropped from 15 to 8 whereas there was an increase in the number of countries with high OSI values from 13 to 22. Only one country joined the countries with very high OSI values.

Figure 4.2.a. Distribution of OSI values in high income countries

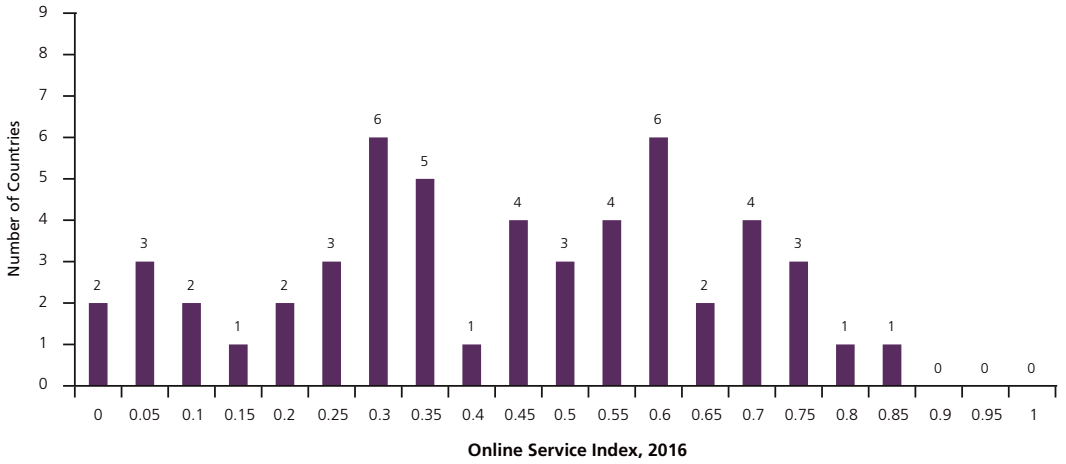



- **Upper middle income countries:**

  As shown in Figure 4.2.b, 5 upper middle income countries have very high OSI values whereas there are 10 countries at the lower end of OSI values from 0.0-0.25, amongst which a number of small islands states such Maldives, Palau, Nauru, Tuvalu and Marshall Islands.

  Overall, the upper middle income countries have experienced substantial improvements in their OSI values. The *Survey* shows that since 2014 there is a positive trend in the online service delivery: in 2016, the number of countries with low OSI values dropped from 16 to 13; the number of countries with middle OSI values dropped from 23 to 19 whereas there was an increase in the number of countries with high OSI values from 14 to 19. For the very high OSI values, there was an increase of 3 countries, from 2 to 5.

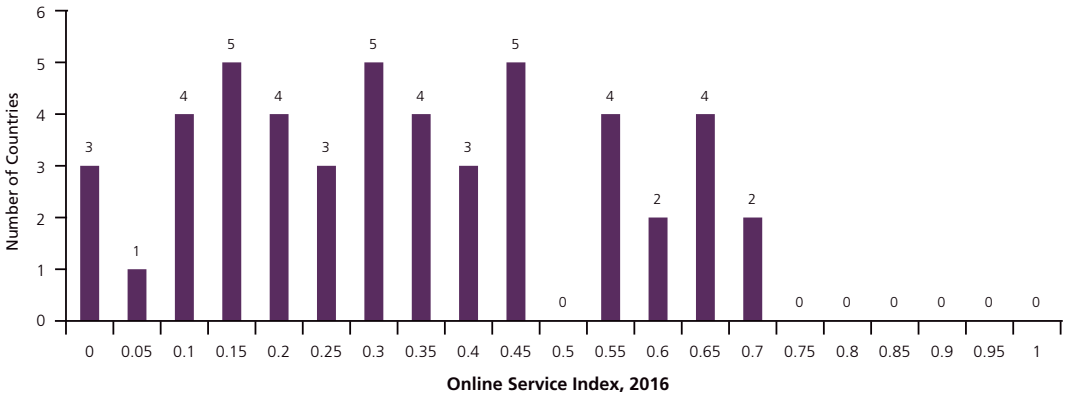
Figure 4.2.b. Distribution of OSI values in upper middle income countries




- **Lower middle income countries:**

  As shown in Figure 4.2.c, no lower middle income country has very high OSI values whereas there are 17 countries at the lower end of OSI values from 0.0-0.25, amongst which a number of Small Island Developing States (SIDS) including Timor-Leste, Kiribati, Vanuatu, Papua New Guinea, Solomon Islands and São Tomé and Príncipe, along with a number of African countries. The lower middle income countries have also experienced a moderate improvement in their OSI values. The *Survey* shows that since 2014, the number of lower middle income countries with middle OSI values increased from 14 to 20 and the number of countries with high OSI values moved from 9 to 12.

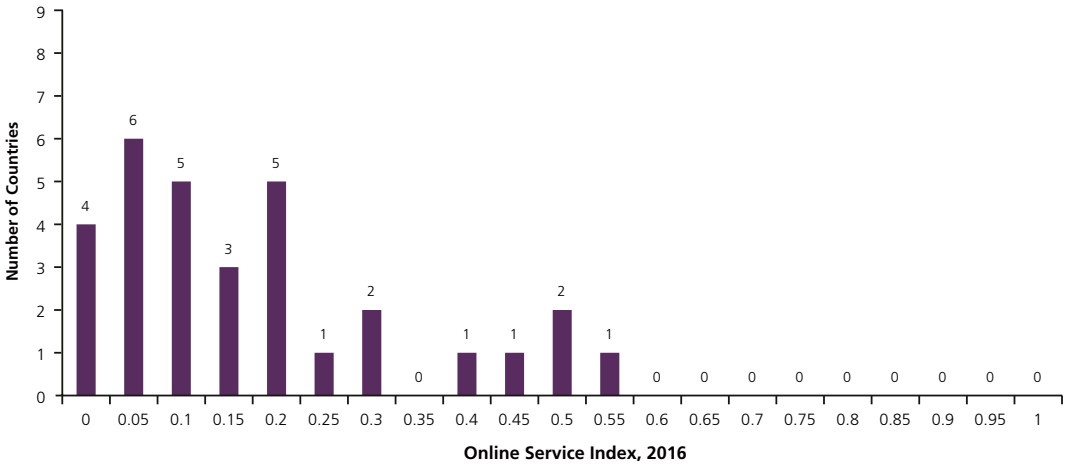
Figure 4.2.c. Distribution of OSI values in lower middle income countries




- **Lower income countries:**

  As shown in Figure 4.2.d, no lower income country has very high OSI values whereas there are still 23 countries at the lower end of OSI values, most of which are either countries in conflict or countries at the early stages of post conflict reconstruction, such as Liberia, Haiti, Burundi, Chad, South Sudan, Mali, Congo, Somalia and Central African Republic, among others. The lower income countries have experienced a very slight improvement in their OSI values. The *Survey* shows that since 2014, the number of lower income countries with middle OSI values dropped from 6 to 5 and the number of countries with high OSI values moved from 1 to 3.

Figure 4.2.d. Distribution of OSI values in lower income countries

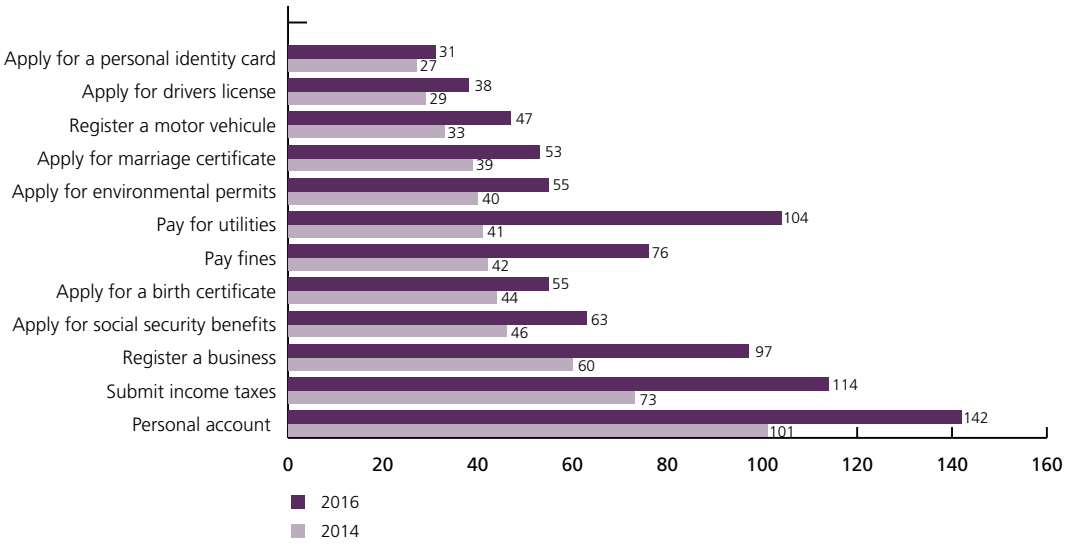



The above trends confirm that there is an empirical correlation between income levels and the OSI. However, an empirical analysis within each income group and the respective country composition shows that the size of country, geographic location, stability and stages of overall development could also highly influence the OSI.

### 4.2.3. Trends of transactional services online

By 2014, all the 193 Member States of the United Nations had national portals. The 2016 *Survey* shows continued effort by most countries to build and maintain national portals and back-end systems to automate core administrative tasks, to improve the delivery of public services and promote transparency and accountability. When compared with the 2014 data, transactional online services[1] have seen variable improvements across different types of services. Figure 4.3 provides a comprehensive breakdown of typical transactional services and the number of countries for which these services could be readily identified through the national website.

Figure 4.3. Trends of transactional services online, 2014 and 2016




[1] Transactional services on Government websites engage in two-way communication with their citizens, including requesting and receiving inputs on government policies, programmes, regulations, etc. Some form of electronic authentication of the citizen's identity is required to successfully complete the exchange. Government websites process non-financial transactions, e.g. filing taxes online or applying for certificates, licenses and permits. They also handle financial transactions, i.e. where money is transferred on a secure network. Transactional services, such as making payments online, are substantially more complicated than simply providing information. Increasing online provision of transactional services such as payments indicates maturity as well as greater integration because payments made through a single site may need to be routed to any number of accounts held by various branches of the government.

According to the *2016 Survey*, the most commonly used online service was the setup of personal accounts for the purpose of accessing personalized online services, followed by payments of utilities (see Chapters 1 and 3).

The opening of a personal account is considered a pre-condition for more advanced, transactional public services online. Almost two-thirds of the 193 countries provided for the establishment or opening of a personal account online, which represents an increase from 101 countries in 2014 to 142 countries in 2016. If the rate of growth continues at the same or similar levels, full global coverage of this online service might be reached by 2020, with all 193 countries providing online personal accounts; reflecting an important step forward in the delivery of more integrated and personalised services, as well as more efficient and transparent public service delivery overall.

Whether it is done manually or digitally, tax filing is an important service for most income earners and business entities. In order to improve tax payers' services, governments are leveraging ICTs to provide online tax services to their citizens (Kaliannan, Murali & Magiswary 2010). According to the 2016 *Survey*, the number of countries providing income tax services online increased from 73 countries in 2014 to 114 in 2016. However, low usage by end-users is still one of the major hurdles to the expansion of e-government projects (Sahu & Gupta, 2010), including filing income taxes online. Streamlining registration processes and reducing the need for in-person visits minimizes transaction time and costs for both businesses and government, often reducing registration time from weeks to a few hours. Greater ease in starting a business and better governance are associated with increased entrepreneurial activity (World Bank, 2008).

Based on the 2016 *Survey*, the registration of businesses online has increased by 19%, bringing the number of countries that offer online users such service from 60 countries in 2014 to 97 countries in 2016. High transactions costs are particularly detrimental to small businesses and small investors with limited resources (Nagy Hanna, 2010). The fact that less than half of all countries – and almost no developing countries - currently offer online business registration globally clearly hampers market entry for new businesses and access to much needed financing for new start-ups and small and medium size enterprises.

As part of the effort to promote health and well-being, and extending life expectancy for all, national systems of identity registration should be implemented to verify social security claims and benefits. This facilitates the effective functioning of a nationwide social security system contributing to economic and social development.

Identity registration at birth is also a UN proclaimed human right and a specific target of the 2030 Agenda (Target 16.9 – A/RES/70/1). However, it is still not available in many of the world's poorer countries today. In absolute terms, as of 2016 there are only 55 countries offering online application for birth certificate, 53 countries offering online application for marriage certificate, and 63 countries offering online application for social security benefits.

The online application for a personal identity card is still the transactional service provided by the lowest number of countries. 31 out of 193 countries provide this service as of 2016, with only 4 countries introducing it since 2014. Concerns over privacy and security have hampered the efforts of countries to fully adopt the online application for identity card.

Compared to 2014, the online payments for both utilities and fines have substantially increased in 2016: an additional 34 countries offer online payment of fines and an additional 63 countries provide online payment of utilities. This represents an overall increase respectively of about 18% and 33% in the number of countries providing these services out of 193 member states.

In 2016, an additional 8 countries offer online applications for environmental permits with an increase of about 8% in the number of countries out of 193 member states, bringing the number of countries that offer this service via their webpage to a total of 55 countries.

### 4.2.4. Distribution of services online by sector

When considering e-government development in different government sectors, there is additional evidence that digital technologies—the Internet, mobile phones, and all the other tools to collect, store, analyze, and share information digitally—have spread quickly.

The availability of archived information, downloadable forms, emails or feed updates, and mobile apps/SMS services has continued to grow in most of the countries around the world. The *Survey* shows that since 2014 in all sectors surveyed—education, health, finance, social welfare, labour and environment—the number of countries providing such services has increased.

Figure 4.3.a. Types of services online, 2016

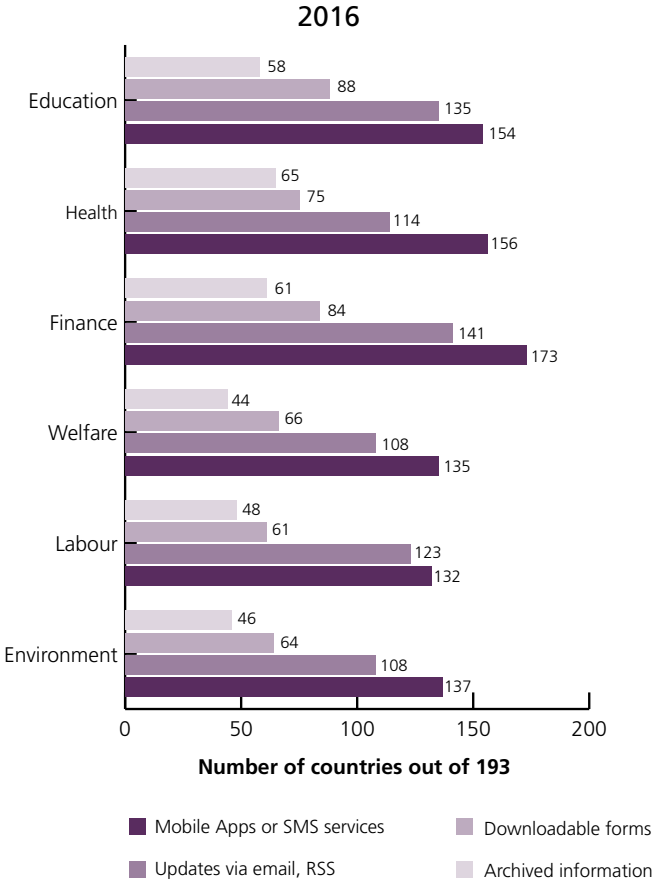
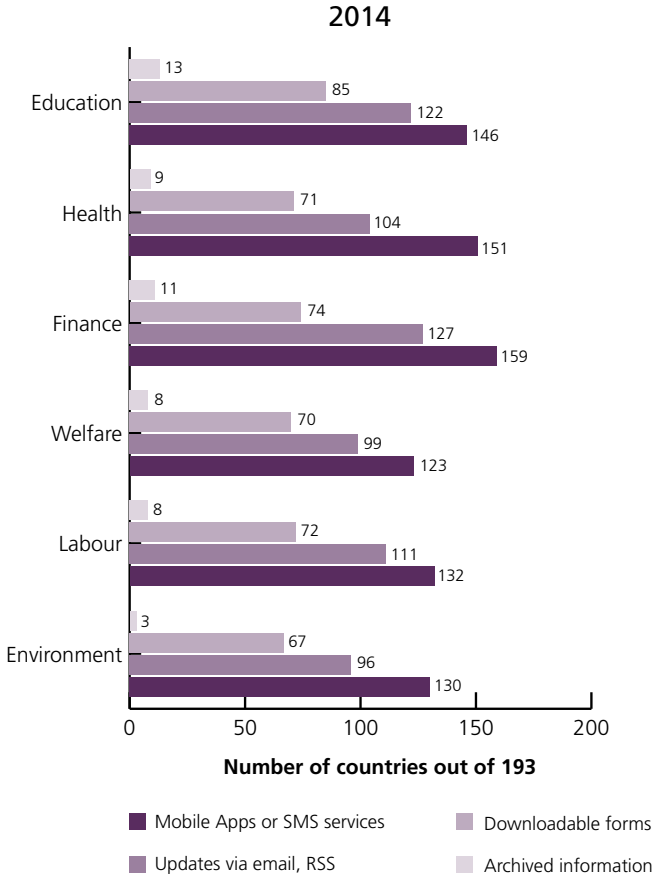



Figure 4.3.b. Types of services online, 2014




The online availability of downloadable forms and archived information is reaching a maturation stage, and a very small number of countries lag behind. The embracement of open government data initiatives by many countries around the world might be one of the driving factors for such an increase, especially as the leading sectors of finance, health and education are the main focus areas of most open government data initiatives.

As in 2014, there appears to be substantial underutilized potential and a continued decrease of the use of the features of update via email and use of Really Simple Syndication (RSS). RSS is still a valid Internet technology that allows users to keep up to date with new content from their favourite sites and has been available almost as long as the web. The reason of this constant decrease can be identified with the massive proliferation and availability of new

performing user-friendly social media based –tools that make these update features almost obsolete.

In all sectors reviewed, the trends of mobile apps and SMS services have experienced a large and significant growth and further information is provided in section 4.2.5.

The environment sector experienced a significant increase with 43 countries introducing mobile apps and SMS services from 2014 to 2016, bringing the overall number to 46 countries out of 193. Box 4.2 shows that we are not only seeing more mobile apps and SMS services, but also an increased capacity of public institutions to improve both their interactions and partnerships with people, and channel the data for improved public policies (see Chapter 1).

**Box 4.2. European Environment Agency (EEA): Mobile apps on environment – Marine Litter Watch**

Source: http://www.eea.europa.eu/themes/coast_sea/marine-litter-watch

Huge amounts of plastic and other debris are increasingly found in the world's seas, harming marine wildlife and potentially threatening human health. However, the composition, movement and origins of the rubbish that litters beaches are still not widely understood. To help tackle this issue, the European Environment Agency (EEA) launched Marine Litter Watch, a mobile app that utilises modern technology to help resolve the problem of marine litter by tracking it. This science-based app aims to help fill data gaps in beach litter monitoring by involving the people who visit beaches. It employs a two-tiered approach: monitoring to support official processes and voluntary clean-ups. This mobile app allows the person who finds the beach litter to choose from a master list of commonly found marine litter items, such as cigarette butts, bottles, fishing materials, etc. The data is then submitted through the app to the EEA hosted Marine Litter Watch database where it can be extracted, viewed on the EEA website, or embedded in other web pages or applications. The data is ultimately used to provide a better understanding of the problem and formulate a policy response.

### 4.2.5. Trends in mobile service delivery

Online services are increasingly being provided through innovative mobile government applications and customized to individual needs. Mobile broadband is the most dynamic market segment; globally, mobile broadband penetration reached 47% in 2015, a value that increased since 2007[2]. Investments in affordable broadband connectivity will therefore be crucial. Governments around the world have begun to respond to this trend by adapting e-government services for the mobile platform, providing public sector field workers[3] access to mobile technologies and applications, enabling smart/flexible working[4] and delivering citizen services anytime, anywhere. Governments are also using mobile applications and social media channels to reach out and provide timely services to remote and vulnerable groups, particularly the young, older persons, women, persons with disabilities, and indigenous people. Thus, there are substantive shifts both from fixed into mobile broadband as well as from fixed to mobile cellular telephones per 100 inhabitants. The 2016 *Survey* shows that the shift of devices from fixed to mobile has unleashed a new era of government mobile services.

E-mail remains a critical communication tool for governments across the world, ensuring timely access to beneficiaries (i.e. citizens, businesses and overall constituencies). Email is almost a mark of identity, and has become quite pervasive. According the Radicati Group's "Email statistics report 2015-2019", there were 4.35 billion e-mail accounts globally in 2015 and the number is expected to grow to 4.2 billion by 2016 and 5.6 billion by 2019 with one-third of the worldwide population using email by year-end 2019.

2 ICT Facts and Figures, 2015, ITU

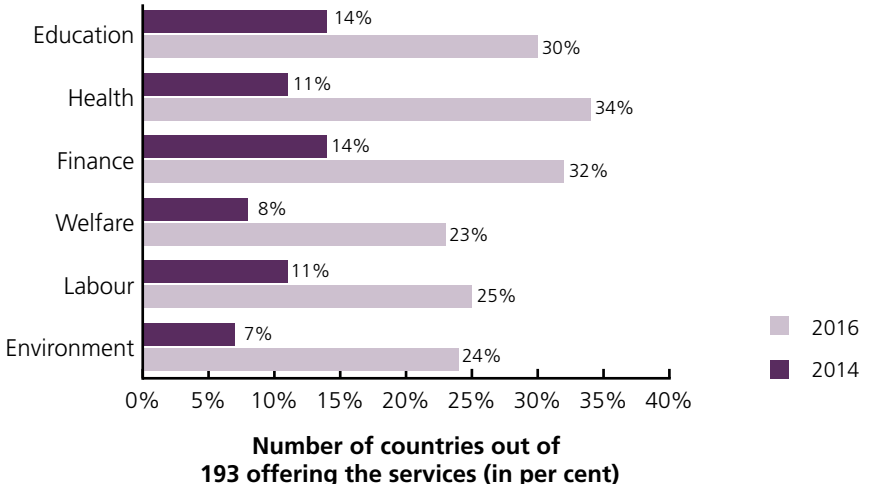
3 Public sector field workers are public servants who are in contact with people and provide face-to-face services and/or provide services 24/7 through mobile platforms, including in the field of health and education.

4 "Flexible working is a way of working that suits an employee's needs, e.g. having flexible start and finish times, or working from home" (https://www.gov.uk/flexible-working).

The percentage of countries providing updates via email or RSS in 2016 was the highest for education with 90 countries (46%), followed by finance provided by 85 countries (44%) and health services provided by 75 countries (39%) with 65, 63, and 61 countries respectively providing such services for welfare, environment, and labour. However, in all six sectors there is potential for growth with more than half of the governments around the world expected to initiate such government services in the coming years.

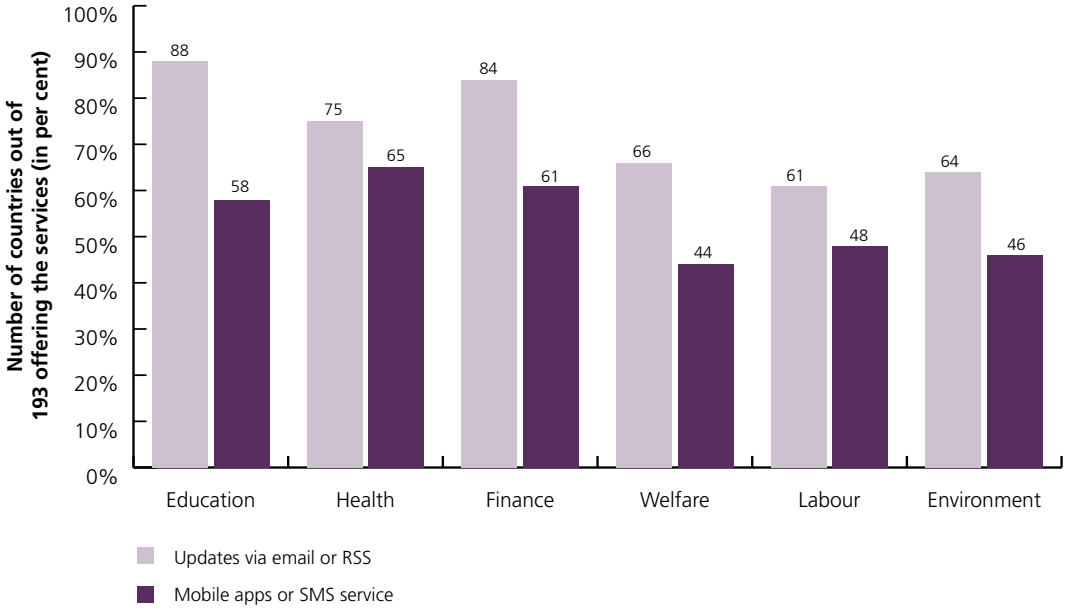
The expected increase in the availability and affordability of mobile devices, especially the ones with email capabilities, will drastically change the landscape of government services and related use of email and RSS. This change will be beneficial, especially in developing countries where the growth of these services in the social sector is expected to drastically accelerate as the affordability and availability of mobile devices increases. This not only will serve to bridge digital divide amongst regions as pertaining to the online services in social sectors, but will also contribute to sustainable development

Figure 4.4.b. Trends in mobile apps and SMS services usage by sectors, in 2014 and 2016




As indicated in Figure 4.4.b, mobile apps and SMS services show tremendous increases in almost all sectors. The highest growth in the mobile apps and SMS services was in the health sector, with an increase from 11 to 34% from 2014 to 2016, followed by the finance sector with an increase from 14 to 32%. Other sectors also experienced high levels of increase, respectively 7 to 24% for the environment, 14 to 30% for education, 8 to 23% for welfare, and 11 to 25% for labour. Figure 4.10 provides an overall picture of mobile services by sector for 2016. Updates via email or RSS experienced the highest number across the sectors as compared to mobile apps or SMS services. Mobile apps and SMS services have both been increasing in the last two years (Figure 4.4.b and Figure 4.4.c), and the gap between the two online services is narrowing. However, the difference is still high in education (30 countries), finance (23 countries), welfare (22 countries), environment (22 countries), and labour (13 countries).

Figure 4.4.c. Mobile services, by sector




The 2016 *Survey* highlights two important phenomena. First, the social sectors such as health and education experienced an increase, which represents a strong commitment from governments around the world to utilise technology for the benefits of all and in support of sustainable development. Second, given the trends highlighted by the 2014 and 2016 *Surveys*, it is expected that increases will occur in both services – updates via both email/RSS and mobile apps/SMS services – across sectors. Such increases will be determined by the availability and affordability of mobile devices.

## 4.3. Advancement of mobile service delivery

Increased connectivity, innovation and access to the Internet have helped achieve progress of the Millennium Development Goals. The 2030 Agenda Targets 9.a and 9.c encourage Member States to facilitate sustainable and resilient infrastructure development in developing countries, and significantly increase access to ICT and strive to provide universal and affordable access to the Internet in least developed countries by 2020 (A/RES/70/1). As highlighted in the General Assembly Resolution A/70/125, the expansion and use of ICTs must continue to be a core priority for all Member States in order to achieve the 2030 Agenda. The outcome document also highlights the cross-cutting contribution of ICTs to the Sustainable Development Goals and poverty eradication, and notes that access to ICTs has also become a development indicator and aspiration in and of itself.

The number of mobile phone subscriptions is estimated to have risen from 2.2 billion in 2005 to 7.1 billion in 2015, and by the end of 2015, 3.2 billion people are expected to be online. This increase would represent over 43 per cent of the total world population, of which 2 billion are from developing countries.

Further, fixed broadband subscriptions have increased, reaching a penetration rate of almost 10%, as compared with 3.4% in 2005. Meanwhile, mobile broadband remains the fastest growing market segment, with continuous double-digit growth rates reaching 47% in 2015, a value that increased 12 times since 2007. Mobile phones, reaching almost four-fifth of the world's people, provide the main form of Internet access in developing countries. 2 billion people however still do not own a mobile phone (World Bank, 2016).

### 4.3.1. Accessibility and availability of broadband

A brief regional analysis of the data shows that fixed broadband subscriptions increased across regions (Figure 4.5) from 2014 to 2016, growing from 0.6 users per 100 inhabitants to 3.5 users per 100 inhabitants. The increase has been uneven across regions. Africa is at the lower end with an increase of 0.6/100 inhabitants, and an overall fixed broadband subscription of 1.2/100 inhabitants. Asia and Oceania experienced an increase of nearly 1.5 and 2.1 users per 100 inhabitants, respectively, in the last two years. The Americas had an increase of 1.9 additional fixed broadband users per 100 inhabitants, with Europe at the highest levels with an increase of 3.5 users per 100 inhabitants.

Figure 4.5. Trends in fixed broadband subscription in 2014 and 2016

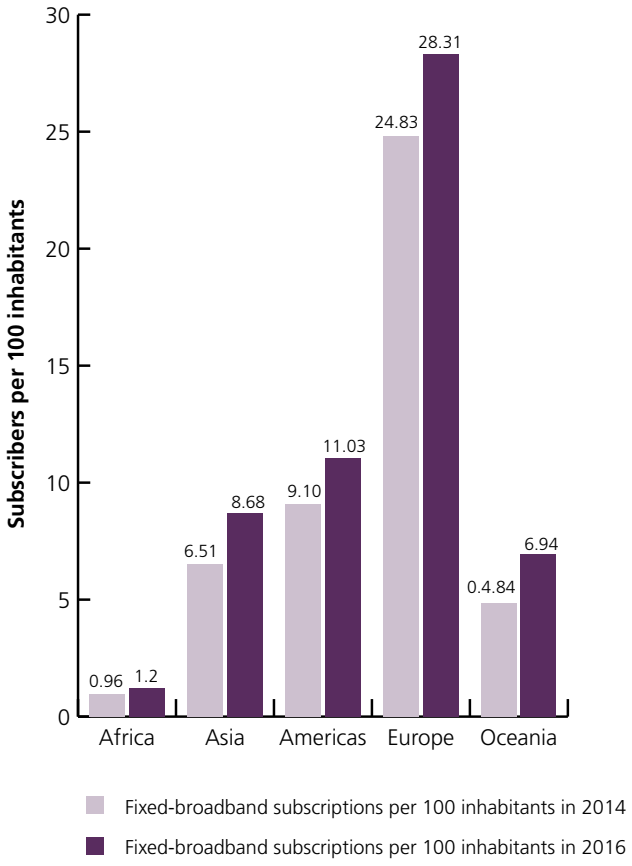
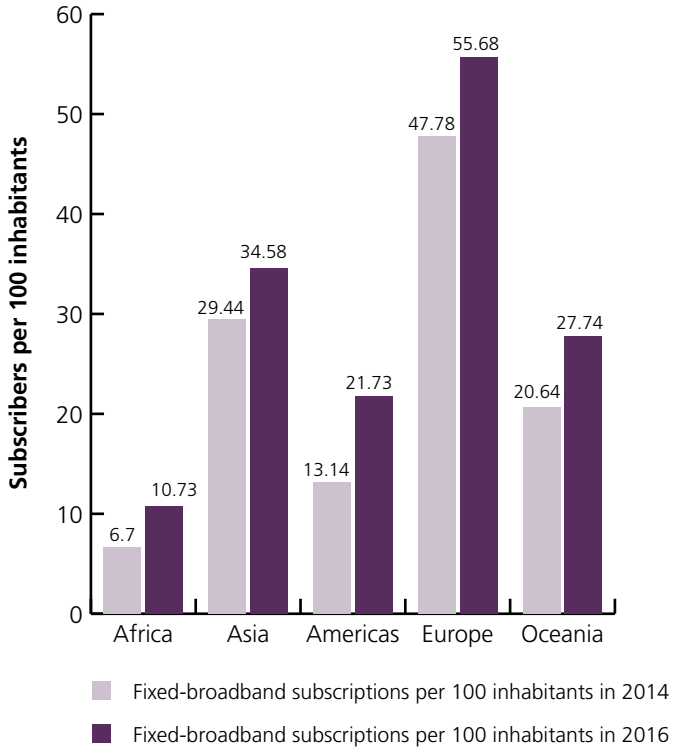


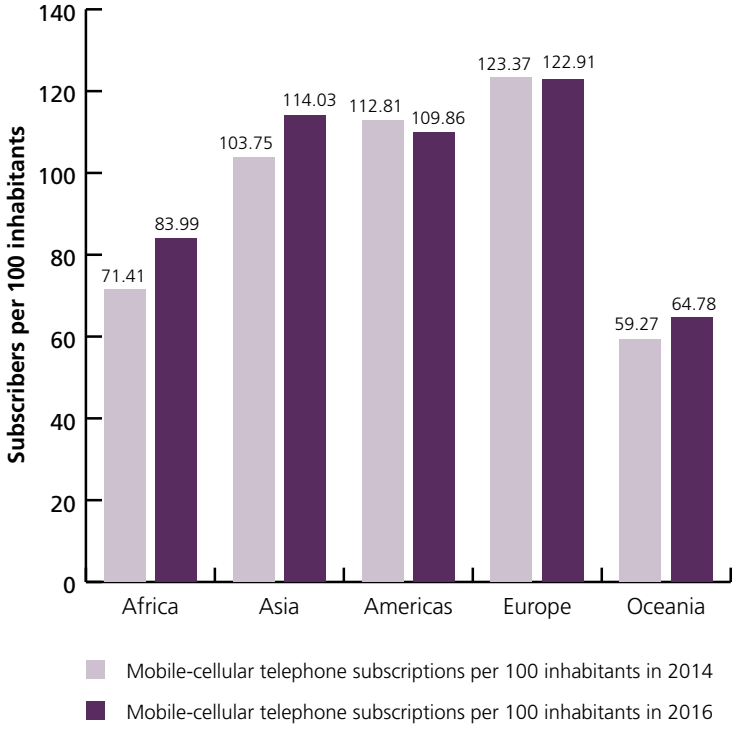

Figure 4.6 indicates the trends in wireless broadband subscription across the regions. Increases in subscription in wireless broadband took place across regions. The number of subscriptions per 100 inhabitants in Africa went from 7 in 2014 to 12 in 2016, with the region still remaining in the lower end. Despite being the second lowest region in absolute number of wireless broadband subscriptions per 100 inhabitants with 22 subscriptions in 2016, the Americas experienced the highest jump with an increase of 9 subscriptions per 100 inhabitants, compared with 13 subscriptions in 2014. Oceania experienced an increase from 21 subscriptions in 2014 to 28 subscriptions in 2016, and Asia saw an increase from 30 subscriptions in 2014 to 35 subscriptions in 2016. Europe remains the highest in absolute terms with an overall subscriptions rate of 56 in 2016, up from 48 in 2014, which puts the region gradually on a path towards market maturation.

Figure 4.6. Trends in wireless broadband subscriptions in 2014 and 2016




Overall, the mobile industry is growing strongly. According to the ITU, by the end of 2015 the total number of mobile cellular subscriptions nearly rivalled the total global population. There will be 7.1 billion mobile cellular subscriptions (not subscribers) by end of 2015 – the equivalent of a global penetration rate of 97 mobile subscriptions per 100 inhabitants (ITU, 2015). This sign of maturation is also reflected in the trends of mobile phone subscriptions for the last two years, as shown in Figure 4.7 which shows market maturation in Europe and a reverse trend of slight reduction in the Americas, alongside steady substantive growth in Africa and Asia.

Figure 4.7. Trends in mobile phone subscription in 2014 and 2016



This growth, if sustained, can help improve the lives of many people in developing countries. Governments, international organizations and Non-Governmental Organizations (NGOs) are launching initiatives to improve health, education, enhance access to finance, or information related to agriculture or disasters. Many innovations are coming from entrepreneurs and people themselves. It is important that the business, scientific, and relevant public institutions are mobilized to develop the kind of mobile phones and mobile apps that are most attuned to developing countries' needs.

The accessibility and availability of broadband has remained a priority for countries around the world. UNDESA, in close cooperation with the ITU, continues to report the trends of fixed and mobile broadband, along with wireless and mobile phones subscriptions, as they pertain to the access and utilisation of well-designed vital public services.[5]

### 4.3.3. Availability and affordability of mobile devices

The availability and affordability of mobile devices remains an important factor and driver of change in the migration from electronic to mobile public service delivery. The Report of Ofcom 2015 of the United Kingdom regulatory agency highlights the dominance of mobile, and indicates that the change has been brought about not by improvements in fixed broadband, but by the availability of larger, more capable phones and faster 4G mobile networks. Phones and 4G are in turn facilitating communication through a variety of channels, especially social media. An ever increasing number of users are switching from computers to smartphones – a shift which is driven by larger size screens and prolonged battery life of smartphones enables people to comfortably carry out the tasks that would have normally been reserved for a desktop, laptop or tablet.

According to the ITU and UNESCO Report on the State of Broadband 2015, the availability and affordability of a multitude of devices has unleashed a new era of innovation. This technological shift allows countries to develop and adopt more mobile public services, going beyond SMS and into a full range of service offerings.

Today several countries have already adopted "Responsive Web Design" (RWD) technology to implement on-line services in their governmental portals. RWD creates dynamic changes to the appearance of a website, depending on the screen size and orientation of the device being used to view. Instead of having to build a special mobile version of a website, which often requires writing a new code from scratch, this technique solves the problem of designing for the multitude of devices available to customers.

This innovative technology emerged as a way to provide equal access to information regardless of the device (fixed or mobile). In 2014, only 48 countries had adopted this technology. In 2016, the *Survey* shows a significant increment, with 99 countries using RWD technology for their national portals (22 from Africa, 21 from the Americas, 26 from Asia, 24 from Europe and 6 from Oceania).

The shift towards mobile services and devices can help improve health, education, and productivity. It can help break the barriers between formal and informal education, health and other basic important public services. Today, mobile technologies are available, even where basic infrastructures and utilities are scarce. As the price of mobile phone ownership continues to fall, many more people, including in extremely impoverished areas, are likely to own and use a mobile device. As people have their devices wherever they go, the provisions of services and learning can happen in places previously non-conducive to education. As health workers adopt mobile devices to a large scale, the health services provided are no longer associated with just the physical institution providing them. The result is that countries are better able to overcome

[5] More information on the telecommunication index and overall EGDI is provided in chapter 5.

physical barriers to health, education and accessing public services, and reshape their delivery not only towards improved services, but towards people-centred, public services, especially ones that utilise mobile broadband and mobile devices to bridge digital divides. Mobile devices and mobile apps have the potential to improve living conditions of the poorest in important ways. It is important to concomitantly adopt policies to, for example, teach people how to use such services, especially the poorest and most vulnerable.

However, discrepancies in availability and affordability persist. According to the most recent data from ITU[6], fixed broadband services remain expensive, costing an average of US$ 74.5 Purchasing Power Parity (compared with just US$ 22.5 in developed countries, less than a third of the developing country equivalent). This implies a disadvantage for the developing world, especially LDCs.

According to the World Bank, only around 15 per cent of the world's people can afford access to broadband Internet, and nearly 2 billion people do not own a mobile phone (World Development Report 2016). "4 billion people from developing countries remain offline, representing two thirds of the population residing in developing countries. Of the 940 million people living in the least developed countries (LDCs), only 89 million use the Internet, corresponding to a 9.5 per cent penetration rate" (ITU, ICT Facts and Figures, 2015). The world's offline population is mainly in India and in China but more than 120 million people are still offline in North America (World Bank Data 2016).

## 4.4. Digital divides

At the early stages of technology, the digital divide was simply defined as the troubling gap between those who use computers and the Internet and those who do not (Wilhelm, 2004). A broader definition of the digital divide goes beyond infrastructure deployment to include the creation of an enabling environment, with a focus on institutional strengthening and capacity building, the creation of content in local language and increased online presence, and continuous improvements in legal and regulatory frameworks, etc.

Looking at a different perspective (Helbig, Gil-Garcia and Ferro, 2005), we can identify three commonly used approaches to the digital divide, such as (i) access divide; (ii) multi-dimensional digital divide; and (iii) multi perspective digital divide.

The "access divide" focuses on the division between individuals and groups that do or do not have access to technologies, simplifying therefore the divide as a gap that exists solely as a technological problem. Based on this technological determination, information technologies can solve social, political, economic and organizational problems. Therefore ICTs have the potential to improve government actions (e-government) and to eliminate the digital divide.

The 'multi-dimensional" digital divide implies that the digital divide is not just about access, but more about other social, political, educational and economic issues. This definition (Norris, Pipa, 2002) sees the digital divide as a mirror of social inequality: as a global divide, as a social divide and as a democratic divide. The public policy response thus aims to address social, political, educational, and economic factors.

The 'multi-perspective digital divide" builds upon the "multi-dimensional digital divide" and focuses on the interrelationships of technology with race, gender and culture. According to this approach (Servon, 2002), the intersection between an individual's race, gender, and culture affects the use of digital technology. There are other factors as well, such as age. Public sector intervention is needed to address the perspective and challenges of each group in closing the digital divide over time. E-government intervention has to address the complex interaction of these factors in order to ensure the success of its projects (Siau, Chiang, Hargrave, 2011).

[6] ITU and UNESCO Report on State of Broadband 2015

According to the ITU Report 2013 on Measuring the Information Society, "the digital divide refers to the gap among individuals, households and businesses at different socio-economic levels with regard to both their opportunities to access ICTs, and their use of the Internet for a wide variety of activities. It also refers to disparities among different geographic areas. The digital divide includes imbalances both in physical access to technology, as well as in the resources and skills needed to effectively use such technology. A knowledge divide reflects the access of various social groupings to information and knowledge, typically by gender, income, race and location".

The digital divide also exists between developed and developing countries, as well as within and among groups in a country, especially countries with greater rural populations. The digital divide within countries can be as high as that between the countries as the digital divide goes beyond technological availability and affordability. "Leaving no one behind" requires enhancing digital inclusion by improving access to high-speed broadband connection to all through reliable and high-quality infrastructure, and by building a more holistic approach that encompasses the social, economic and environmental factors to advance digital inclusion.

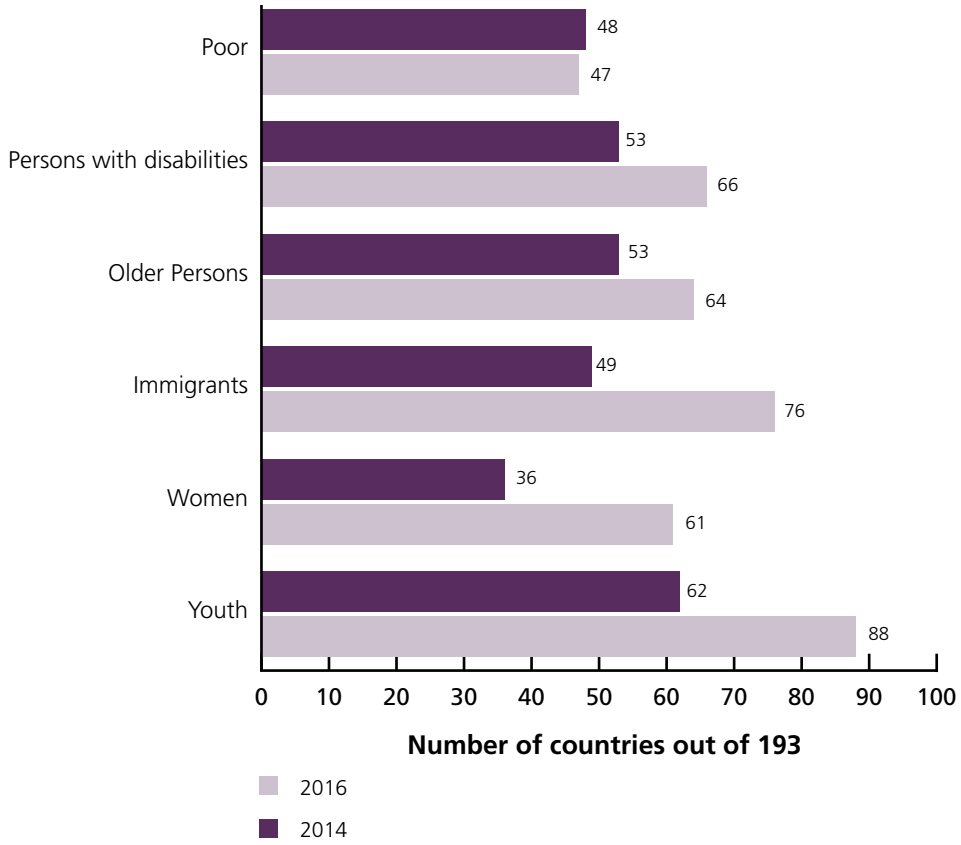
To bridge the divides in terms of capabilities at the individual, government and enterprise levels, ICT usage and other complementary skills are needed. Policy actions include creating alternate spaces for learning, involving community centres, creating better metrics of ICT usage, making efficient use of digital platforms, engaging in continuous experimentation, exploring strategic collaborations, popularizing open government data models, developing comprehensive citizen engagement strategy, and adopting participatory e-governance models for the 'shared economy. (Draft Global Sustainable Development Report, 2016, chapter 3).

Efforts are also needed to provide improved online services targeted to specific vulnerable groups, as well as by offering user-friendly features and language content that help promote inclusion.

### 4.4.1. Targeted services for vulnerable groups

The 2016 *Survey* provides a global assessment of online government services targeted to vulnerable groups by region. Figure 4.8 reflects country efforts to reach out to vulnerable groups via online services. It shows that the number of countries providing such services has increased compared to 2014. The number of countries offering online services to youth increased from 66 countries in 2014 to 88 in 2016. Possibly due to increased advocacy efforts, the number of countries offering tailored online government services to women has almost doubled from 36 countries in 2014 to 61 in 2016. The number of countries that provide targeted online government services to immigrants also increased from 49 countries in 2014 countries to 76 in 2016. While there was a small increase in online services to older persons and persons with disabilities, only 13 countries introduced such services between 2014 and 2016. As a result, the total number of countries offering such service is less than one-third of all countries.

Figure 4.8. Online government services for vulnerable groups in 2014, and 2016




The 2016 *Survey* shows that an increasing number of countries are providing online services in more than one official language and more have increased the availability of online guidance/tutorials on how to use services, compared to 2014. In fact, Figure 4.9 highlights that in 2016, 166 countries are now offering online services in more than one official language compared to 142 in 2014. The number of guidance/tutorials increased from 58 to 91 countries. There was no increase in the availability of audio content over the past two years, and only 7 new countries compared to 2014 are now providing configuration of size/font.

In line with the need to continue and improve the targeted services to vulnerable groups, United Nations Member States have underscored that there is a "need for further development of local content and services in a variety of languages and formats that are accessible to all people, who also need the capabilities and capacities, including media, information and digital literacy skills to make use of and further develop information and communications technologies (United Nations, para. 24, 2015). It is of "vital importance to recognize the principles of multilingualism in the information society to ensure the linguistic, cultural and historical diversity of all nations" (ibid.).Locally relevant content can be promoted by establishing local innovation centres and technology hubs, promoting local internet exchange points, increasing support for open data initiatives and organizing contests and challenges. Above all, an ecosystem approach to digital policy can help bridging the existing gaps (Draft Global Sustainable Development Report, 2016, chapter 3).

Figure 4.9. Number of countries with available features for vulnerable groups

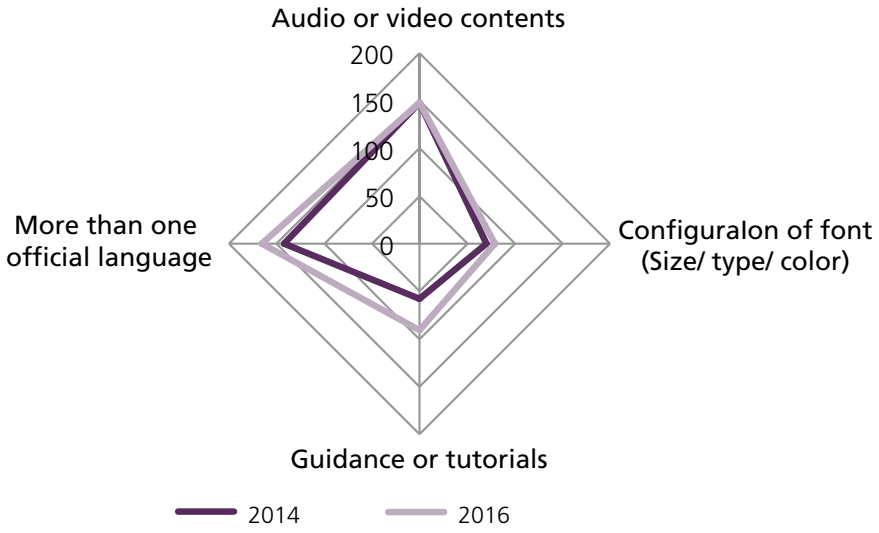
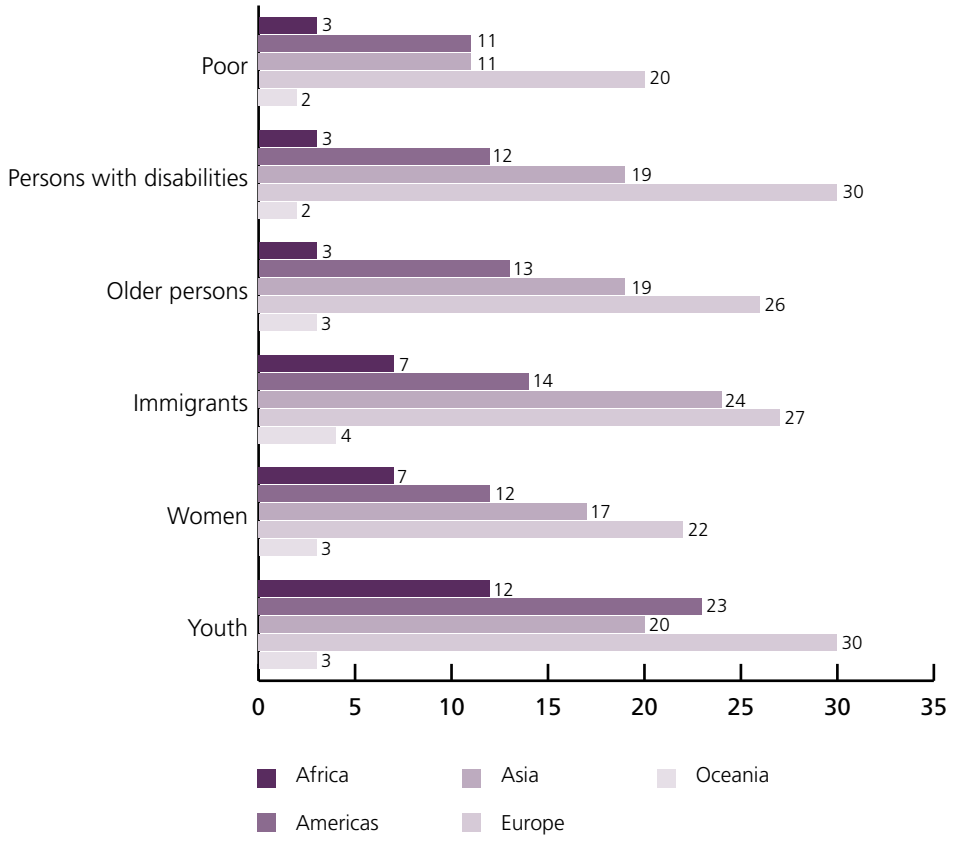



Figure 4.10 shows that, according to the 2016 *Survey*, more countries provide online services to youth and persons with disabilities.

Figure 4.10. Services to vulnerable groups, by region




| | Poor | Persons with disabilities | Older persons | Immigrants | Women | Youth |
|---|---|---|---|---|---|---|
| Africa | 3 | 3 | 3 | 7 | 7 | 12 |
| Americas | 11 | 12 | 13 | 14 | 12 | 23 |
| Asia | 11 | 19 | 19 | 24 | 17 | 20 |
| Europe | 20 | 30 | 26 | 27 | 22 | 30 |
| Oceania | 2 | 2 | 3 | 4 | 3 | 3 |
| | 47 | 66 | 64 | 76 | 61 | 88 |

Figure 4.11. Services for at least one vulnerable group, by region

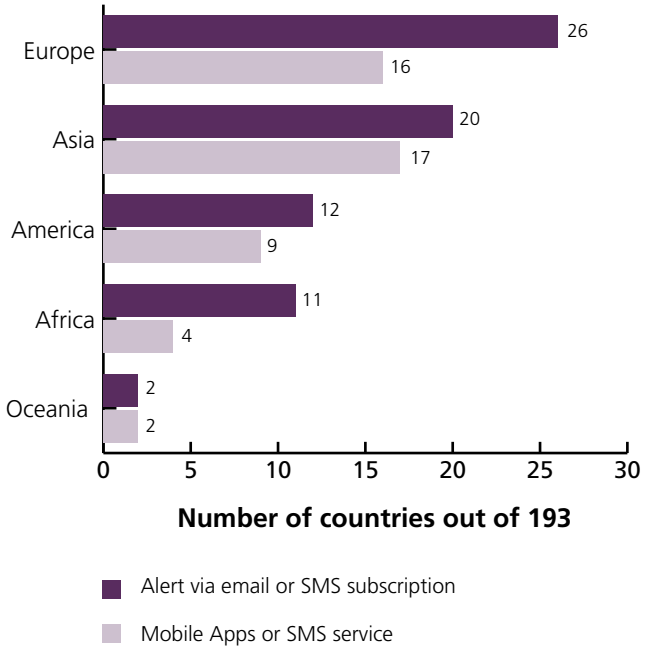



Figure 4.11 indicates that in 2016, Europe leads the online services to vulnerable groups with an increase of 20%. More than 60% of the overall number of European countries (26 out of 43) provides emails or SMS subscription to at least one vulnerable group. However, the biggest leap was undertaken by Africa, which had 7 new countries introducing targeted services to vulnerable groups.

In addition to developing infrastructure and access to the Internet, improvements in basic services targeted to vulnerable groups have led to more inclusive public services at the national level and have contributed to efforts to bridge the digital divide. Overall, the digital divide persists among nations and regions and between men and women, younger and older generations, educated and less educated people, and people of various groups of the population.

## 4.5. Key trends in online service delivery

With the considerable increases in connectivity, use, creation of online and mobile services, and innovation, new tools have emerged to drive poverty eradication and economic, social and environmental betterment. For example, fixed and wired broadband, smartphones and tablets, cloud computing, open data, social media, and Big Data were only in their early states at the time of the adoption of the Tunis Agenda on the world information society. They are now understood to be significant enablers of sustainable development.[7]

### 4.5.1. The use of Geographic Information Systems (GIS) for public service delivery

The use of Geographic Information Systems (GIS) in public service delivery has unleashed a tremendous number of innovations and improved processes and outcomes for public service. Geographic Information Systems (GIS) is a computer system that allows one to map, model, query, and analyse large quantities of data within a single and structured database according to location. GIS gives a person the power to: create maps, integrate information, visualize scenarios, present powerful ideas and develop effective solutions (EPA.GOV).

[7] United Nations Information and Communications Technologies for Development, (December 2015), Pg13.

The adoption of GIS in public service delivery goes far beyond the traditional mapping tool usage. Rather, it is integrated throughout processes and systems to substantially improve public policies and public services in key social sectors such as health, education, energy, agriculture, transport and so on. Because GIS has become more common and easier to use, governments are using it to analyse financial decisions, improve service delivery and engage people in monitoring and evaluating government performance. Further, GIS has unique promises to enhance government accountability and transparency. Web-based GIS platforms can also provide specific and timely information that is especially useful for emergency and disaster management.

The use of GIS technologies allows users to integrate and analyse large, disparate data sets that involve geospatial information like population density or customer preferences (McKinsey, Inc. - Grant, Rozdan & Shan, 2014). Recent changes and developments have introduced quite a revolution in the use of geospatial data; particularly in location-based services. These include: (i) the increase of geospatial information available through smart-phones, credit cards, social media, GPS devices and other sources; (ii) greater standardization of data and databases; and (iii) increased accuracy of geospatial data due to better hardware and software applications.

These changes have been increasingly applied in new and innovative ways by all stakeholders in society. However, this has been especially true for public administration institutions, which seek to further utilise technology for improved policy and decision-making processes, and public service delivery.

The use of GIS can help tackle some of the most challenging problems in policy-making and public service delivery. It can help provide high quality services to all segments of society especially when servicing large and demographically diverse areas. Coupled with optimized resource allocations, GIS supports policymakers in designing public policies that address pressing issues at both local and central levels (see Box 4.3). Both governments and the public can use GIS technology and geospatial analysis to improve and monitor service delivery; and governments can strategically plan to integrate GIS technology and geospatial data throughout public policy processes and public service delivery (see Box 4.4).

### Box 4.3. South Africa: Use of GIS for improving public policy and public service delivery

The government of South Africa was facing a number of challenges that required enhanced use of data and GIS information, in order to: (i) provide more services to semi-urban and informal settlements within urban centres; (ii) provide services to the most vulnerable especially in rural areas; (iii) optimally locate service points closer to the people, especially in areas of changing human settlement patterns and demographics; and (iii) develop road infrastructure and transport services to improve access to services and encourage economic development. In order to tackle these challenges, the government prepared a step-by-step strategy, which required the formulation of a national vision on how to improve GIS infrastructure and data collection. Once the first stage was implemented, the government followed two paths: (i) using GIS data for public policy formulation, implementation and monitoring, both group and sector oriented, and (ii) incorporating GIS application and data into basic public service delivery in social welfare, health, safety and transportation among others. This strategic approach was formulated and implemented with the participation of all stakeholders. It has introduced an innovative method wherein the benefits of technological advancements in GIS are integrated into the processes of developing public policy and delivering public services.

Source: http://www.dpsa.gov.za/programmes.php?id=23

### Box 4.4. Australia: GIS use for public health prevention

Historically, public health information (surveillance) systems, based in local, state and commonwealth governments, have collected and tabulated data on illness, disabilities, causes of death, injuries, environmental risk factors, health costs and other health issues. Improvements of both spatial analysis tools (sophisticated software and fast personal computers) and the quality and accessibility of the information itself (unique identifiers, digital census data, rapid internet), have led to the increasing use of GIS.

In Queensland (Australia), GIS provides an environment in which the biophysical, social, behavioural, and cultural worlds can be combined for a systemic understanding of health and disease. GIS has been successfully applied in many areas of population health. For example, it was used to inform the placement of water pumps in Queensland villages that were most infected by Guinea Worm to ensure a safe water supply. GIS applications were also used to enhance community-based child welfare services, as well as to identify distribution points for culturally-appropriate promotion materials about diabetes in a multicultural community.

Some other GIS applications used by local Queensland governments include: quantifying major hazards in a neighbourhood, predicting injuries of pedestrian children, and analysing disease policy and planning. These applications have been integrated into targeted interventions. This led to: (i) reduced prevalence of guinea worm disease in villages where pumps were introduced, (ii) children in high child poverty areas receiving subsidized meals while at family day care, (iii) a targeted and culturally-sensitive diabetes program; (iv) the direction of finite vector-control resources to the highest priority response areas during dengue fever outbreaks; (v) screening programs to assess hazards in high-risk neighbourhoods, which also reduced overall costs; and (vi ) locating clusters in space and time of child pedestrian injuries and suggesting interventions.

Source: https://www.health.qld.gov.au/epidemiology/documents/gis-ph-spatial-app.pdf

The number of good practices and case studies involving GIS and geospatial data is increasing every day, as more and more public services at all levels incorporate its use into their work processes. This confirms that the renewed use of GIS is yet another means to address development challenges at the local, national, and regional levels, while countries work towards achievements of development goals as outlined in the 2030 Agenda for Sustainable Development. It is clear that GIS technology on its own does not usually deliver better health outcomes. Rather, by informing epidemiologists, policy and decision-makers, and health workers of the location and geographic relationship between datasets, GIS is an enabling integrator that helps target existing interventions to improve the efficacy of the service delivered and/or reduce associated costs.

The 2030 Agenda for Sustainable Development recognises the important role of technological innovation in the implementation of the Sustainable Development Goals (SDGs) and contains specific references to the need for high quality, timely, reliable and disaggregated data, including earth observation and geospatial information. The UNDESA Statistical Division has been supporting the work on the improvement and harmonization of GIS data and its use. This work takes place through the United Nations Committee of experts on Global Geospatial Information Management (UN-GGIM). An intergovernmental Committee, UN-GGIM is tasked with making joint decisions and setting directions on the production and use of geospatial information within national, regional and global policy frameworks, and takes a leading role in setting the agenda for the development of global geospatial information to address key global challenges. At its third High Level Forum, the UN-GGIM issued the 2014 Beijing Declaration on Sustainable Development with Geospatial Information. This Declaration called for "a greater use of geospatial information for timely, evidence-based and authoritative decision-making, and policy formulation on local-based development issues, including disasters and humanitarian needs." The Declaration urged Member States to develop more effective communication mechanisms to demonstrate how geospatial information can contribute to sustainable development.

### 4.5.2. Internet of Things

Even though the term Internet of Things (IoT) was initially introduced in 1999, it is only in the last few years that the term has found its way into public discourse. According to the ITU (Internet of things, Global Standards Initiative, ITU 2012) IoT is "the network of physical objects or 'things' embedded with electronics, software, sensors and network connectivity, which enables these objects to collect and exchange data." IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems leading to improved efficiency, accuracy and economic benefit. Since its introduction, IoT has been used in many aspects of our daily lives from home security, to remote health follow-up, remote computer access and so on; however, most of its benefits are still to be revealed.

IoT is considered part of the global infrastructure for the information society. It enhances services by interconnecting (physical and virtual) "things" based on existing and evolving interoperable information and communication technologies (ITU Recommendation 06/2012). Through the exploitation of identification, data capture, processing and communication capabilities, IoT makes full use of "things" to offer services to all kinds of applications. At the same time, it is important to ensure that security and privacy are safeguarded.

According to a number of research centers and institutions, the number of devices that will be connected wirelessly on the Internet of Things will be between 26 billion (according to Gartner, Inc. based in the US) to 30 billion by 2020 (according to ABI Research also based in the US). There is a growing belief that the IoT will have widespread and beneficial effects by 2025 or earlier (Anderson & Rainie, 2015). It is expected to change and enhance a number of important areas in our lives, such as how education is delivered, environmental monitoring, infrastructure management, and health monitoring and energy management among others. Box 4.5 provides a relevant example.

**Box 4.5. Detecting early-stage dementia using mobile devices**

Dementia is characterized as a global health epidemic and a public health priority. Although there is currently no cure for dementia, it is possible to get an earlier, more accurate diagnosis as well as better, personalized treatment through the use of Information Communication Technology (ICT).

The EU funded project Dem@Care has developed a system based on smart mobile sensors that can monitor health parameters, activity levels and even emotional and cognitive status of users. With this new technological innovation, hospitals and other public health institutions are able to offer more timely diagnosis of early state dementia and provide optimized personal care solutions for those living with dementia. The Dem@care project consists of 11 academic and industrial partners from all over Europe. Since 2012, they have been working to improve differential diagnosis and develop effective interventions for people with dementia in a variety of settings.


Source: http://www.dpsa.gov.za/programmes.php?id=23

A number of IoT applications are being developed and implemented in every field. Examples relate to environmental monitoring (e.g., monitoring of air and water quality, atmospheric and soil conditions, movements of wildlife, and tsunami and earthquake early warning systems). IoT can be combined with other efforts to provide better emergency responses and related services. Similarly, IoT can support transportation and infrastructure. By continually monitoring changes in structural conditions that can compromise safety, proper and timely repair and maintenance activities can be ensured.

IoT allows for better coordination between different service providers and users, providing more efficiency and public satisfaction. In the energy and water sectors, IoT offers the opportunity to remotely monitor and control all electronic devices, and powering them on and

off as and when needed. Increasing the sustainability and efficiency of energy distribution and water management has not only improved service, but also can save time and even lives. In the medical and healthcare arena, IoT has enabled remote health monitoring and emergency notification systems, in areas such as blood pressure and heart monitoring. The result has been improved efficiency in service and a decrease in hospital expenses.

While IoT introduces new and exciting opportunities, it also raises new questions on the interaction between people and businesses operating in the digital world. Some of these questions involve the capture, processing and ownership of people's data. Other questions are about the possible need to create new legislative or technical frameworks to manage such a large and complex environment, while at the same time avoiding unnecessary constraints on IoT market development. Issues, such as governance, security, and privacy need to be addressed (European Union Research Cluster on Internet of Things, 2015).

The Mauritius Declaration on the Internet of Things and the Resolution on Big Data (both adopted in 2014) set out principles and recommendations designed to reduce risks associated with the collection and use of data in connected devices and Big Data ecosystems. Both documents begin by acknowledging that connected devices and Big Data have the capacity to make our lives easier. Among many trends in advancing e-government, such as co-creation, co-production, crowd-sourcing and crowd-funding (addressed in previous chapters), the extensive use of GIS and the IoT stand out for the ways they are revolutionising overall governance processes. They are also affecting the way societies operate and interact with eco-systems. They hold great opportunities to address key development challenges in health, education, climate change, disaster management, agriculture and so on. These trends are allowing governments around the world to move towards more advanced electronic and mobile services. They are leading towards higher level of interconnectivity and interdependency among people, nature, technology and overall development.

## 4.6. Conclusion

The lessons learned from this chapter can be summarized as follows:

- Countries around the world have experienced substantial progress in the online service delivery, as it pertains to the provision of basic services, e-participation, multichannel service delivery, mobile services, and a Whole-of-Government approach. Progress in income levels is generally related to higher levels of OSI. However, despite considerable progress, online service delivery remains a challenge for LDCs and SIDS. The regional distribution shows an increasing divide, with most of the African countries remaining at the lowest levels of OSI.

- Several types of transactional services online have increased. The transactional services related to finance, personal accounts, and payment of utilities continue to experience linear progression, reconfirming the commitment of countries to increase uptake of public services online as well as improve transparency in public finance. The improvement of the business environment has remained a priority for the period 2014-2016, with 37 countries introducing the online business registration. However, the application for a number of registration and licenses still remains at low levels, while concerns over privacy and security have hampered efforts of countries to fully adopt the online application for identity cards.

- The availability of information has increased in the areas of education, health, finance, welfare, labour, and environment. Environmental information and mobile apps and SMS services experienced the highest increases.

- The efforts of countries to increase accessibility and availability of broadband have led to increased levels of fixed-and mobile broadband subscriptions per 100 inhabitants, while the rate of increase has been lower in mobile phone subscriptions per 100 inhabitants.

These improvements in access and availability have provided for better utilisation of well-designed public services online. The increase in mobile service delivery continues in the 2016 *Survey*, with the health, finance and education sectors experiencing the largest increases. The accessibility and availability of mobile devices has had a tremendous impact on the shift from fixed to mobile public services, especially in developing countries.

- There are increased efforts to bridge the digital divide through national and multilateral efforts. The services to vulnerable groups have experienced tremendous increases throughout regions and groups, with services to youth remaining at the highest levels, followed by services for the poor, persons with disabilities, older persons and immigrants; services to women are also high. The adoption of GIS in policy processes is resulting in increased levels of efficiency, transparency, accountability and participation. The Internet of Things, through increased levels of interconnectivity, is allowing for more targeted and specialised public service delivery with lower costs and higher transparency. These key trends are opening the door to great opportunities, but also great challenges that need to be addressed.

- Bridging the digital divide between countries and people is a key objective of the international community. It requires international cooperation and support. It also requires mobilizing the public and private sectors and societies at large to develop the kind of devices, applications, technologies, and safeguards that can enable and mobilize ICT for addressing poverty, illiteracy, and disease. Progress has to be accompanied by policies to equip people to use online and mobile services, and develop the necessary enabling environment and safeguards.

# World e-government rankings

## 5.1. Introduction

The evolution and diffusion of technology has brought about a revolution in the way people live, work, care for others, and interact. Information communication technologies (ICTs) in particular, have become a part of everyday life. In areas of human development such as health, education and social services, the use of ICTs has become ever more pervasive and is driving improvement in people's lives. Digital divides and disruptions[1] are changing the fabric of many societies in a digitally dependent world.

The use of ICTs in public administration is no exception. The significant evolution of e-government over the past two decades is an example of the transformative power of ICTs. The relevance and benefits of online public services are becoming increasingly visibile.

This chapter presents an overview of e-government development at the global and regional levels. It also analyses e-government development in specific country groups, including the Small Island Developing States (SIDS), Landlocked Developing Countries (LLDCs) and Least Developed Countries (LDCs). The chapter highlights the growing importance and increasing complexity of e-government, specifically related to its role in promoting effective, inclusive and accountable public services that deliver concrete and people-driven outcomes.

## 5.2. E-government rankings in 2016

The 2016 *Survey* marks the ninth edition of the flagship publication of the United Nations Department of Economic and Social Affairs (UNDESA) in benchmarking e-government development achieved by all Member States of the UN. The *Survey* is not designed to capture e-government development in an absolute sense. Rather, it aims to give an indicative assessment of the diffusion of e-government through a performance rating of national governments relative to one another.[2]

Figure 5.1 shows the number of countries grouped by the E-Government Development Index (EGDI) in 2016 as compared to 2014. Notably, in 2016, there are more countries with very-high-EGDI values (i.e., EGDI values greater than 0.75). 29 countries scored "very-high-EGDI" values in 2016 and this group includes all 25 countries that had also scored very high EGDI in the last edition of the *Survey* (UNDESA, 2014). The four additional countries that joined this group of top performers are Slovenia (ranked 21st), Lithuania (ranked 23rd), Switzerland (ranked 28th), and the United Arab Emirates (ranked 29th). As seen in the 2014 *Survey*, the trend that leadership in e-government development is not solely dependent on the income level of a country (UNDESA, 2014). In the second- (high-EGDI) and lower-tier (middle-EGDI and low-EGDI) some lower income countries perform as well as higher income countries, if not better in some instances.

[1] Digital disruptions are defined as digital innovations that create new value networks that eventually disrupts and displaces existing markets and networks (Christensen, 1995).

[2] See section on Methodology

Photo credit: blackdogvfx/Shutterstock.com

In this chapter:

Likewise, the number of countries with high-EGDI values (i.e., between 0.50 and 0.75) increased to 65, up from 62. While three countries (Antigua and Barbuda, Egypt and Fiji) dropped from high-EGDI to medium-EGDI, ten countries (the Bahamas, Bosnia and Herzegovina, Lebanon, the Philippines, Saint Kitts and Nevis, South Africa, Thailand, Trinidad and Tobago, Uzbekistan and Vietnam) improved their e-government performance and made the leap from middle-EGDI to high-EGDI values (see Table 5.1). Meanwhile, the number of countries with middle-EGDI values (i.e., between 0.25 and 0.50) declined from 74 to 67 countries.

Figure 5.1. Number of countries grouped by E-Government Development Index (EGDI) levels, in 2014 and 2016

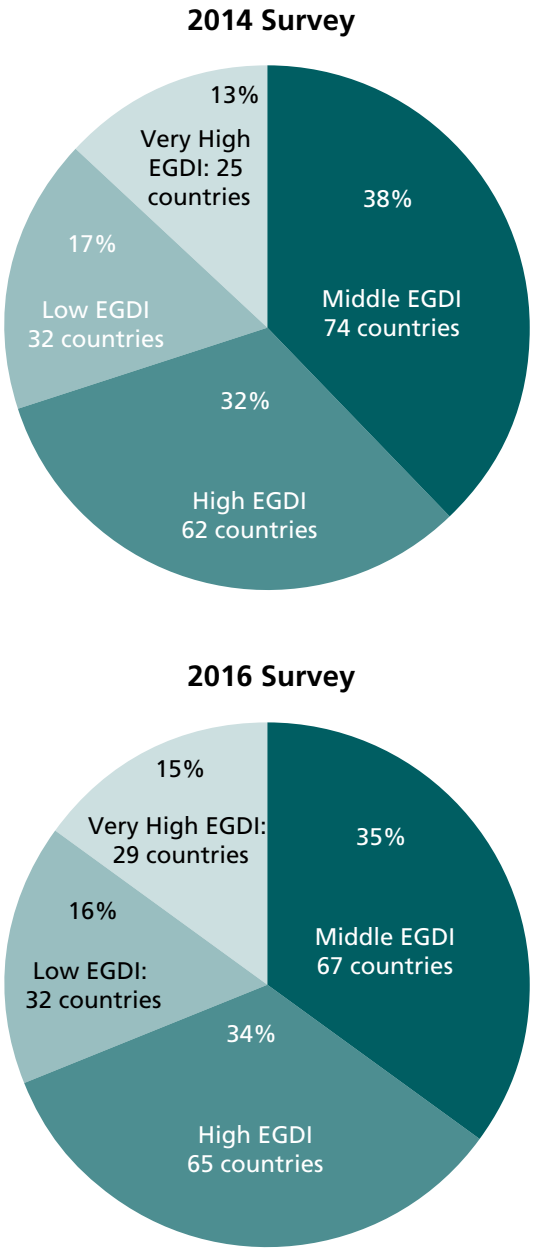


Table 5.1. Countries grouped by E-Government Development Index (EGDI) levels in alphabetical order

| Very-High-EGDI (Greater than 0.75) | High-EGDI (Between 0.50 and 0.75) | | Middle-EGDI (Between 0.25 and 0.50) | | Low-EGDI (Less than 0.25) |
|---|---|---|---|---|---|
| Australia | Albania | Mauritius | Algeria | Lesotho | Afghanistan |
| Austria | Andorra | Mexico | Angola | Libyan Arab Jamahiriya | Benin |
| Bahrain | Argentina | Monaco | Antigua and Barbuda (-) | Maldives | Burkina Faso |
| Belgium | Armenia | Mongolia | Bangladesh | Marshall Islands | Burundi |
| Canada | Azerbaijan | Montenegro | Belize | Micronesia (Federated States of) | Central African Republic |
| Denmark | Bahamas (+) | Morocco | Bhutan | Namibia | Chad |
| Estonia | Barbados | Oman | Bolivia | Nauru | Comoros |
| Finland | Belarus | Peru | Botswana | Nepal (+) | Congo (-) |
| France | Bosnia and Herzegovina (+) | Philippines (+) | Cambodia | Nicaragua | Côte d'Ivoire |
| Germany | Brazil | Poland | Cameroon | Nigeria | Democratic Republic of Congo |
| Iceland | Brunei Darus-salam | Portugal | Cape Verde | Pakistan | Djibouti |
| Ireland | Bulgaria | Qatar | Cuba | Palau | Equatorial Guinea |
| Israel | Chile | Republic of Moldova | DPR of Korea | Panama | Eritrea |
| Italy | China | Romania | Dominica | Paraguay | Gambia |
| Japan | Colombia | Russian Federation | Dominican Republic | Rwanda | Guinea |
| Lithuania (+) | Costa Rica | Saint Kitts and Nevis (+) | Egypt (-) | Saint Lucia | Guinea-Bissau |
| Luxembourg | Croatia | San Marino | El Salvador | St Vincent & the Grenadines | Haiti |
| Netherlands | Cyprus | Saudi Arabia | Ethiopia | Samoa | Liberia |
| New Zealand | Czech Republic | Serbia | Fiji (-) | Senegal | Madagascar (-) |
| Norway | Ecuador | Seychelles | Gabon | Sudan | Malawi |
| Republic of Korea | Georgia | Slovakia | Ghana | Suriname | Mali |
| Singapore | Greece | South Africa (+) | Guatemala | Swaziland | Mauritania |
| Slovenia (+) | Grenada | Sri Lanka | Guyana | Syrian Arab Republic | Mozambique |
| Spain | Hungary | Thailand (+) | Honduras | Tajikistan | Myanmar |
| Sweden | Jordan | TFYR of Macedonia | India | Timor-Leste | Niger |
| Switzerland (+) | Kazakhstan | Trinidad and Tobago (+) | Indonesia | Togo (+) | Papua New Guinea |
| United Arab Emirates (+) | Kuwait | Tunisia | Iran (Islamic Republic of) | Tonga | Sao Tome and Principe |
| United Kingdom | Latvia | Turkey | Iraq | Turkmenistan | Sierra Leone |
| United States of America | Lebanon (+) | Ukraine | Jamaica | Tuvalu | Solomon Islands |
| | Liechtenstein | Uruguay | Kenya | Uganda | Somalia |
| | Malaysia | Uzbekistan (+) | Kiribati | United Republic of Tanzania | South Sudan |
| | Malta | Venezuela | Kyrgyzstan | Vanuatu | Yemen (-) |
| | | Viet Nam (+) | Lao People's PR | Zambia (+) | |
| Australia | | | | Zimbabwe | |

Note: Countries with superscript (+) have advanced from a lower EGDI group to a higher EGDI group (e.g., from low-EGDI to middle-EGDI); countries with superscript (-) have dropped from a higher EGDI group to a lower EGDI group (e.g. from high-EGDI to middle-EGDI).

The above trend signals that more countries are advancing towards higher levels of e-government. They are responding to people's increasingly varied and complex needs, as well as the persistent call for new, better and faster public services. There is also growing recognition of e-government to support sustainable development in the three dimensions – economic growth, social inclusion and environmental protection.

However, despite some development gains and investments in several countries, the e-government divide, similar to the digital divide, persists. The number of countries with low-EGDI values (less than 0.25) remains at 32 in 2016, out of which 29 are least developed countries. There were also 32 low-EGDI countries in 2014, albeit with a mix of different countries. Within countries, there is the risk that the divide deepens between people who have access to the Internet and online services and those who do not. Countries that have graduated from low- to middle-EGDI levels are Nepal, Togo and Zambia. Congo, Madagascar and Yemen have fallen from middle- to low-EGDI levels due to adverse political, socio-economic and natural conditions (see Table 5.1 [3]).

Table 5.2 shows a list of countries leading in e-government development, with corresponding EGDI values and its three components, namely the Online Service Index (OSI), the Telecommunication Infrastructure Index (TII) and the Human Capital Index (HCI).[4] For the first time, the top ranking goes to the United Kingdom, which was ranked fifth in the 2003 *Survey* and has been among the top 10 for the past seven editions of the *Survey*. The United Kingdom has also been leading the global trend in deploying new web technologies such as HTML5[5], as part of the aim to make its national portal GOV.UK "accessible to the widest possible audience but this does not mean working to the lowest common denominator" (Berrima, 2012). This achievement was also won through, among others, efficiency gains which resulted in savings of £1.7bn in 2014 through its digital and technology transformation (Foreshew-Cain, 2015). Eighty-five per cent of self-assessment tax filing is now done through online channels and over 98 per cent of driving tests are now booked online (Foreshew-Cain, 2015).

Australia retains its second position while the Republic of Korea, ranked first in the 2014 *Survey*, falls to the third position. The Australian Government has been one of the early adopters of an extensive one-stop national portal, offering citizens a secured single sign-on[6] for access to various interactive services, both at the federal and local levels, ranging from birth certifications to medicare, taxation, job search, aged care, child support, and among others (Government of Australia, 2015). The establishment of the Digital Transformation Office as an executive agency under the Australian Prime Minister's portfolio in July 2015 signalled another milestone in advancing the government's commitment to lead the transformation of services, using "technology to make services simpler, clearer and faster for Australian families and businesses" (Government of Australia, 2016). Likewise, the Republic of Korea continues to innovate in e-government through its plan to move over 750 e-government services to the cloud by the end of 2016; by 2017, an estimate of more than 60 percent of e-government services will have been transferred to cloud computing (Iglauer, 2015 and Ahcopra, 2015). It is pertinent to note that a relative decline in rankings does not necessarily imply that countries have done less but rather those holding leadership positions have advanced or performed better than others.

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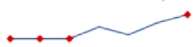
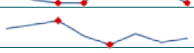
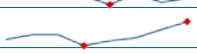
[3] Countries with superscript (+) have advanced from a lower EGDI group to a higher EGDI group (e.g., from low-EGDI to middle-EGDI); countries with superscript (-) have dropped from a higher EGDI group to lower EGDI group (e.g., from high-EGDI to middle-EGDI.)

[4] See section on Methodology

[5] Hypertext Markup Language revision 5 (HTML5) is a markup language for the structure and presentation of World Wide Web contents. HTML5 supports the traditional HTML and XHTML-style syntax and other new features in its markup, New APIs, XHTML and error handling [Source: Techopedia.com]

[6] Note: A single sign-on (SSO) is a web session/user authentication process that permits a user to enter one name and password in order to access multiple online applications or services.

Table 5.2. World e-government leaders with very high E-Government Development Index (EGDI) levels

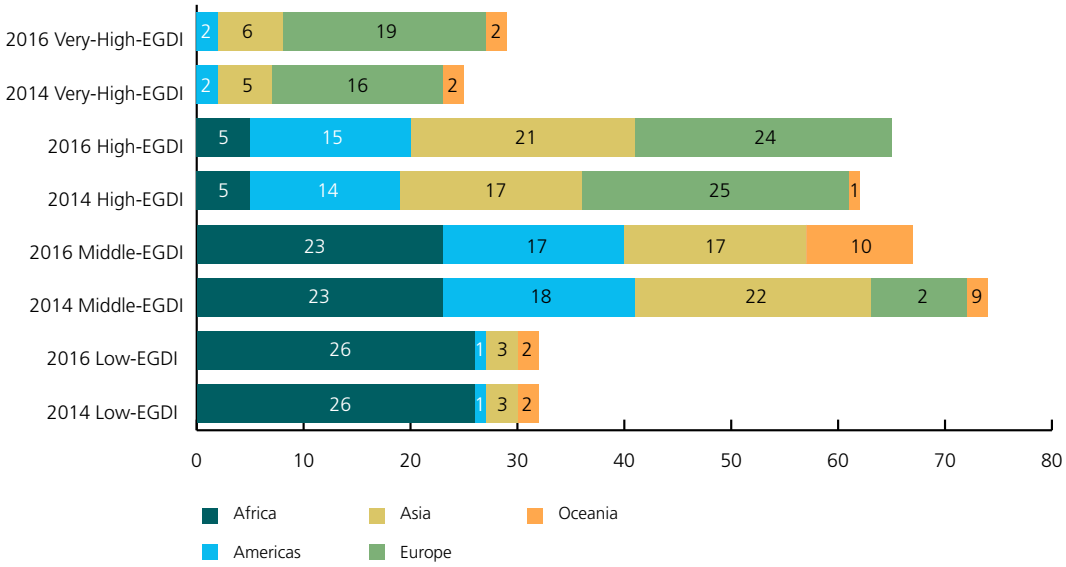
| Country | Region | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | Ranking Trendline (2003 - 2016) |
|---|---|---|---|---|---|---|---|---|
| United Kingdom | Europe | 1.0000 | 0.9402 | 0.8177 | 0.9193 | Very high | 1 |  |
| Australia | Oceania | 0.9783 | 1.0000 | 0.7646 | 0.9143 | Very high | 2 |  |
| Republic of Korea | Asia | 0.9420 | 0.8795 | 0.8530 | 0.8915 | Very high | 3 |  |
| Singapore | Asia | 0.9710 | 0.8360 | 0.8414 | 0.8828 | Very high | 4 |  |
| Finland | Europe | 0.9420 | 0.9440 | 0.7590 | 0.8817 | Very high | 5 |  |
| Sweden | Europe | 0.8768 | 0.9210 | 0.8134 | 0.8704 | Very high | 6 |  |
| Netherlands | Europe | 0.9275 | 0.9183 | 0.7517 | 0.8659 | Very high | 7 |  |
| New Zealand | Oceania | 0.9420 | 0.9402 | 0.7136 | 0.8653 | Very high | 8 |  |
| Denmark | Europe | 0.7754 | 0.9530 | 0.8247 | 0.8510 | Very high | 9 |  |
| France | Europe | 0.9420 | 0.8445 | 0.7502 | 0.8456 | Very high | 10 |  |
| Japan | Asia | 0.8768 | 0.8274 | 0.8277 | 0.8440 | Very high | 11 |  |
| United States of America | Americas | 0.9275 | 0.8815 | 0.7170 | 0.8420 | Very high | 12 |  |
| Estonia | Europe | 0.8913 | 0.8761 | 0.7329 | 0.8334 | Very high | 13 |  |
| Canada | Americas | 0.9565 | 0.8572 | 0.6717 | 0.8285 | Very high | 14 |  |
| Germany | Europe | 0.8406 | 0.8882 | 0.7342 | 0.8210 | Very high | 15 |  |
| Austria | Europe | 0.9130 | 0.8396 | 0.7098 | 0.8208 | Very high | 16 |  |
| Spain | Europe | 0.9130 | 0.8782 | 0.6493 | 0.8135 | Very high | 17 |  |
| Norway | Europe | 0.8043 | 0.9031 | 0.7276 | 0.8117 | Very high | 18 |  |
| Belgium | Europe | 0.7101 | 0.9712 | 0.6808 | 0.7874 | Very high | 19 |  |
| Israel | Asia | 0.8623 | 0.8619 | 0.6175 | 0.7806 | Very high | 20 |  |
| Slovenia | Europe | 0.8478 | 0.8952 | 0.5877 | 0.7769 | Very high | 21 |  |
| Italy | Europe | 0.8696 | 0.8126 | 0.6469 | 0.7764 | Very high | 22 |  |
| Lithuania | Europe | 0.8261 | 0.8717 | 0.6262 | 0.7747 | Very high | 23 |  |
| Bahrain | Asia | 0.8261 | 0.7178 | 0.7762 | 0.7734 | Very high | 24 |  |
| Luxembourg | Europe | 0.7174 | 0.7750 | 0.8190 | 0.7705 | Very high | 25 |  |
| Ireland | Europe | 0.7246 | 0.9218 | 0.6602 | 0.7689 | Very high | 26 |  |
| Iceland | Europe | 0.6232 | 0.8940 | 0.7814 | 0.7662 | Very high | 27 |  |
| Switzerland | Europe | 0.6014 | 0.8579 | 0.7980 | 0.7525 | Very high | 28 |  |
| United Arab Emirates | Asia | 0.8913 | 0.6752 | 0.6881 | 0.7515 | Very high | 29 |  |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

## 5.2.1. Regional rankings

The regional characteristics for e-government development in 2016 mirror those of previous *Surveys*. Figure 5.2 illustrates the gaps that have persisted in e-government development among regions during the period 2014-2016. A majority of countries in the very-high-EGDI group are from Europe, which comprises 19 out of 29 countries (66 per cent) in 2016, as compared to 16 out of 25 countries (64 per cent) in 2014; while at the other extreme, the low-EGDI group mainly consists of African countries. In fact, the statistics have remained unchanged for this low EGDI group, with 26 countries from Africa (81.2 per cent), 3 from Asia (9.4 per cent), 2 from Oceania (6.3 per cent) and 1 from the Americas (3.1 per cent).

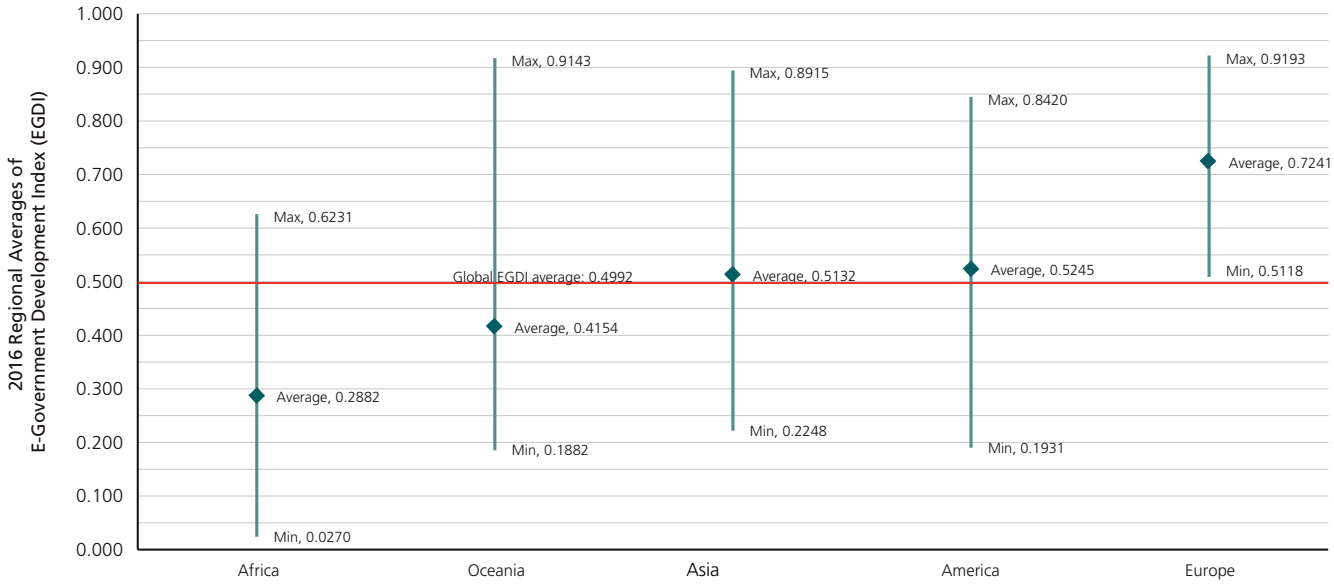
Figure 5.2. Number of countries grouped by E-Government Development index (EGDI) level and geographical regions




Africa continues to lag globally with a low average at 0.2882, a figure that falls far below the leading European EGDI of 0.7241, as shown in Figure 5.3. Oceania countries, with an average EGDI of 0.4154, also perform lower than the global average of 0.4922. Asia and the Americas are very close at 0.5132 and 0.5245 respectively. E-government divides also clearly exist within regions, with the widest gap in Oceania. While Australia and New Zealand are ranked among the top 10 with very high EGDI values, the rest of the countries in the region score medium and low EGDI values. The smallest gap is in Europe, perhaps in part due to the move towards a 'Digital Single Market' as part of its Digital Agenda, a programme which looks to standardize access to digital content across the 28 member states in the European Union[7] (European Commission, 2016).

[7] There are 43 countries in the Europe region, according to the classification of the Statistics Division of the Department of Economic and Social Affairs, United Nations. For details, see http://unstats.un.org/unsd/methods/m49/m49regin.htm. All 28 member states in the European Union are included in the Europe region.

Figure 5.3. Regional averages with maximum and minimum values of E-Government Development Index (EGDI) in 2016




## • Africa

The world population is growing and it will be over nine billion in 2050 (UNDESA 2015b), the greatest increase is expected to occur in the poorest and most vulnerable regions, including Africa and the Arab states. In addition to pressing development needs, countries in Africa are disproportionately impacted by global challenges such as food security and climate change. Therefore, they have not been able to reap sustainable gains in e-government. For instance, in countries like Somalia (ranked 193rd), Chad (ranked 188th), South Sudan (ranked 183rd), and the Democratic Republic of Congo (ranked 180th), extreme and harsh environments have adversely affected development, and logically hindered progress and priorities related to e-government, with regression in some areas.

Except for five countries, all other African countries are in the lower two tiers of e-government development (i.e., the low-EGDI and middle-EGDI groups) as shown in Table 5.1. These top five performers on e-government with high EGDI values are Mauritius, ranked globally at 58th, Tunisia at 72nd, South Africa at 76th, Morocco at 85th, and Seychelles at 86th (see Table 5.3).

Table 5.3. Top 10 countries for e-government in Africa

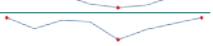
| Country | Region | Sub-Region | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | |
|---|---|---|---|---|---|---|---|---|---|
| Mauritius | Africa | Eastern Africa | 0.7029 | 0.7067 | 0.4596 | 0.6231 | High | 58 | |
| Tunisia | Africa | Northern Africa | 0.7174 | 0.6397 | 0.3476 | 0.5682 | High | 72 | |
| South Africa | Africa | Southern Africa | 0.5580 | 0.7253 | 0.3807 | 0.5546 | High | 76 | |
| Morocco | Africa | Northern Africa | 0.7391 | 0.4737 | 0.3429 | 0.5186 | High | 85 | |
| Seychelles | Africa | Eastern Africa | 0.4058 | 0.6861 | 0.4624 | 0.5181 | High | 86 | |
| Cape Verde | Africa | West Africa | 0.4565 | 0.6031 | 0.3629 | 0.4742 | Medium | 103 | |
| Egypt | Africa | Northern Africa | 0.4710 | 0.6048 | 0.3025 | 0.4594 | Medium | 108 | |
| Botswana | Africa | Southern Africa | 0.2826 | 0.6553 | 0.4215 | 0.4531 | Medium | 113 | |
| Libyan Arab Jamahiriya | Africa | Northern Africa | 0.1087 | 0.7588 | 0.4291 | 0.4322 | Medium | 118 | |
| Kenya | Africa | Eastern Africa | 0.5580 | 0.5169 | 0.1808 | 0.4186 | Medium | 119 | |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

## • Americas

In the Americas, the United States and Canada are leading in e-government development. Back in 2009, the United States declared cyberspace as the fifth domain, in addition to land, sea, air and space; it has invested in e-government and its digital infrastructure as a strategic national asset (The White House, 2009). The next three top countries are from South America, namely Uruguay (ranked 34th), Argentina (ranked 41st), and Chile (ranked 42nd); (see Table 5.4). The Digital Agenda Uruguay, also called ADU by its initials in Spanish, outlines a dynamic roadmap to support government policies and objectives for development, through various building blocks such as a public key infrastructure, an interoperability platform, a computer emergency readiness team (CERT), and a mechanism for online payments. The State Modernization Plan of the Argentina Government has aimed to promote the development of smart cities across the country, putting the State at the service of the people and encourage agile administration. Similarly, the Chile's Agenda Digital Imagina Chile 2013-2020 (Imagine Chile Digital Agenda 2013-2020) has envisioned a digital economy to reach 1- percent of GDP by 2020. All countries in Central America and the Caribbean are ranked in the lower tiers of high-EGDI and middle-EGDI. Haiti continues to have a low-EGDI value, as it has in past *Surveys*.

Table 5.4. Top 10 countries for e-government in the Americas

| Country | Region | Sub-Region | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | |
|---|---|---|---|---|---|---|---|---|---|
| United States of America | Americas | North America | 0.9275 | 0.8815 | 0.7170 | 0.8420 | Very High | 12 |  |
| Canada | Americas | North America | 0.9565 | 0.8572 | 0.6717 | 0.8285 | Very High | 14 |  |
| Uruguay | Americas | South America | 0.7754 | 0.7820 | 0.6137 | 0.7237 | High | 34 |  |
| Argentina | Americas | South America | 0.7101 | 0.8802 | 0.5031 | 0.6978 | High | 41 |  |
| Chile | Americas | South America | 0.7754 | 0.8124 | 0.4970 | 0.6949 | High | 42 |  |
| Brazil | Americas | South America | 0.7319 | 0.6787 | 0.5025 | 0.6377 | High | 51 |  |
| Costa Rica | Americas | Central America | 0.6377 | 0.7436 | 0.5129 | 0.6314 | High | 53 |  |
| Barbados | Americas | Caribbean | 0.4420 | 0.8113 | 0.6397 | 0.6310 | High | 54 |  |
| Colombia | Americas | South America | 0.7899 | 0.7000 | 0.3813 | 0.6237 | High | 57 |  |
| Mexico | Americas | Central America | 0.8478 | 0.6993 | 0.3114 | 0.6195 | High | 59 |  |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

## • Asia

The top performing countries in the region are listed in Table 5.5. with Very High EGDI levels. For the Gulf Cooperation Council (GCC), which comprises six Arab countries, e-government itself has become a development indicator. Much emphasis has been placed on advancing e-government in the region, as both a means and an end in development. In promoting knowledge sharing among the GCC countries, the biennial GCC e-government Awards are presented to government entities that have demonstrated excellence in e-government (GCC, 2015). The Republic of Korea (ranked 3rd), Singapore (4th), Japan (11th), Israel (ranked 20th), Bahrain (24th), and the United Arab Emirates (29th) are among the global leaders with Very-High-EGDI levels, while Kazakhstan (33rd), Kuwait (40th), Saudi Arabia (44th) and Qatar (48th) are among the top Asian countries with High-EGDI levels.

Table 5.5. Top 10 countries for e-government in Asia

| Country | Region | Sub-Region | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | |
|---|---|---|---|---|---|---|---|---|---|
| Republic of Korea | Asia | Eastern Asia | 0.9420 | 0.8795 | 0.8530 | 0.8915 | Very High | 3 |  |
| Singapore | Asia | South-Eastern Asia | 0.9710 | 0.8360 | 0.8414 | 0.8828 | Very High | 4 |  |
| Japan | Asia | Eastern Asia | 0.8768 | 0.8274 | 0.8277 | 0.8440 | Very High | 11 |  |
| Israel | Asia | Western Asia | 0.8623 | 0.8619 | 0.6175 | 0.7806 | Very High | 20 |  |
| Bahrain | Asia | Western Asia | 0.8261 | 0.7178 | 0.7762 | 0.7734 | Very High | 24 |  |
| United Arab Emirates | Asia | Western Asia | 0.8913 | 0.6752 | 0.6881 | 0.7515 | Very High | 29 |  |
| Kazakhstan | Asia | Central Asia | 0.7681 | 0.8401 | 0.5668 | 0.7250 | High | 33 |  |
| Kuwait | Asia | Western Asia | 0.6522 | 0.7287 | 0.7430 | 0.7080 | High | 40 |  |
| Saudi Arabia | Asia | Western Asia | 0.6739 | 0.7995 | 0.5733 | 0.6822 | High | 44 |  |
| Qatar | Asia | Western Asia | 0.6739 | 0.7317 | 0.6041 | 0.6699 | High | 48 |  |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

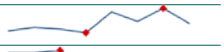
- **Europe**

In Europe, the leading region, e-government is progressing steadily across the continent. The top 10 e-government leaders in Europe are the United Kingdom (ranked 1st), Finland (ranked 5th), Sweden (ranked 6th), the Netherlands (ranked 7th), Denmark (ranked 9th), France (ranked 10th), Estonia (ranked 13th), Germany (ranked 15th), Austria (ranked 16th), and Spain (ranked 17th). Some countries like Denmark and the United Kingdom are aiming for 'digital by default', meaning that "digital services are so straightforward and convenient that all those who can use them will choose to do so whilst those who can't are not excluded" (Verhulst, 2012). The use of digital identity is fast becoming a norm and a must-have feature of any functional e-government website in Europe, even though it may still be considered as an advanced innovation in other regions. Digital identity is often linked to a personal identification number and must be recognised as a legal instrument for authenticating users.

In France, an innovative approach to policy-making is the use of crowdsourcing in regards to enacting its new digital law. In a bid to tap widespread views and ideas, an open and participatory consultation process attracted over 20,000 people and organisations to go online to vote and comment on the text of the new digital law (Dunlevy, 2015).[8] In Estonia, special focus is placed on the 'once only' principle in e-government and data management, meaning that "the State is not allowed to ask citizens for the same information twice" (Pop V., 2015). This programme is enabled through a decentralized data exchange platform called the X-Road that connects all digital governance applications (Estonian ICT Demo Centre, 2012, and World Bank, 2015). Legislation and implementation practices, through the Digital Agenda of the European Union, have also contributed to increased interoperability, usability, cost-efficiency and transparency in citizen-state relations (European Commission, 2015).

[8] See Chapter 4 on crowdsourcing in e-government

Table 5.6. Top 10 countries for e-government in Europe

| Country | Region | Sub-Region | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | |
|---|---|---|---|---|---|---|---|---|---|
| United Kingdom | Europe | Northern Europe | 1.0000 | 0.9402 | 0.8177 | 0.9193 | Very High | 1 |  |
| Finland | Europe | Northern Europe | 0.9420 | 0.9440 | 0.7590 | 0.8817 | Very High | 5 |  |
| Sweden | Europe | Northern Europe | 0.8768 | 0.9210 | 0.8134 | 0.8704 | Very High | 6 |  |
| Netherlands | Europe | Western Europe | 0.9275 | 0.9183 | 0.7517 | 0.8659 | Very High | 7 |  |
| Denmark | Europe | Northern Europe | 0.7754 | 0.9530 | 0.8247 | 0.8510 | Very High | 9 |  |
| France | Europe | Western Europe | 0.9420 | 0.8445 | 0.7502 | 0.8456 | Very High | 10 |  |
| Estonia | Europe | Northern Europe | 0.8913 | 0.8761 | 0.7329 | 0.8334 | Very High | 13 |  |
| Germany | Europe | Western Europe | 0.8406 | 0.8882 | 0.7342 | 0.8210 | Very High | 15 |  |
| Austria | Europe | Western Europe | 0.9130 | 0.8396 | 0.7098 | 0.8208 | Very High | 16 |  |
| Spain | Europe | Southern Europe | 0.9130 | 0.8782 | 0.6493 | 0.8135 | Very High | 17 |  |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

### 5.2.2. The situation in the Least Developed Countries (LDCs) and Landlocked Developing Countries (LLDCs)

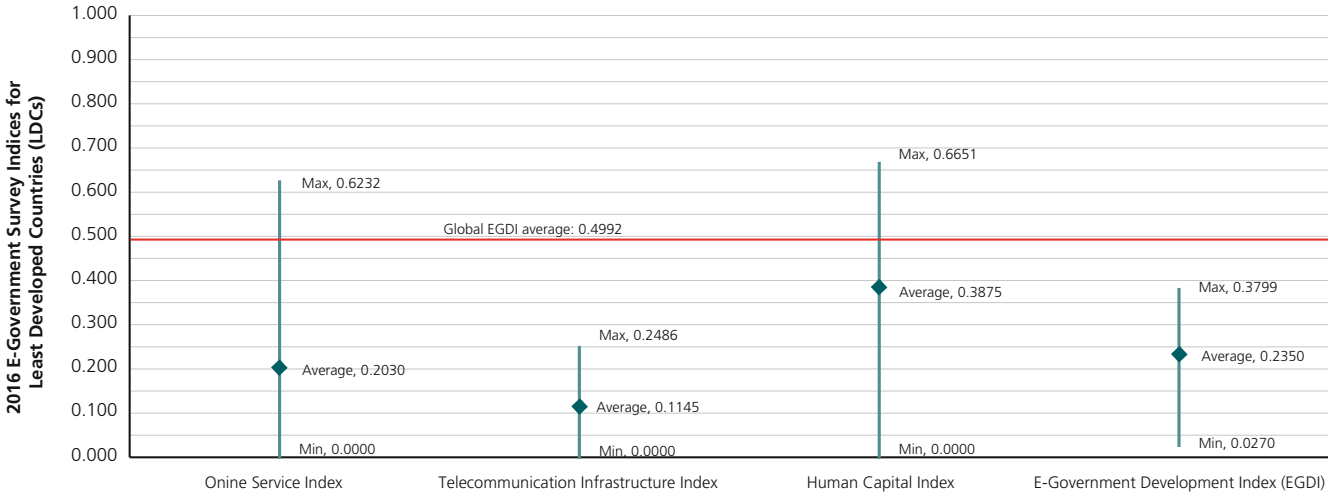
Among the 48 Least Developed Countries (LDCs), the majority - 34 countries - are from the Africa region, 22 of which are also landlocked developing countries. Low productive capacity and structural challenges, such as lack of ICT infrastructure and limited access to technologies and related know-how, continue to challenge e-government advancement in the LDCs (United Nations, 2011). 29 countries, representing more than 60 per cent of the least developed countries, have low-EDGI values (less than 0.25), while the remaining 19 countries have middle-EGDI values (between 0.25 and 0.50), leaving none of them performing in the upper two tiers of e-government development.

In the least developed countries, deficits in e-government development reflect those in economic and in human development (UNDP, 2015). Some LDCs suffering from crises or emerging from conflicts – such as the Central African Republic, South Sudan, Libya Chad, Sierra Leone, and the Democratic Republic of Congo – also suffer from lack of capable institutions and public governance (UNDESA, 2012: 35). At the same time, least developed countries are often most impacted by global challenges such as volatile energy prices, food insecurity, the increasing effects of climate change, and the loss of biodiversity. The landlocked countries face the same challenges as the least developed countries; however, they differ due to issues related to geographical constraints, which can result in, for example, greater dependence on bordering countries for broadband infrastructure development.

The average EGDI of the LDCs is 0.2350, which is only approximately half of the global average of 0.4922. While all three components of the EGDI warrant attention, the low average of ICT infrastructure (0.1145) is most significant as a factor in holding back e-government development for most if not all the least developed countries (see Figure 5.4). First highlighted in the Istanbul Declaration and the Programme of Action for the Least Developed Countries for the Decade 2011-2020 (United Nations, 2011: 1d), the critical need to access ICTs in least developed countries has been reaffirmed in the 2030 Agenda through one of its targets to "Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020" (UN General Assembly, 2015: Target 9c). It is no doubt an ambitious target, but also an essential one. Improving access to ICTs is a critical means of implementation to support the sustainable development goals and targets (UN General Assembly, 2015b).

Along with developing ICT infrastructure, it is important to improve access to knowledge and technologies, and build the related capacities in developing countries. This was recognized in the Addis Ababa Action Agenda (UN DESA, 2015c) and in the Istanbul Declaration and the Programme of Action for the Least Developed Countries for the Decade 2011-2020. The technology facilitation mechanism launched at the September summit on the 2030 Agenda can make an important contribution in this regard.

Figure 5.4. E-Government Development Index (EGDI) and its three sub-components: Online Service Index (OSI), Telecommunication Infrastructure Index (TII), Human Capital Index (HCI) – for the least developed countries (LDCs) in 2016




Because LDCs have more pressing needs like peaceful societies and poverty eradication, the rationale, foundations and implications of e-government are often not as prominent on their radar. For this reason, there is a need to initiate discussions and build stakeholder capacity related to the broader political, social, and economic implications of e-government. Comparative analysis is needed to reveal the losses the LDCs would incur, including the loss of opportunities, should they not invest in e-government, while also looking into the costs associated with providing e-government. At the same time, countries will need to avoid the technocratic approach to e-government that results in government websites or online services with low relevance or minimal usage. Rather, governments will need a more strategic, integrated and sustained approach that is ambitious yet focused, with realistic commitments towards sustainable development and concrete ways to ensure the relevance and inclusiveness of online services. It is important to consider the various channels of public service delivery, including but not limited to web portal, email, SMS, mobile apps, social media, public kiosks and intermediaries through public-private partnerships, in selecting the right channel for the right service targeting the specific audience. Channel selection is a deciding factor to effectively reach out to specific groups of citizens, for example, rural population with limited ICT access. An inclusive multichannel approach could be a relevant solution for governments to utilize a multiplicity of the channels to reach out to disadvantaged and vulnerable groups and find smart ways to increase usage of online services. (UNDESA, 2014:96-122).

Given the competing priorities and limited public resources, public-private partnerships play an important role in driving e-government in the LDCs, and boosting efforts to achieve sustained, inclusive and equitable growth (United Nations, 2011). Good governance and transparent, effective and accountable institutions, including through e-government at all levels, are fundamental to building peaceful, just and inclusive societies (UN General Assembly, 2015: para. 35), and realizing the SDGs. In fostering inclusive development, the Programme of Action for the Least Developed Countries for the Decade 2011-2020 also recognizes the role that civil society plays in complementing efforts of governments and the private sector (United Nations, 2011: para. 155) in ensuring e-participation and a participatory and inclusive development process.

Table 5.7. Least developed countries and landlocked countries with significant gains in e-government development (2003-2016)

| Country | Region | Sub-Region | LDC | LLDC | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bangladesh | Asia | Southern Asia | x | | 0.6232 | 0.3973 | 0.1193 | 0.3799 | Medium | 124 |  |
| Bhutan | Asia | Southern Asia | x | x | 0.3188 | 0.5139 | 0.2192 | 0.3506 | Medium | 133 |  |
| Rwanda | Africa | Eastern Africa | x | x | 0.4565 | 0.4522 | 0.1084 | 0.3390 | Medium | 138 |  |
| Angola | Africa | Central Africa | x | | 0.3478 | 0.5015 | 0.1441 | 0.3311 | Medium | 142 |  |
| Kiribati | Oceania | Oceania | x | | 0.2101 | 0.6599 | 0.0665 | 0.3122 | Medium | 145 |  |
| Vanuatu | Oceania | Oceania | x | | 0.1667 | 0.5884 | 0.1684 | 0.3078 | Medium | 149 |  |
| Tuvalu | Oceania | Oceania | x | | 0.0217 | 0.6651 | 0.1981 | 0.2950 | Medium | 151 |  |
| Ethiopia | Africa | Eastern Africa | x | x | 0.5290 | 0.2212 | 0.0495 | 0.2666 | Medium | 157 |  |
| Timor-Leste | Asia | South-Eastern Asia | x | | 0.2174 | 0.4843 | 0.0728 | 0.2582 | Medium | 160 |  |
| Equatorial Guinea | Africa | Central Africa | x | | 0.0797 | 0.5174 | 0.1237 | 0.2403 | Low | 165 |  |
| Liberia | Africa | West Africa | x | | 0.2391 | 0.3581 | 0.1041 | 0.2338 | Low | 170 |  |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

Table 5.7 shows the LDCs and LLDCs which achieved large gains in e-government development during the period 2003-2016, as observed through the *Survey*. Bangladesh has made the largest gains with a global ranking of 124th in the 2016 *Survey*, partly due to the fact that the role of e-government is recognised at the highest level of its administration, with the Prime Minister of Bangladesh highlighting its "state of the art" digital technology. People in Bangladesh are today receiving more than 200 services from 4,582 digitalized Union Services and Information Centres (Bangladesh, 2013). In Ethiopia (ranked 157th), the significant improvement in e-government development over the period 2003-2016 has been a result of its far-reaching vision recognising ICT, including e-government, as a key cross-cutting factor to promoting national prosperity and sustainable development. The national e-government strategy has a holistic approach: it focuses on creating a "SMART" (Simple, Moral, Accountable, Responsive and Transparent) government; affirms that e-government is not merely translating processes, but rather transforming processes; and aims to build a networked and integrated government (Ministry of Communication and Information Technology, Ethiopia, 2015).

### 5.2.3. The situation in Small Island Developing States (SIDS)

The Small Island Developing States (SIDS) face specific vulnerabilities and dependencies, along with prevalent development challenges, such as scarcity of resources, physical isolation and barriers to major markets (Lee, 2014). Both intra-country and inter-community isolations hinder the flow of information and public services, which also negatively impacts local development. E-government is not just an enabler of sustainable development for the small island developing states; rather, it is often seen as a critical multiplier and accelerator. Hence, without e-government the opportunity costs of development would increase. One expert argues that in the age of globalization, SIDS cannot survive without maximizing the benefits of the digital economy (Ming, Awan and Somani, 2013).

In particular, e-government can help SIDS find new ways to build resilience to climate change, including by supporting disaster preparedness and disaster management. The 2030 Agenda recognizes the importance of promoting resilience and disaster risk reduction for sustainable development, with a focus on disaster management, including through the use of ICTs (UN General Assembly, 2015: para. 33). The Samoa Pathway, adopted at the Third International

Conference on SIDS, also called for countries to promote and enhance the use of ICTs for, inter alia, education, employment creation, in particular youth employment, and SIDS' economic sustainability (United Nations, 2014). The optimal use of ICTs, including e-government, often relies on the capacities of governments to devise and implement national development strategies, to explore innovative and sustainable solutions in addressing disaster risk reduction, and to build resilience to disasters within the context of sustainable development and poverty eradication.

The average EGDI of the SIDS is 0.4093, which is below but not too far from the global average of 0.4922, as shown in Figure 5.5. While all three components of EGDI warrant attention, SIDS's progress in online services and ICT infrastructure components, with average values of 0.2879 and 0.2977 respectively, trails their development in human capital, which has a higher average value of 0.6422. In addition to the lack of ICT infrastructure and financial resources, these small states also suffer from a lack of technical experts and experience, as a result of brain-drain and other, in establishing and implementing comprehensive e-government strategies (Lee, 2014). Their efforts thus need to be supported as agreed at the Samoa Conference in 2014 (United Nations, 2014: para 111)

**Figure 5.5. E-Government Development Index (EGDI) and its three sub-components (Online Service Index (OSI), Telecommunication Infrastructure Index (TII), Human Capital Index (HCI)) for Small Island Developing States (SIDS)**

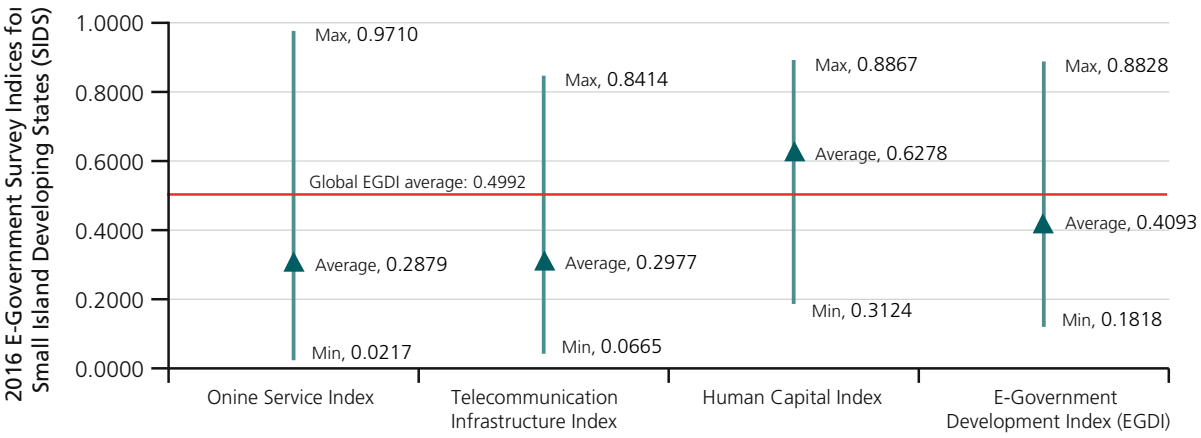



Table 5.8 shows that SIDS made significant gains in e-government development in the period 2003-2016. In the 2016 *Survey*, Barbados, Dominica and Suriname made the biggest jump. The Government of Dominica for example, is beginning to leverage mobile apps as a way for citizens to understand and access important information and initiatives, as seen in the recently launched Government of Dominica Internal Directory Mobile App, which complements an already comprehensive list of online services (Government of Dominca, 2015a and 2015b). The portal of the Government of Barbados carries the tagline "Barbados Integrated Government - Access Barbados", and is a convenient one-stop shop where people can locate the latest government news, information and policies, as well as all online services (Government of Barbados, 2015).

Given their common challenges and strategic objectives, increased bilateral and multilateral collaboration among the SIDS, and with other countries, could be beneficial for sharing knowledge about e-government development. The expansion of existing partnerships and the launch of new partnerships with various international organizations, regional development banks, and individual developed countries are needed to mobilise financial and human resources for strategic e-government development in the SIDS (UN General Assembly, 2015: para. 17.9 and 17.16).

Table 5.8. Small island developing states with significant gains in e-government development (2003-2016)

| Country | Region | Sub-Region | SIDS | OSI | HCI | TII | EGDI | EGDI Level | 2016 Rank | |
|---|---|---|---|---|---|---|---|---|---|---|
| Barbados | Americas | Caribbean | x | 0.4420 | 0.8113 | 0.6397 | 0.6310 | High | 54 |  |
| Dominica | Americas | Caribbean | x | 0.3043 | 0.6384 | 0.4305 | 0.4577 | Medium | 109 |  |
| Suriname | Americas | South America | x | 0.2971 | 0.6551 | 0.4116 | 0.4546 | Medium | 110 |  |

*Note: The Ranking Trend lines display the country rankings, with 1 being the top ranked and appearing at the bottom of the vertical axis, and 193 being the lowest ranked and appearing at the top of the vertical axis. Therefore, the lower is the graphical point, the higher is the ranking. The horizontal axis represents the survey periods of the *UN E-Government Survey*, i.e. 2003, 2004, 2005, 2008, 2010, 2012, 2014 and 2016.

As shown in Figure 5.6, among the six sectors, the least developed dimension in terms of e-government in SIDS is the social one, globally at 37 per cent utilisation, as compared to 49 percent for both finance and education, 46 per cent for health and 42 per cent for the labour and employment sector. More significantly the e-government performance of the social sector dropped to 21 percent among the small island developing states, and to 11 per cent among the least developed countries, as seen in Figure 5.7. Environment is the next sector that has not performed well globally at 41 per cent utilization, with only 21 percent for the SIDS and 15 per cent for the LDCs. For the LDCs, the provision of information and services on employment and labour also lags behind at 27 per cent.

Figure 5.6. Sectoral e-government utilisation (percentage) of the Small Island Developing States relative to global development in 2016

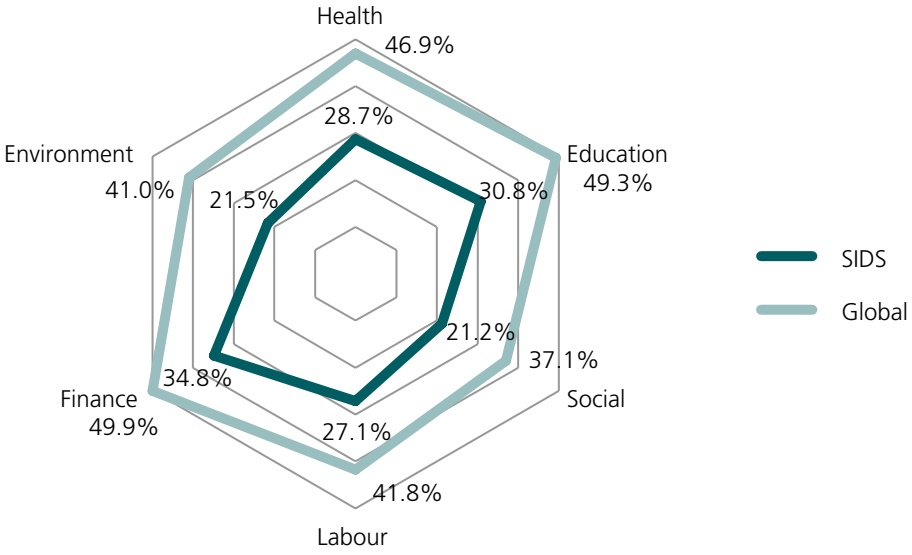
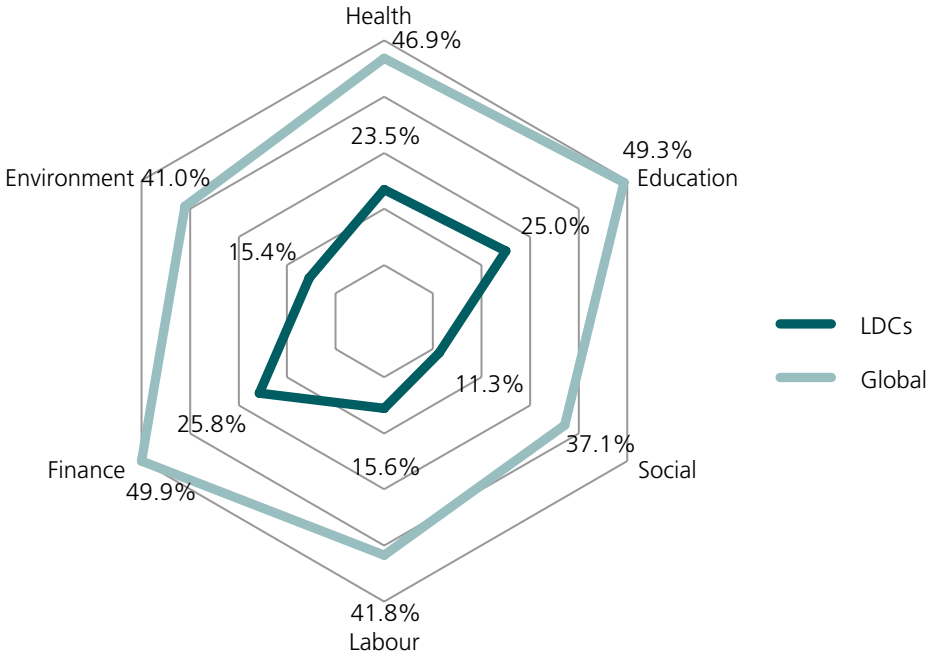


Figure 5.7. Sectoral e-government utilisation (percentage) of the Least Developed Countries (LDCs) relative to global development in 2016




## 5.3. ICT for sustainable development

ICTs can be an important means of implementation to deliver national strategies and policies for sustainable development. The UN General Assembly recognised the potential of e-government in promoting transparency, accountability, efficiency and citizen engagement in public service delivery. It reaffirms that that the foundations of sustainable development at all levels include a professional, ethical, responsive and ICT-enabled public administration. It therefore encourages Member States to utilize ICTs "in the design of public policies and the provision of public services in order to support national development efforts and respond effectively to national and local needs and priorities" (UN General Assembly, 2014, Resolution 69/327).

### 5.3.1. The World Summit on the Information Society

Global leaders and policy-makers also embraced the use of ICT for development at the two-stage World Summit for Information Society (WSIS), which took place in 2003 (the Geneva phase) and 2005 (the Tunis phase). The WSIS highlighted the urgent need to harness the potential of knowledge and technology to achieve the Millennium Development Goals and guided a development-focused 'Plan of Action' to put the potential of knowledge and ICTs at the service of development for 10 years (2006-2015). The WSIS Geneva Plan of Action stated that "ICT applications can support sustainable development, in the fields of public administration, business, education and training, health, employment, environment, agriculture and science within the framework of national e-strategies". In respect of e-government, the WSIS called on governments to:

- Implement e-government strategies focusing on applications aimed at innovating and promoting transparency in public administrations and democratic processes, improving efficiency and strengthening relations with citizens;
- Develop national e-government initiatives and services, at all levels, adapted to the needs of citizens and business, to achieve a more efficient allocation of resources and public goods;
- Support international cooperation initiatives in the field of e-government, in order to transparency, accountability and efficiency at all levels of government.

With the adoption of the Sustainable Development Goals and Targets in 2015, a mapping exercise was carried out by UN agencies that are facilitators of the WSIS Action Lines, attempting to draw direct linkages between the WSIS Actions and the SDGs (United Nations, 2015). In particular, the "role of governments and all stakeholders in the promotion of ICTs for development" is linked to sustainable development goals 1, 3, 5, 10, 16, and 17, while e-government is linked to Goal 9, 16 and 17. Box 5.1 illustrates the WSIS Action Lines C1 and C7 on e-government and its linkages to relevant Sustainable Development Goals and Targets and the rationale.

**Box 5.1. WSIS Action Lines C1 and C7 on e-government and their linkages to relevant SDGs**

| WSIS Action Lines | Sustainable Development Goals/Targets | Rationale/Clarification |
|---|---|---|
| C1: WSIS Action Lines Sustainable Development Goals/Targets Rationale/ Clarification | Goal 1. End poverty in all its forms everywhere | Increased Internet use can reduce poverty and create jobs through increased efficiency and transparency in government, the growing number of broadband connections and household Internet penetration. |
| | Target 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all | ICT can be used for creation of various data banks on diseases and can also assist governments and decision makers in health planning (e-health), human resources needs assessment, medicine procurement and infrastructure construction. |
| | Target 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks | ICT can be used to bring together people in danger, collect knowledge from specialists, and monitor the spread of a disease by governments and healthcare workers. Databases and storage of good practices can be maintained too. |
| | Goal 5. Achieve gender equality and empower all women and girls | ICT can be used for online training programmes; to include women in policy-making through e-voting and e-learning; to enhance women's ability to take surveys; to anonymously make complaints; and to participate in discussion forums (e-participation). |
| | Target 10.c By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent | ICT can give people access to formal banking, through either e-banking or m-banking. |
| | Target 16.5 Substantially reduce corruption and bribery in all their forms | Availability of government data, including open data, on online websites, which helps develop the justice system. This information can include: practical information for use by people, online forms, news about law and justice, and information required to promote national reconciliation. |
| | Target 16.6 Develop effective, accountable and transparent institutions at all levels | Notary and other e-government transactions can be performed online. |
| | Target 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements | E-government can help ensure a fully participatory approach by creating structures for communication and collaboration that enable coordination. Such an approach strengthens actions among governments, key stakeholders, international organizations, NGOs, the private sector and civil society. |

| WSIS Action Lines | Sustainable Development Goals/Targets | Rationale/Clarification |
|---|---|---|
| | Target 17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts | Central to the development of reliable and open datasets should be issues of trustworthiness and privacy. Providing public service electronically is an important step to delivering more convenient, customer-oriented and cost-effective public services in a timely manner without bureaucracy. Websites that effectively provide procedures, information and communication from government contribute to effectiveness and transparency. |
| C7 ICT Applications: e-government | Target 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020 | Various forms of ICT-enabled information sharing and consultation provide opportunities to expand participation in decision-making, provided digital divides have been addressed. |
| | Target 16.6 Develop effective, accountable and transparent institutions at all levels | |
| | Target 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels | |
| | Target 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements | |

Within the WSIS framework, there are targets to measure progress in governments' use of ICT. To advance e-government, the Geneva Plan of Action identified a target to "connect all local and central government departments and establish websites and email addresses" (United Nations, 2003). In order to meet the WSIS target for e-government, it was deemed important that national, local and municipal governments and departments be connected online. Through a consultation in the Partnership on Measuring ICT for Development (see Box 5.2), a joint proposal of ICT indicators was put forward to help track the Sustainable Development Goals and Targets. It recognizes the cross-cutting nature of ICTs and the role of ICTs as a key development enabler. There is a need for such indicators to be further recognised and reported. In 2007, the Task Group on E-government, an initiative of the Partnership, made an important contribution in identifying a core list of e-government indicators as well as methodologies to compile these indicators. These proposed indicatiors should be reviewed and adapted in complementing the indicators developed by the Inter-agency and Expert Group on Sustainable Development Goal (IAEG). Local key performance indicators could also be considered for an in-depth understanding of e-government's impact on sustainable development goals.

## Box 5.2. Partnership on measuring ICT for development


The Partnership on Measuring ICT for development is an international, multi-stakeholder initiative that was launched in 2004 to improve the availability and quality of ICT data and indicators, particularly in developing countries. The Partnership has guided policymakers in producing ICT statistics that are crucial to informed decision-making. Among other services, the Partnership identifies a core list of ICT indicators, as well as methodologies to collect these indicators; it helps developing countries collect ICT statistics, particularly through capacity-building and hands-on training for national statistical offices; and it collects and disseminates information society statistics. The following 14 organisations are members of the Partnership: ITU, UNCTAD, OECD, EUROSTAT, ILO, UIS, UN ECA, UN ECLAC, UN ESCAP, UN ESCWA, UNDESA, UNEP/SBS, UNU-IAS, and the World Bank. In connection to e-government, Target 6 aims specifically to connect all central government departments and to establish websites. To ensure a globally consistent approach for review and assessment, this target was clarified and interpreted as comprising three distinct goals (UNECA, 2014):

1. Connect central and local government departments.
2. Establish websites for central and local government departments.
3. Establish e-mail addresses for central and local government departments.

Some specific Partnership recommendations that are consistent with the findings of the *UN E-Government Survey* include: (i) governments need to address challenges in capturing data regarding the use of ICT in government; (ii) development of a secondary set of e-government indicators may help to broaden the scope of monitoring and feedback; (iii) there is a need to review the framework for supporting and monitoring e-government at the global level; and (iv) governments should develop a strategic framework for how ICT can be better utilized by governments.

In 2006, the Partnership on Measuring ICT for Development established the Task Group on E-government (TGEG).[9] In its terms of reference, the Group was asked to develop and recommend a core set of statistical indicators on e-government to be collected by countries, a request that was also put forth by the United Nations Statistical Commission (UNSC) at its 2007 meeting. The Group has been working on the development of consistent, sound, relevant e-government indicators for cross-country comparisons. It has developed a core list of e-government indicators, which were endorsed by the UN Statistical Commission at its forty-third session. A training manual on the use of the e-government indicators has also been developed (Partnership and UNECA, 2013) and will be translated from English to French for dissemination. The members of the Task Group are UNECA (coordinator), UNECLAC, UNESCAP, UNESCWA, Eurostat, ITU, OECD, UNCTAD, UNDESA and the World Bank.

Source: Partnership on Measuring ICT for Development, 2015

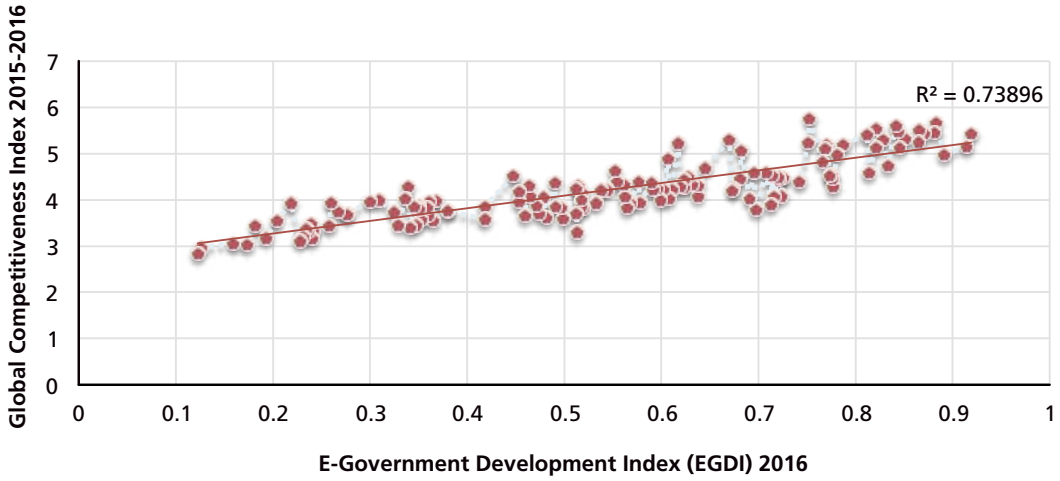
The outcome document of the General Assembly High-level Meeting on the overall review of the outcomes of the World Summit on the Information Society (WSIS+10), adopted by the General Assembly in December 2015, highlights the nexus of issues connecting ICT for development and e-government, among others (UN General Assembly, 2015b). On the one hand, the document underscores the remarkable progress of ICTs in the past decade, penetrating into almost all corners of the globe and thereby, creating new opportunities for social interaction, enabling new business models, and contributing to economic growth and development in all other sectors. On the other hand, it also raises flags about the continuing digital divides among countries. These divides include both digital and knowledge divides; those between and within countries, as well as the gender digital divide, and divides between various segments of the population and people (see Chapter 4). Concerted efforts are needed for stakeholders to "regularly analyse the nature of divides, study strategies to bridge them, and make their findings available to the international community", so that ICT contributes to social inclusion (UN General Assembly, 2015b). Recognising the linkages between ICTs and the SDGs, stakeholders are calling for a close and strategic alignment between the WSIS process and the 2030 Agenda for Sustainable Development. This is due to ICT's cross-cutting contributions to the SDGs and poverty eradication, as well as to ICT-enabled breakthroughs in government, including in the provision of public services to achieve higher levels of social benefits and inclusion.

[9] For the work of TGEG, see the World Telecommunication/ICT Development Report (ITU, 2010) and the Framework for a set of e-government core indicators (Partnership and UNECA, 2012).

### 5.3.2. Global competitiveness and e-government

As evidenced in previous editions of the *Survey* (UNDESA, 2012 and 2014), the income per capita of a country has a strong influence on national e-government development, as income is a general indicator of economic capacity (UNDESA, 2014: 19-20). Access to ICT infrastructure and the provision of education, including ICT literacy, are highly related to the income level of a nation. Lower income countries, have a higher marginal cost for every dollar spent on ICT, including e-government (UNDESA, 2012: 13). The correlation of EGDI and the global competitiveness of countries, assessed by the World Economic Forum in its Global Competitiveness Report 2015-2016,[10] show that countries that have performed in e-government development are more competitive (see Figure 5.8). While correlation is not causation, it is reasonable to assume that (i) competitiveness of an economy comes with economic and other characteristics that are conducive to progress in e-government, and that (ii) a high level of technological adoption and ICT penetration in both private and public sector, including in e-government, has a positive effect on economic competitiveness. E-government gives rise to new business models and revolutionizes industries, bringing great promise for a future wave of innovations in both the public and private sectors that could drive longer-term growth (Schwab and Sala-i-Martín, 2015).

Figure 5.8. Correlation of E-Government Development Index (EGDI) 2016 and the global competitiveness (2015-2016)




### 5.3.3. E-Government in combating corruption

In building effective, accountable and inclusive institutions at all levels, Target 16.5 of the SDGs calls for countries to substantially reduce corruption and bribery in all their forms (see Table 5.6). Historical data shows that there is a strong positive correlation[11] between e-government development and the Corruption Perception Index (CPI)[12]. Countries with high corruption rates in the public sector will generally score poorly on their ability to deliver public services via ICTs, including the provision of open government data. Figure 5.9 shows a strong positive correlation between EGDI 2016 data and CPI measure for the year of 2014.

[10] The Global competitiveness report defines competitiveness as the set of institutions, policies, and factors that determine the level of productivity of an economy. The Global competitiveness Index examines 12 indicators (pillars) in three categories that capture concepts that matter for productivity.

[11] While the correlation is high with the R-squared value of 0.4868 when comparing CPI2014 to *Survey* 2014, the R-squared value is even higher at 0.5715 when comparing CPI 2016 with EGDI 2016.

[12] The Corruption Perception Index (CPI) scores and ranks countries/territories based on how corrupt a country's public sector is perceived to be. It is a composite index, a combination of surveys and assessments of corruption, collected by a variety of reputable institutions. A CPI score of 0 means that the country is very corrupt and 100 is very clean from the perspective of government corruption. The CPI is the most widely used indicator of corruption worldwide. CPI index is available for 175 nation states and territories, whereas EGDI is assessed for all 193 members of UN. (Source: Transparency International, "2014 Corruption Perception Index" )

This correlation probably also reflects the impact of other factors on both e-government and CPI levels. But e-government can certainly be associated with the high commitment of an institution to promote transparency and accountability, which also leads to other measures to fight corruption. E-government can also increase trust in the government and the way it is perceived by people.

## 5.4. Conclusion

The lessons learned from this chapter are as follows.

- Countries continue to advance towards higher levels of e-government. The number of countries with very-high and high E-Government Development Index (EGDI) values increased in 2016.

- Gaps persist among regions, with 66% of the 29 countries with very high EGDI being from Europe; while African countries represent 81.2% of the low-EGDI group. Africa (average EGDI of 0.2882) and Oceania (average EGDI of 0.4154) perform lower than the global average. Asia is at 0.5132 and the Americas at 0.5245, while Europe is at 0.7241.

- In LDCs, deficits in e-government development reflect the magnitude of the challenges faced by these countries; including in the area of sustainable development. It is critical to develop ICT infrastructure, improve access to knowledge and technologies and build the related capacities; while responding to the many urgent sustainable development priorities of these countries. At the same time, some of the LDCs have made advances in the area of e-government.

- SIDS should derive much benefits from e-government, but their EGDI remains slightly below the global average. Progress in online services and ICT infrastructure lags behind. However, SIDS have realized major advances in e-government since 2003.

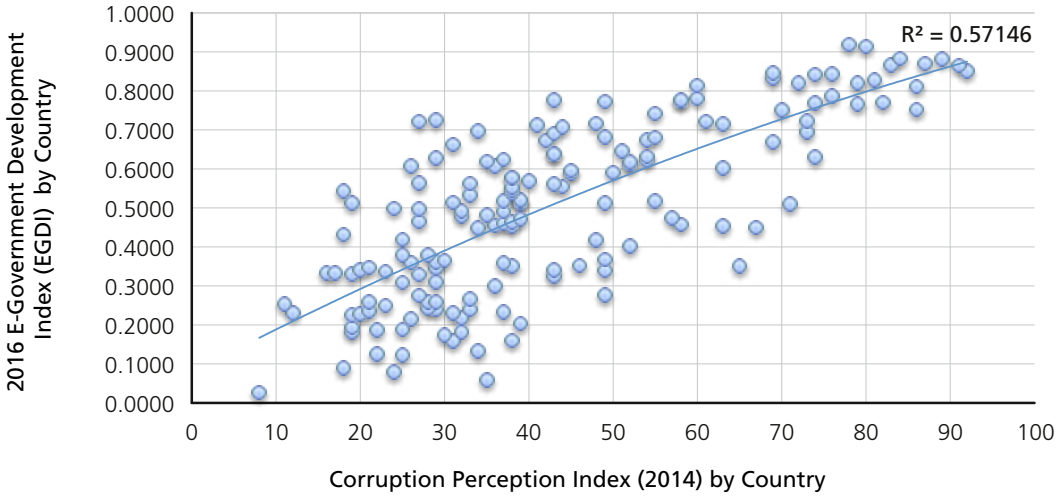
- For both LDCs and SIDS, partnerships and international and regional cooperation will be critical to make advances in e-government, and ICT more generally.

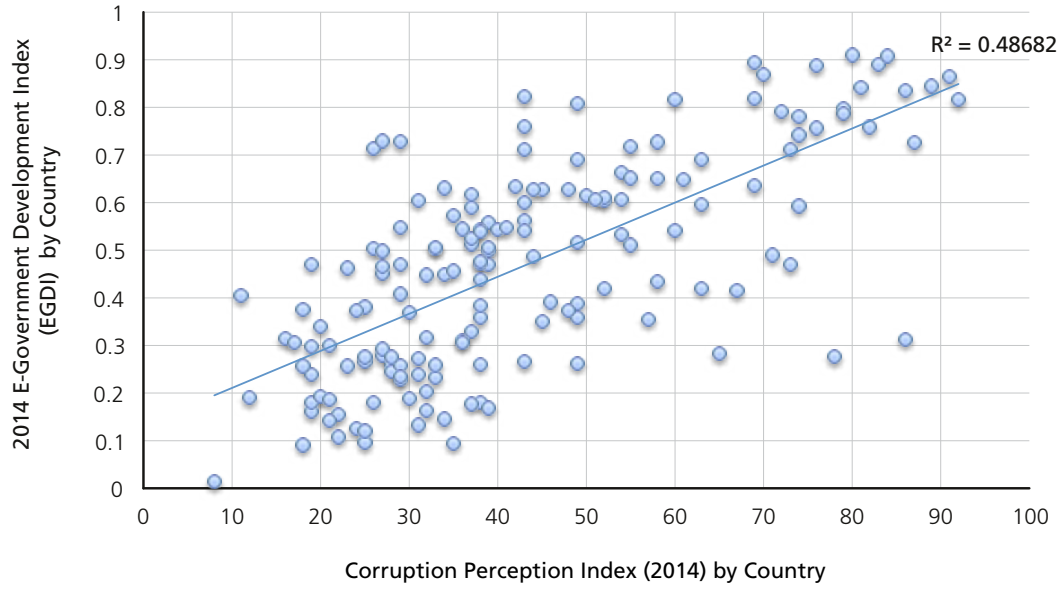
- The level of e-government is positively related to progress in some areas of the SDGs, notably competitiveness and combating corruption.

As the maxim goes 'what gets measured gets done' ,[13] or not; and therefore it is essential to have data and indicators to guide policy makers in evidence-based and informed decision-making. There is, however, a need to improve the current availability and quality of ICT data and indicators, including those related to e-government, and particularly in developing countries.

[13] The maxim "what gets measured gets done" was first quoted by management guru Peter Drucker.

Figure 5.9. Correlation of E-Government Development Index (EGDI), in 2014 and 2016 and the Corruption Perception Index (CPI)



# Overall Conclusion

Without an effective, accountable and inclusive public administration, it is unlikely that the 2030 Agenda for Sustainable Development will be implemented. Public institutions at all levels have the responsibility to translate the Sustainable Development Goals (SDGs) into national and local targets, strategies and plans to lift people out of poverty and provide opportunities for prosperity to all while protecting our planet. Access to quality public services, particularly for vulnerable groups, is essential for the attainment of the SDGs; be it in the areas of education, health, sanitation, finance, or security. Universal and indivisible in nature, the 2030 Agenda calls for an integrated approach to development based on partnerships and the active participation of all stakeholders. New institutional set-ups and integrated coordination of government activities at all levels are needed to promote a holistic and participatory approach to public service delivery. Traditional principles of public administration, such as effectiveness, accountability and ethics are taking renewed urgency, as is the need to gear all efforts towards servicing the people.

As shown throughout this publication, the use of information and communication technologies (ICTs) in government can effectively support an integrated and inclusive implementation of the SDGs with poverty eradication as the overarching goal. E-government can provide the necessary tools to enable policy integration not only across economic, social and environmental dimensions but also among various sectors, subsectors and programmes. It can help "siloed" government institutions to join forces to pursue common objectives through whole-of-government approaches. E-government can also offer opportunities to re-engineer existing decision-making processes and information flows.

It can help increase transparency and accountability as well as participation through open government data. By providing online access to the information that the government generates and collects on a host of subject areas, people have greater insight into how governments operate and how public funds are spent. Data about public spending is also essential to ensure effective review of the implementation of the SDGs.

Participation of people in policy-making and in the design and delivery of services is essential to the implementation of the 2030 Agenda. Target 16.7 pledges to ensure "responsive, inclusive, participatory and representative decision-making at all levels". The use of e-participation tools, including e-information, e-consultation and e-decision-making, has opened up new avenues of e-consultation, participation, collaboration and co-creation of public value. While developed countries continue to rank high in the E-Participation Index, (EPI) many developing countries are making progress, particularly in the area of e-information and e-consultation. Access to ICTs and increased levels of e-literacy are essential to engage vulnerable groups. Devising e-participation policies and strategies across key development sectors, developing new easy-to-use civic engagement instruments, increasing the capacity of governments at all levels to include the outcomes of public participation into decision-making, and training civil society, will pave the way for an increased level of engagement of people in the implementation of SDGs. Transparency and accountability should also go hand in hand with increasing participation.

Countries around the world have experienced substantial progress in online service delivery. However, disparities in e-government exist among countries and within regions, particularly regarding the least developed countries and the small island developing states, as well as in various sectors, such as between social services and employment. While higher income levels are generally related to higher levels of Online Service Index, (OSI) progress has also been made by several low income countries. Increasingly, there is a shift towards people-driven services whereby people play a more active role in the design and customization of services. In all sectors mobile apps and Short Message Service SMS services have experienced a large and significant growth. Services to vulnerable groups have grown everywhere for all segments of society, with services to youth at the highest levels, followed by services for people living in

poverty, persons with disabilities, older persons and immigrants. Services to women are also high. The use of new technologies, such as Geographic Information System and the Internet of Things help promote more targeted and specialised public services and effective policy processes.

Overall, the *Survey* shows that most countries have reached or are evolving towards higher levels of e-government development, with all 193 Member States having an online presence as of 2012. Looking back over the past fifteen years, the process of developing e-government has been shifting, and will continue to shift, away from a staged progression to non-sequential, overlapping and connected building blocks. Such variation will allow for leap-frogging and quick wins while calling for longer term sustainable development strategies. Promoting effective e-government, whether in the area of whole-of-government approaches, e-participation, open government data or electronic and mobile services, requires strong political commitment, government-wide vision, collaborative leadership, as well as appropriate legislation and holistic institutional frameworks. ICT infrastructure, improved access to knoweldge and technologies as well as building capacities within the public sector and civil society are also crucial to effective delivery of public e-services in support of sustainable development. Additionally, keeping the Internet open and safe, and protecting privacy are critical aspects to be addressed when devising e-government strategies.

However, for e-government to truly contribute to improving peoples' lives, it is vital to increase public access to the Internet and promote digital literacy. Advances in e-government also have to go hand in hand with determined efforts to eradicate poverty, reduce inequality, make public institutions effective, inclusive and accountable and realize all the SDGs.

E-government is not about building award-winning design, nor is it just about using state-of-the-art computers or technologies in providing services to the public. On the contrary, e-government is a way for governments to achieve their objectives to better serve people, including the poorest and most vulnerable, and for people to be involved in the design and use of public services to ensure the well-being of all. As the *Survey* shows, e-government can be a positive enabler of government transformation as long as it is used to support institutional systems that are legitimate, effective, transparent and participatory. The SDGs provide a framework to orient efforts to advance e-government and keep them focused on the overarching objective to profoundly improve the lives of all people and improve our world for the better.

# ANNEXES

# Annexes

## *Survey* Methodology

### A.1. E-Government Development Index (EGDI): An Overview

Mathematically, the E-Government Development Index (EGDI) is a weighted average of normalised scores on the three most important dimensions of e-government, namely: scope and quality of online services (Online Service Index, OSI), status of the development of telecommunication infrastructure (Telecommunication Infrastructure Index, TII) and inherent human capital (Human Capital Index, HCI). Each of these sets of indices is in itself a composite measure that can be extracted and analysed independently (See Figure A.1).

$$EGDI = \frac{1}{3}\left(OSI_{normalized} + TII_{normalized} + HCI_{normalized}\right)$$

Prior to the normalization of the three component indicators, the Z-score standardization procedure is implemented for each component indicator to ensure that the overall EGDI is equally decided by the three component indexes, (i.e., each component index presents comparable variance subsequent to the Z-score standardization.) In the absence of the Z-score standardization treatment, the EGDI would mainly depend on the component index with the greatest dispersion. After the Z-score standardization, the arithmetic average sum becomes a good statistical indicator, where "equal weights" truly means "equal importance."

For standard Z-score calculation of each component indicator:

$$x_{new} = \frac{(x - \mu)}{\sigma}$$

Where:

x is a raw score to be standardized;
σ
μ is the mean of the population;

is the standard deviation of the population.

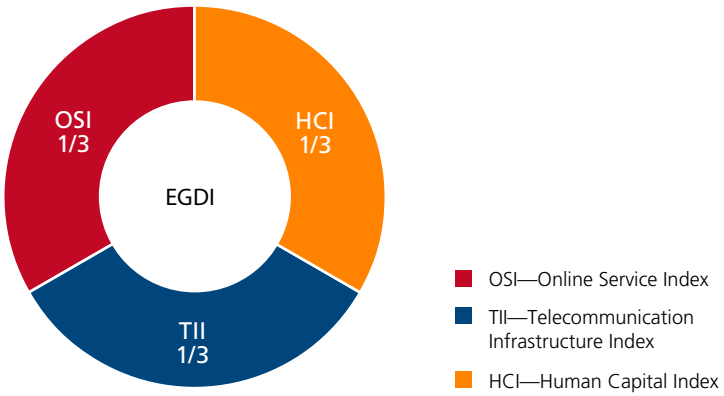
The composite value of each component index is then normalised to fall between the range of 0 to 1 and the overall EGDI is derived by taking the arithmetic average of the three component indexes.

As indicated, the EGDI is used as a benchmark to provide a numerical ranking of e-government development across United Nations Member States. While the methodological framework for EGDI has remained consistent across the *Survey* editions, each edition of the *Survey* has been adjusted to reflect emerging trends of e-government strategies, evolving knowledge of best practices in e-government, changes in technology and other factors. In addition, data collection practices have been periodically refined.

Photo credit: nmedia/Shutterstock.com

In this chapter:

Figure A.1. The three components of the E-Government Development Index (EGDI)




## A.2. Telecommunication Infrastructure Index (TII)

The Telecommunication Infrastructure Index (TII) is an arithmetic average composite of five indicators: (i) estimated internet users per 100 inhabitants; (ii) number of main fixed telephone lines per 100 inhabitants; (iii) number of mobile subscribers per 100 inhabitants; (iv) number of wireless broadband subscriptions per 100 inhabitants; and (v) number of fixed broadband subscriptions per 100 inhabitants. The International Telecommunication Union is the primary source of data in each case. (See Figure A.2)

The definitions of the five components of TII[1] are:

1. Internet users (per 100 inhabitants) refer to individuals who used the Internet from any location in the last three months.[2]

2. Main fixed telephone lines (per 100 inhabitants) refers to telephone lines connecting a customer's terminal equipment (e.g., telephone set, facsimile machine) to the public switched telephone network (PSTN), which has a dedicated port on a telephone exchange. This term is synonymous with the terms main station or Direct Exchange Line (DEL), which are commonly used in telecommunication documents. It may not be the same as an access line or a subscription.

3. Mobile subscribers (per 100 inhabitants) are the number of subscriptions to mobile service in the last three months. A mobile (cellular) telephone refers to a portable telephone subscribed to a public mobile telephone service using cellular technology, which provides access to the PSTN. This includes analogue and digital cellular systems and technologies such as IMT-2000 (3G) and IMT-Advanced. Users of both post-paid subscriptions and prepaid accounts are included.

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1 ITU - http://www.itu.int/dms_pub/itu-d/opb/ind/D-IND-ITCMEAS-2014-PDF-E.pdf

2 Note: The Internet is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network. (Ibid)

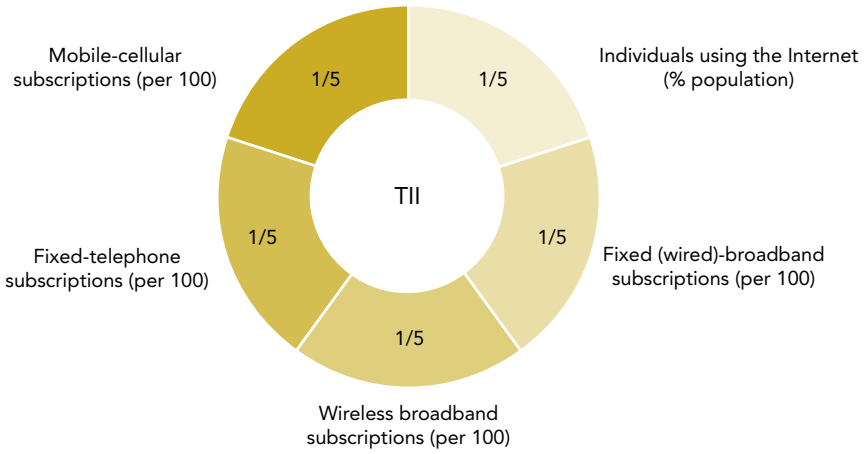
3 https://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2014/MIS2014_without_Annex_4.pdf p.223

Note: Satellite broadband subscriptions refers to the number of satellite Internet subscriptions with an advertised download speed of at least 256 kbit/s. It refers to the retail subscription technology and not the backbone technology. Terrestrial fixed wireless broadband subscriptions refers to the number of terrestrial fixed wireless Internet subscriptions with an advertised download speed of at least 256 kbit/s. This includes fixed WiMAX and fixed wireless subscriptions, but excludes occasional users at hotspots and Wi-Fi hotspot subscribers. It also excludes mobilebroadband subscriptions where users can access a service throughout the country wherever coverage is available. Active mobile-broadband subscriptions refers to the sum of standard mobilebroadband subscriptions and dedicated mobile-broadband data subscriptions to the public Internet. It covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets.

4. Wireless-broadband subscriptions refers to the sum of satellite broadband, terrestrial fixed wireless broadband and active mobile-broadband subscriptions to the public Internet.[3]

5. Fixed broadband subscriptions (per 100 inhabitants) refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fibre-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment.

Figure A.2. Telecommunication Infrastructure Index (TII) and its components




It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations.

The TII has remained largely unchanged since 2002, except for the replacement of online population with fixed-broadband subscription and the removal of number of television sets in 2008; the replacement of personal computer (PC) users with fixed Internet subscriptions in 2012; and the replacement of fixed Internet subscriptions with wireless broadband subscriptions in 2014 (See Table A.1).

Each of these indicators was standardised via the Z-score procedure to derive the Z-score for each component indicator. The telecommunication infrastructure composite value for country "x" is the simple arithmetic mean of the five standardised indicators derived this way:

Telecommunication infrastructure composite value=

Average (Internet user Z-score

+ Telephone line Z-score

+ Mobile subscription Z-score

Table A.1. Telecommunication infrastructure index (TII) and changes of its components (2003-2016)

| TII (2001) | TII (2003) | TII (2004) | TII (2005) | TII (2008) | TII (2010) | TII (2012) | TII (2014) | TII (2016) |
|---|---|---|---|---|---|---|---|---|
| Internet users | Internet users | Internet users | Internet users | Internet users | Internet users | Internet users | Internet users | Internet users |
| Online population | Online population | Online population | Online population | Fixed-broadband subscriptions | Fixed-broadband subscriptions | Fixed-broadband subscriptions | Fixed-broadband subscriptions | Fixed-broadband subscriptions |
| Personal computer (PC) users | Personal computer (PC) users | Personal computer (PC) users | Personal computer (PC) users | Personal computer (PC) users | Personal computer (PC) users | Fixed Internet subscriptions | Wireless broadband subscriptions | Wireless broadband subscriptions |
| Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions | Fixed-telephone subscriptions |
| Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions | Mobile-cellular subscriptions |
| Television sets | Television sets | Television sets | Television sets | - | - | - | - | - |

+ Wireless broadband subscription Z-score

+ Fixed broadband Z-score)

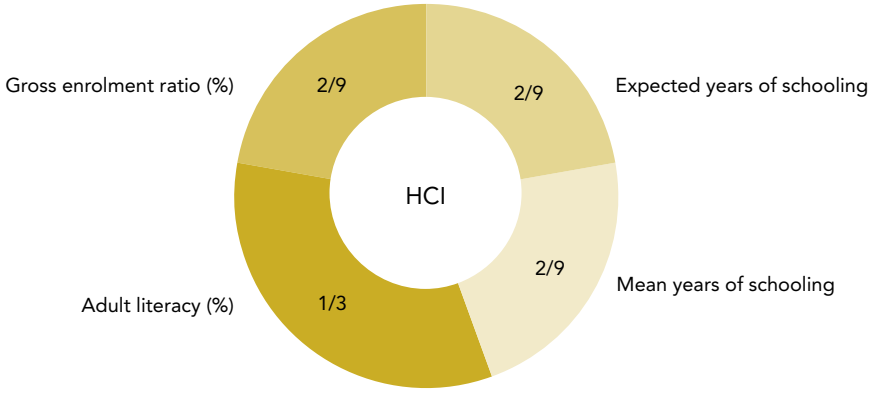
Finally, the TII composite value is normalized by taking its value for a given country, subtracting the lowest composite value in the *Survey* and dividing by the range of composite values for all countries. For example, if country "x" has the composite value of 1.3813, and the lowest composite value for all countries is -1.1358 and the highest is 2.3640, then the normalized value of TII for country "x" would be:

$$\text{TII (Country "x")} = \frac{[1.3813-(-1.1358)]}{[2.3640-(-1.1358)]} = 0.7192$$

## A.3. Human Capital Index (HCI)

The Human Capital Index (HCI) consists of four components, namely: (i) adult literacy rate; (ii) the combined primary, secondary and tertiary gross enrolment ratio; (iii) expected years of schooling; and (iv) average years of schooling. (See Figure A.3)

Figure A.3. Human Capital Index (HCI) and its components



The definitions of the four indicators of HCI are:

1. Adult literacy is measured as the percentage of people aged 15 years and above who can, with understanding, both read and write a short simple statement on their everyday life.

2. Gross enrolment ratio is measured as the combined primary, secondary and tertiary gross enrolment ratio, of the total number of students enrolled at the primary, secondary and tertiary level, regardless of age, as a percentage of the population of school age for that level.

3. Expected years of schooling is the total number of years of schooling that a child of a certain age can expect to receive in the future, assuming that the probability of his or her being in school at any particular age is equal to the current enrolment ratio age .

4. Mean years of schooling (MYS) provides the average number of years of education completed by a country's adult population (25 years and older), excluding the years spent repeating grades (add reference 6).

The first two components, i.e. adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio have been used for the past *Surveys* since 2002. Recognizing that education is the fundamental pillar in supporting human capital, the 2014 *Survey* introduced two new components to the human capital index (HCI), namely (i) expected years of schooling; and (ii) mean years of schooling. The preliminary statistical study commissioned by DESA/DPADM validated the use of the new HCI, accentuating that the two new components has strengthened the HCI and it does not introduce any error (UNDESA, 2014) (See Table A.2).

Table A.2. Human Capital Index and changes of its components (2003–2014)

| Components of HCI in past *Surveys* (2002, 2003, 2004, 2005, 2008, 2010, 2012) | Components of HCI in 2014 *Survey* |
|---|---|
| Adult literacy | Adult literacy |
| Gross enrolment ratio | Gross enrolment ratio |
| - | Expected years of schooling |
| - | Mean years of schooling |

The HCI is a weighted average composite of the four indicators. Similar to calculating the TII, each of the four component indicators is first standardized via the Z-score procedure to derive the Z-score value for each component indicator. The human capital composite value for country "x" is the weighted arithmetic mean with one-third weight assigned to adult literacy rate and two-ninth weight assigned to the gross enrolment ratio, estimated years of schooling and mean years of schooling derived this way:

Human capital composite value =

1⁄3× Adult literacy rate Z-score +

2⁄9× Gross enrolment ratio Z-score +

2⁄9 × Estimated years of schooling Z-score +

2⁄9 × Mean years of schooling Z-score

Then, the human capital composite value is normalized by taking its composite value for a given country, subtracting the lowest composite value in the *Survey* and dividing by the range of composite values for all countries. For example, if country "x" has the composite value at 0.8438, and the lowest composite value for all countries is –3.2354 and the highest equal to 1.2752, then the normalized value of the Human Capital Index for country "x" would be:

$$\text{Human Capital Index (Country "x")} = \frac{[0.8438–(–3.2354)]}{[1.2752–(–3.2354)]} = 0.9044$$

## A.4. Online Service Index (OSI)

To arrive at a set of Online Service Index (OSI) values for 2016, a total of 111 researchers, including UN experts and online United Nations Volunteers (UNVs) from over 60 countries with coverage of 66 languages assessed each country's national website in the native language, including the national portal, e-services portal and e-participation portal, as well as the websites of the related ministries of education, labour, social services, health, finance and environment as applicable. The UNVs included qualified graduate students and volunteers from universities in the field of public administration.

To ensure consistency of assessments, all the researchers were provided with a rigorous training by e-government and online service delivery experts with years of experience in conducting the assessments, and were guided by Data Team Coordinators who provided support and guidance throughout the assessment period. Researchers were instructed and trained to assume the mind-set of an average citizen user in assessing sites. Thus, responses were generally based on whether the relevant features could be found and accessed easily, not whether they in fact exist although hidden somewhere on the sites. The key point is that the average user needs to find information and features quickly and intuitively for a site to be "usable" with content readily discoverable by the intended beneficiaries.

The data collection and *Survey* research ran from May 2015 until the end of July 2015. Each country was assessed by at least two researchers who conducted the *Survey* in the country's national language. After the initial assessment, the evaluations by the two researchers on each country were compared and questions with discrepancies were reviewed again by the researchers. The third phase, from July to August, was the final review by the Data Team Coordinators who analyzed all the answers and, where needed, carried out further review and verification processes using multiple methods and sources. The scores were then sent for approval by a senior researcher. Through this multilevel approach, all surveyed sites were thoroughly assessed by at least three people, one of whom has years of experience in assessing public sector online services, and reviewed by one of the Data Team Coordinators.

Once the evaluation phase was completed, the statistics team produced the first draft of the OSI ranking. The data was extracted from the platform and the raw OSI scores were created. Rankings were compared with previous OSI scores, and any discrepancies were reviewed thoroughly.

Each question calls for a binary response. Every positive answer generates a new "more in depth question" inside and across the patterns. The outcome is an enhanced quantitative *Survey* with a wider range of point distributions reflecting differences in levels of e-government development among countries.

The total number of points scored by each country is normalised to the range of 0 to 1. The online index value for a given country is equal to the actual total score less the lowest total score divided by the range of total score values for all countries. For example, if country "x" has a score of 114, and the lowest score of any country is 0 and the highest equal to 153, then the online services value for country "x" would be:

$$\text{Online Service Index (Country "x")} = \frac{(114–0)}{(153–0)} = 0.7451$$

## A.5. Challenges in reviewing a country's online presence

### Selecting the appropriate site/URL at the national level

As done for each edition of the *Survey*, the United Nations Member States were requested to provide information regarding their website addresses (URL) for different government ministries and the national portal(s). Information was also requested with regards to open government data, e-participation and the designated authority in charge of e-government policies. Sixty-two (62) Member States returned this information and all appropriate sites were then utilised during the verification process.

One of the essential decisions for researchers when undertaking this *Survey* is to identify the specific site(s) to review as the national government site for each country. Regardless of the sophistication of e-government in a specific country, the priority for users is to find a clear indication as to which of the many potentially available government sites could be deemed as the "official" national government site – in a sense, the gateway or starting point for national users. Not only is this fairly easy to do – a simple, clear statement at the chosen website is sufficient to start—but it is also an important step towards providing government information and services to the public in an integrated, usable and easy-to-find manner. Many countries have in fact engaged in the procedure of actually noting on their national site that it is their "official" Government site, or "Gateway to Government," or other such statement.

Yet not all countries provided the appropriate URLs. Thus, some discretion is exerted when deciding whether to use only the country-provided websites. What is noteworthy in this *Survey* is that the researchers not only reviewed the national portals but also undertook exhaustive research on e-participation and open government data where applicable.

One dilemma facing researchers is that a number of countries provide more than one apparently legitimate national access point. While some have simply not yet consolidated their government entry points into a single site or portal that could be clearly distinguished, others have actually taken this approach on purpose – offering different access points to different audiences. Considering that the use of integrated portals or multi-portals is emerging as a trend in e-government strategies worldwide, researchers would select the integrated website as a National Portal or other portal if it was deemed to be the official homepage of the government. However, more than one site could be scored if the sites were clearly part of a tightly integrated "network" of national sites. It should be noted that for those countries for which more than one site was assessed, having more than one national entry is neither a disadvantage nor a benefit.

Some countries do not offer certain public services at the federal level, but rather at the sub-national or local level. No country is penalised for offering a service at the sub-national level as opposed to the federal level per se. In fact, when the issue arises researchers tend to be inclusive in assessing the matter as long as the information and/or service can be found from the national level.

A more difficult problem arises when not only a specific service is located at the local level but when the entire ministerial functions are altogether missing at the national level. If researchers are unable to locate a ministry as per the above described method, then the next step is to find out whether the country in question actually has such a ministry at the national level or whether the functions might be locally administered.

## Integrated Portal and Multi-Portal Approaches

Some countries have adopted a different approach to their online e-government portal, through utilizing multiple websites for different topics. Hence, instead of centralizing all the e-information, e-services, e-participation, open data and other online features in one portal, they have been made available on separate websites for a more audience-targeted approach. Researchers made sure to examine all possible websites when making the assessment, through links or search engines, to cover all government websites where relative information can be found.

Even though the norm has been to follow a one-stop-shop type of service delivery and an integrated portal approach, countries who have used a decentralised approach have not been penalised in their score, and the assessment was conducted as though for an integrated approach.

For example, Finland has a website www.valtioneuvosto.fi, which is the information portal of the Finnish Government, whereas the website www.suomi.fi is the e-service and public service information portal and also has open government data. Information on e-participation is centralised on the websites www.kansalaisaloite.fi and www.otakantaa.fi. This approach of having several websites for different purposes (information, services, participation and open government data) is typical of several European countries.

## Accessing in national official languages

The research team was fully equipped to handle the six official languages of the United Nations, namely Arabic, Chinese, English, French, Russian and Spanish. However, as in previous *Survey* cycles, the team went beyond this mandate and made an effort to review each website in the official language of the country, or where that was not possible, in another of the languages available on the site. Translators provided assistance as necessary so that possible errors based on language have been reduced to a minimum.

## Data quality checks

In order to ensure data quality, UNDESA has put *Survey* procedures under close monitoring including by developing a web-based application platform for data collection and storage, preparing the methodological and training guidelines for researchers, and instituting a training programme for either group training or individual hands-on support for researchers to resolve thorny issues.

Among other tasks, team members were asked to justify the selection of URLs and indicate whether the URLs had been reviewed in past *Surveys*. Regular discussions were held to discuss concerns and ensure consistency of evaluation methods.

UNDESA applied the *Survey* scores to generate an ordering of online service presence of all United Nations Member States and compared them with the historical results in previous *Surveys* so as to detect possible shortcomings in the process. The new scores are then compared to scores from the previous *Surveys* by removing the new questions and only considering the ones that remain unchanged. The team was assisted in the research by United Nations interns and volunteers with language skills not otherwise covered by the core group.

## Towards a more citizen-centric approach

In line with the global trend towards a more citizen-centric approach and the demand for greater efficiency and cost-effectiveness of the public sector, the *Survey* questionnaire has been designed to reflect this paradigm of e-government. As mentioned above, user take-up has been included as one special subject in the *Survey*, which encourages governments to

take account not only of the supply side but also the demand side of e-services. Accordingly, the research team was instructed to enforce this approach consistently throughout the whole *Survey*. If features could not be found easily, quickly and intuitively, then a site would score poorly.

## A.6. E-Participation Index (EPI)

The e-participation index (EPI) is derived as a supplementary index to the *UN E-Government Survey*. It extends the dimension of the *Survey* by focusing on the use of online services to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation") and engagement in decision-making processes ("e-decision-making;" See Box A.1)

### A.1. E-Participation Framework

- E-information: Enabling participation by providing citizens with public information and access to information without or upon demand
- E-consultation: Engaging citizens in contributions to and deliberation on public policies and services
- E-decision-making: Empowering citizens through co-design of policy options and co-production of service components and delivery modalities.

A country's EPI reflects its e-participation mechanisms that are deployed by the government as compared to all other countries. The purpose of this measure is not to prescribe any particular practice, but rather to offer insight into how different countries are using online tools to promote interaction between citizen and government, as well as among citizens, for the benefit of all. As the EPI is a qualitative assessment based on the availability and relevance of participatory services available on government websites, the comparative ranking of countries is for illustrative purposes and should serve only as an indicator of the broad trends in promoting citizen engagement. As with the EGDI, the EPI is not intended as an absolute measurement of e-participation, but rather, it attempts to capture the e-participation performance of counties relative to one another at a particular point in time.

In the 2016 *Survey*, the e-participation questions were carefully reviewed and expanded to reflect current trends and modalities in how governments engage their citizens in public policy-making, implementation and evaluation. New questions were added to address data publishing and sharing by government agencies. Other updates included: the availability of information on the citizens' rights to access government information; feedback from citizens concerning the improvement of online public services; and tools about public opinion regarding policy deliberation through social media, online polls and online discussion forums. While the EPI provides a useful qualitative analytical tool when comparing the data and ranking of countries for one particular year, caution must be taken in comparing e-participation rankings with past editions of the *Survey*.

Mathematically, the EPI is normalised by taking the total score value for a given country subtracting the lowest total score for any country in the *Survey* and dividing by the range of total score values for all countries. For example, if country "x" has an e-participation score of 29, and the lowest value of any country is 0 and the highest equal to 38, then the normalised index value for country "x" would be:

$$\text{E-Participation Index (Country "x")} = \frac{(29-0)}{(38-0)} = 0.7632$$

The e-participation ranking of countries is determined by the value of EPI through the "standard competition ranking". In standard competition ranking, countries with the same EPI receive the same ranking number and a gap is left in the ranking numbers. This ranking strategy is adopted in view that if two or more countries tie for a position in the ranking, the positions of all those ranked below them are unaffected. For example, if country A ranks ahead of B and C, both of which share the same EPI value and scores ahead of D, then A is ranked first (1st), B and C are ranked second (2nd) and D is ranked fourth (4th). In 2012, the "modified competition ranking" was used and for comparison reasons, all ranks were adjusted in 2014 and 2016 using the standard competition ranking.

## A.7. Country Classifications and Nomenclature in the *Survey*

Regional groupings are taken from the classification of the United Nations Statistics Division. For details, see http://unstats.un.org/unsd/methods/m49/m49regin.htm.

Economies are divided according to 2015 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, USD $1,045 or less; lower middle income, USD $1,046 - $4,125; upper middle income, USD $4,126 - $12,735; and high income, US $12,736 or more. (Accessed on 14 December 2015). Wherever data and statistics are reported by income groups, the report classifies countries according to the World Bank income classification of high, middle and low income groups.

For details, see http://data.worldbank.org/about/country-classifications.

The lists of least developing countries, landlocked developing countries and small island developing countries were obtained from the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS).

For details, see http://www.unohrlls.org/en/ldc/25/

## A.8. United Nations e-government knowledge base

The Division for Public Administration and Development Management of the United Nations Department of Economic and Social Affairs is maintaining the United Nations e-government knowledge base (egovkb) to provide governments and all stakeholders with easy access to data and information on e-government development.

The egovkb is an interactive online tool to view, sort and download information and datasets in open data formats from the *2016 UN E-Government Survey* and previous editions (2003, 2004, 2005, 2008, 2010, 2012 and 2014). The egovkb also includes advanced research features such as customisable regional and country comparisons, rankings and country profiles.

For more information and details, see the United Nations e-Government Knowledge Base at https://publicadministration.un.org/egovkb/

## A.9. Evolving definitions and understandings of e-Government and its related development

| Sources | Definition |
|---|---|
| *2001 Benchmarking E-government: A Global Perspective* (UNDESA, 2001) | E-government is 'a tool for information and service provision to citizens' |
| *2003 World Public Sector Report: E-Government at the Crossroads* (UNDESA, 2003) | E-government is what enhances the capacity of public administration through the use of ICTs to increase the supply of public value (i.e., to deliver the things that people want). |
| *United Nations Global E-Government Readiness Report 2004: Towards Access for Opportunity* (UNDESA, 2004) | E-government is what enhances the capacity of public administration through the use of ICTs to increase the supply of public value (i.e., to deliver the things that people want). |
| *United Nations Global E-Government Readiness Report 2005: From E-Government to E-Inclusion* (UNDESA, 2005) | The definition of e-government needs to be enhanced from simply 'government-to-government networking' or 'use of ICTs by governments to provide information and services to the public' to one which encompasses the role of the government in promoting equality and social inclusion. |
| *United Nations E-Government Survey 2008: From E-Government to Connected Governance* (UNDESA, 2008) | E-government is the continuous innovation in the delivery of services, public participation and governance through the transformation of external and internal relationships by the use of information technology, especially the Internet. |
| *UN E-Government Survey 2014: E-Government for the Future We Want* (UNDESA, 2014) | E-government can be referred to as the use and application of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people. |
| Organisation for Economic Co-operation and Development (OECD) | E-government is defined as 'the use of information and communications technologies (ICTs), and particularly the Internet, to achieve better government'. |
| World Bank (WB, 2015) | E-government refers to government agencies' use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth and/or cost reductions. |

## A.10. Matrix of assessment parameters used in the *UN E-Government Surveys* in relation to relevant Sustainable Development Goals (SDGs) and Targets

| Sustainable Development Goals (SDGs) | Targets | Relevant assessment parameters used in the *UN E-Government Surveys* (2003-2016) |
|---|---|---|
| Goal 1: No Poverty | 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable. | The *Survey* evaluates online information and service provision in national, ministry and/or sectoral portal(s) in the six sectors, namely health, education, social, labour, finance and environment. |
| | 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance. | |
| Goal 3: Good Health and Well-Being | 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all. | The *Survey* evaluates e-health or online services related to health in national, ministry and/or sectoral portal(s). |
| Goal 4: Quality Education | 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university. | Human capital is a requisite and one of the three main components of the E-Government Development Index (EGDI); the four sub-components (indicators) of the Human Capital Index in EGDI are (i) adult literacy; (ii) gross enrolment ratio; (iii) expected years of schooling and (iv) mean years of schooling. The source of human capital data is derived from UNESCO. |
| | 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy. | |
| Goal 5: Gender Equality | 5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women | The *Survey* evaluates online services for women and girls in national, ministry and/or sectoral portal(s). |
| | 5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate. | The *Survey* evaluates if national, ministry and/or sectoral portal(s) offer specific online services to people living in poverty, older persons, the illiterate, persons with disabilities, immigrants, women and youth. |
| Goal 8: Decent Work and Economic Growth | 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value. | The *Survey* evaluates online information and services offered by ministries or government agencies responsible for labour and employment, or the labour sector in general. |
| | 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment. | The *Survey* evaluates if national, ministry and/or sectoral portal(s) offer specific online services to immigrants. |
| Goal 9: Industry. Innovation and Infrastructure | 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all | Telecommunication infrastructure is a requisite and one of the three main components of the E-Government Development Index (EGDI); the five sub-components (indicators) of the Telecommunication Infrastructure Index in EGDI are: (i) Internet users; (ii) fixed-telephone subscriptions; (iii) mobile-cellular subscriptions; (iv) fixed-broadband subscriptions; (v) wireless broadband subscriptions. The source of human capital data is derived from ITU. |
| | 9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020. | |

| Sustainable Development Goals (SDGs) | Targets | Relevant assessment parameters used in the *UN E-Government Surveys* (2003-2016) |
|---|---|---|
| Goal 10: Reduced inequalities | 10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status. | The *Survey* evaluates if national, ministry and/or sectoral portal(s) offer specific online services to people living in poverty, older persons, the illiterate, persons with disabilities, immigrants, women and youth. |
| Goal 11: Sustainable cities and communities | 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums. | The *Survey* evaluates online information and service provision in the six sectors, namely health, education, social, labour, finance and environment. |
| | 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries. | The *Survey* evaluates e-participation, i.e., use of online services to engage citizens and non-citizens including through provision of online information (e-information), interaction with stakeholders (e-consultation) and engagement in decision-making processes (e-decision making)[4] |
| Goal 12: Responsible consumption and production | 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature. | The *Survey* evaluates the provision of online information, including open government data, in the six sectors in national portals or open data portals, namely in health, education, social, labour, finance and environment.[5] |
| Goal 13: Climate Action | 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. | The *Survey* evaluates the provision of online information, including open government data, related to environmental protection or climate change. |
| Goal 16: Peace, Justice and Strong Institutions | 16.5 Substantially reduce corruption and bribery in all their forms. | The *Survey* measures online public services available to people in various sectors and the availability of public e-procurement services. |
| | 16.6 Develop effective, accountable and transparent institutions at all levels. | The *Survey* measures online public services available to people provision in the six sectors, namely health, education, social, labour, finance and environment. |
| | 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels. | The *Survey* evaluates e-participation, i.e., use of online services to engage citizens and non-citizens including through provision of online information (e-information), interaction with stakeholders (e-consultation) and engagement in decision-making processes (e-decision making).[6] |

4 See Chapter 3 on e-participation
5 See Chapter 2 on open government data
6 See Chapter 3 on e-participation

| Sustainable Development Goals (SDGs) | Targets | Relevant assessment parameters used in the *UN E-Government Surveys* (2003-2016) |
|---|---|---|
| | 16.9 By 2030, provide legal identity for all, including birth registration. | The *Survey* evaluates if government portals provide digital identity and if birth certificates are available on request through national, ministry and/or sectoral portal(s).[7] |
| | 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements. | The *Survey* evaluates the provision of online information including open government data, in the six sectors in government portals or open data portals. |
| | 16.B Promote and enforce non-discriminatory laws and policies for sustainable development. | The *Survey* evaluates the provision of online information on laws and policies in the six sectors, namely in health, education, social, labour, finance and environment. |
| Goal 17: Partnerships for the Goals | 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships. | The *Survey* evaluates the existence of public-private partnership in offering e-government services in national, ministry and/or sectoral portals. |

7 See Chapter 2 on open government data

# Data tables

Table 1. Country Profiles

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 171 | Afghanistan | Asia | Southern Asia | 0.2313 | 0.3043 | 0.1066 | 0.2830 | Low Income | x | x | |
| 82 | Albania | Europe | Southern Europe | 0.5331 | 0.5942 | 0.3530 | 0.6520 | Upper Middle Income | | | |
| 150 | Algeria | Africa | Northern Africa | 0.2999 | 0.0652 | 0.1934 | 0.6412 | Upper Middle Income | | | |
| 55 | Andorra | Europe | Southern Europe | 0.6302 | 0.5072 | 0.6855 | 0.6978 | High Income | | | |
| 142 | Angola | Africa | Central Africa | 0.3311 | 0.3478 | 0.1441 | 0.5015 | Upper Middle Income | x | | |
| 100 | Antigua and Barbuda | Americas | Caribbean | 0.4892 | 0.1812 | 0.5412 | 0.7453 | Lower Middle Income | | | x |
| 41 | Argentina | Americas | South America | 0.6978 | 0.7101 | 0.5031 | 0.8802 | Upper Middle Income | | | |
| 87 | Armenia | Asia | Western Asia | 0.5179 | 0.4275 | 0.3922 | 0.7338 | Lower Middle Income | | x | |
| 2 | Australia | Oceania | Oceania | 0.9143 | 0.9783 | 0.7646 | 1.0000 | High Income | | | |
| 16 | Austria | Europe | Western Europe | 0.8208 | 0.9130 | 0.7098 | 0.8396 | High Income | | | |
| 56 | Azerbaijan | Asia | Western Asia | 0.6274 | 0.6812 | 0.4852 | 0.7158 | Upper Middle Income | | x | |
| 93 | Bahamas | Americas | Caribbean | 0.5108 | 0.4275 | 0.3842 | 0.7207 | High Income | | | x |
| 24 | Bahrain | Asia | Western Asia | 0.7734 | 0.8261 | 0.7762 | 0.7178 | High Income | | | x |
| 124 | Bangladesh | Asia | Southern Asia | 0.3799 | 0.6232 | 0.1193 | 0.3973 | Low Income | x | | |
| 54 | Barbados | Americas | Caribbean | 0.6310 | 0.4420 | 0.6397 | 0.8113 | High Income | | | x |
| 49 | Belarus | Europe | Eastern Europe | 0.6625 | 0.4855 | 0.6304 | 0.8716 | Upper Middle Income | | | |
| 19 | Belgium | Europe | Western Europe | 0.7874 | 0.7101 | 0.6808 | 0.9712 | High Income | | | |
| 122 | Belize | Americas | Central America | 0.3825 | 0.3188 | 0.1834 | 0.6454 | Upper Middle Income | | | x |
| 177 | Benin | Africa | West Africa | 0.2039 | 0.1449 | 0.1471 | 0.3196 | Low Income | x | | |
| 133 | Bhutan | Asia | Southern Asia | 0.3506 | 0.3188 | 0.2192 | 0.5139 | Lower Middle Income | x | x | |
| 101 | Bolivia | Americas | South America | 0.4821 | 0.4928 | 0.2532 | 0.7004 | Lower Middle Income | | x | |
| 92 | Bosnia and Herzegovina | Europe | Southern Europe | 0.5118 | 0.4493 | 0.4047 | 0.6815 | Upper Middle Income | | | |
| 113 | Botswana | Africa | Southern Africa | 0.4531 | 0.2826 | 0.4215 | 0.6553 | Upper Middle Income | | x | |
| 51 | Brazil | Americas | South America | 0.6377 | 0.7319 | 0.5025 | 0.6787 | Upper Middle Income | | | |
| 83 | Brunei Darussalam | Asia | South-Eastern Asia | 0.5298 | 0.5072 | 0.3512 | 0.7310 | High Income | | | |
| 52 | Bulgaria | Europe | Eastern Europe | 0.6376 | 0.5652 | 0.5602 | 0.7875 | Upper Middle Income | | | |
| 185 | Burkina Faso | Africa | West Africa | 0.1598 | 0.1884 | 0.1232 | 0.1677 | Low Income | x | x | |

Table 1. Country Profiles (continued)

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 173 | Burundi | Africa | Eastern Africa | 0.2277 | 0.1522 | 0.0331 | 0.4979 | Low Income | x | x | |
| 158 | Cambodia | Asia | South-Eastern Asia | 0.2593 | 0.0507 | 0.2486 | 0.4785 | Low Income | x | | |
| 155 | Cameroon | Africa | Central Africa | 0.2759 | 0.2174 | 0.1310 | 0.4794 | Lower Middle Income | | | |
| 14 | Canada | Americas | North America | 0.8285 | 0.9565 | 0.6717 | 0.8572 | High Income | | | |
| 103 | Cape Verde | Africa | West Africa | 0.4742 | 0.4565 | 0.3629 | 0.6031 | Lower Middle Income | | | x |
| 191 | Central African Republic | Africa | Central Africa | 0.0789 | 0.0000 | 0.0381 | 0.1985 | Low Income | x | x | |
| 188 | Chad | Africa | Central Africa | 0.1256 | 0.1377 | 0.0476 | 0.1917 | Low Income | x | x | |
| 42 | Chile | Americas | South America | 0.6949 | 0.7754 | 0.4970 | 0.8124 | High Income | | | |
| 63 | China | Asia | Eastern Asia | 0.6071 | 0.7681 | 0.3673 | 0.6860 | Upper Middle Income | | | |
| 57 | Colombia | Americas | South America | 0.6237 | 0.7899 | 0.3813 | 0.7000 | Upper Middle Income | | | |
| 176 | Comoros | Africa | Eastern Africa | 0.2155 | 0.0507 | 0.1073 | 0.4885 | Low Income | x | | x |
| 162 | Congo | Africa | Central Africa | 0.2497 | 0.0435 | 0.1713 | 0.5344 | Low Income | | | |
| 53 | Costa Rica | Americas | Central America | 0.6314 | 0.6377 | 0.5129 | 0.7436 | Upper Middle Income | | | |
| 175 | Côte d'Ivoire | Africa | West Africa | 0.2185 | 0.1884 | 0.1711 | 0.2959 | Lower Middle Income | | | |
| 37 | Croatia | Europe | Southern Europe | 0.7162 | 0.7464 | 0.5974 | 0.8050 | High Income | | | |
| 131 | Cuba | Americas | Caribbean | 0.3522 | 0.1957 | 0.1103 | 0.7507 | Upper Middle Income | | | x |
| 64 | Cyprus | Asia | Western Asia | 0.6023 | 0.5362 | 0.4923 | 0.7782 | High Income | | | |
| 50 | Czech Republic | Europe | Eastern Europe | 0.6454 | 0.4783 | 0.5952 | 0.8627 | High Income | | | |
| 153 | Democratic People's Republic of Korea | Asia | Eastern Asia | 0.2801 | 0.0217 | 0.0363 | 0.7822 | Low Income | | | |
| 180 | Democratic Republic of the Congo | Africa | Central Africa | 0.1876 | 0.0870 | 0.0788 | 0.3970 | Low Income | x | | |
| 9 | Denmark | Europe | Northern Europe | 0.8510 | 0.7754 | 0.8247 | 0.9530 | High Income | | | |
| 187 | Djibouti | Africa | Eastern Africa | 0.1337 | 0.0217 | 0.0698 | 0.3095 | Lower Middle Income | x | | |
| 109 | Dominica | Americas | Caribbean | 0.4577 | 0.3043 | 0.4305 | 0.6384 | Upper Middle Income | | | x |
| 98 | Dominican Republic | Americas | Caribbean | 0.4914 | 0.5072 | 0.2992 | 0.6676 | Upper Middle Income | | | x |
| 74 | Ecuador | Americas | South America | 0.5625 | 0.6304 | 0.3438 | 0.7134 | Upper Middle Income | | | |
| 108 | Egypt | Africa | Northern Africa | 0.4594 | 0.4710 | 0.3025 | 0.6048 | Lower Middle Income | | | |
| 104 | El Salvador | Americas | Central America | 0.4718 | 0.4855 | 0.3265 | 0.6035 | Lower Middle Income | | | |
| 165 | Equatorial Guinea | Africa | Central Africa | 0.2403 | 0.0797 | 0.1237 | 0.5174 | High Income | x | | |
| 190 | Eritrea | Africa | Eastern Africa | 0.0902 | 0.0217 | 0.0000 | 0.2487 | Low Income | x | | |
| 13 | Estonia | Europe | Northern Europe | 0.8334 | 0.8913 | 0.7329 | 0.8761 | High Income | | | |

Table 1. Country Profiles (continued)

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 157 | Ethiopia | Africa | Eastern Africa | 0.2666 | 0.5290 | 0.0495 | 0.2212 | Low Income | x | x | |
| 96 | Fiji | Oceania | Oceania | 0.4989 | 0.4130 | 0.3326 | 0.7509 | Upper Middle Income | | | x |
| 5 | Finland | Europe | Northern Europe | 0.8817 | 0.9420 | 0.7590 | 0.9440 | High Income | | | |
| 10 | France | Europe | Western Europe | 0.8456 | 0.9420 | 0.7502 | 0.8445 | High Income | | | |
| 129 | Gabon | Africa | Central Africa | 0.3584 | 0.1522 | 0.3068 | 0.6162 | Upper Middle Income | | | |
| 167 | Gambia | Africa | West Africa | 0.2396 | 0.1957 | 0.1959 | 0.3274 | Low Income | x | | |
| 61 | Georgia | Asia | Western Asia | 0.6108 | 0.6377 | 0.4184 | 0.7763 | Lower Middle Income | | | |
| 15 | Germany | Europe | Western Europe | 0.8210 | 0.8406 | 0.7342 | 0.8882 | High Income | | | |
| 120 | Ghana | Africa | West Africa | 0.4181 | 0.4493 | 0.2594 | 0.5458 | Lower Middle Income | | | |
| 43 | Greece | Europe | Southern Europe | 0.6910 | 0.5797 | 0.6032 | 0.8901 | High Income | | | |
| 88 | Grenada | Americas | Caribbean | 0.5168 | 0.3696 | 0.3988 | 0.7820 | Upper Middle Income | | | x |
| 102 | Guatemala | Americas | Central America | 0.4790 | 0.6667 | 0.2358 | 0.5345 | Lower Middle Income | | | |
| 189 | Guinea | Africa | West Africa | 0.1226 | 0.0870 | 0.0906 | 0.1903 | Low Income | x | | |
| 181 | Guinea-Bissau | Africa | West Africa | 0.1818 | 0.1087 | 0.0828 | 0.3538 | Low Income | x | | x |
| 126 | Guyana | Americas | South America | 0.3651 | 0.2826 | 0.2432 | 0.5694 | Lower Middle Income | | | x |
| 178 | Haiti | Americas | Caribbean | 0.1931 | 0.1667 | 0.1004 | 0.3124 | Low Income | x | | x |
| 127 | Honduras | Americas | Central America | 0.3611 | 0.3116 | 0.2008 | 0.5709 | Lower Middle Income | | | |
| 46 | Hungary | Europe | Eastern Europe | 0.6745 | 0.6304 | 0.5615 | 0.8317 | Upper Middle Income | | | |
| 27 | Iceland | Europe | Northern Europe | 0.7662 | 0.6232 | 0.7814 | 0.8940 | High Income | | | |
| 107 | India | Asia | Southern Asia | 0.4637 | 0.7464 | 0.1430 | 0.5019 | Lower Middle Income | | | |
| 116 | Indonesia | Asia | South-Eastern Asia | 0.4478 | 0.3623 | 0.3016 | 0.6796 | Lower Middle Income | | | |
| 106 | Iran (Islamic Republic of) | Asia | Southern Asia | 0.4649 | 0.3333 | 0.3514 | 0.7101 | Upper Middle Income | | | |
| 141 | Iraq | Asia | Western Asia | 0.3334 | 0.3551 | 0.1647 | 0.4803 | Upper Middle Income | | | |
| 26 | Ireland | Europe | Northern Europe | 0.7689 | 0.7246 | 0.6602 | 0.9218 | High Income | | | |
| 20 | Israel | Asia | Western Asia | 0.7806 | 0.8623 | 0.6175 | 0.8619 | High Income | | | |
| 22 | Italy | Europe | Southern Europe | 0.7764 | 0.8696 | 0.6469 | 0.8126 | High Income | | | |
| 112 | Jamaica | Americas | Caribbean | 0.4534 | 0.3551 | 0.3193 | 0.6859 | Upper Middle Income | | | x |
| 11 | Japan | Asia | Eastern Asia | 0.8440 | 0.8768 | 0.8277 | 0.8274 | High Income | | | |
| 91 | Jordan | Asia | Western Asia | 0.5123 | 0.4565 | 0.3458 | 0.7344 | Upper Middle Income | | | |

Table 1. Country Profiles (continued)

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | Kazakhstan | Asia | Central Asia | 0.7250 | 0.7681 | 0.5668 | 0.8401 | Upper Middle Income | | x | |
| 119 | Kenya | Africa | Eastern Africa | 0.4186 | 0.5580 | 0.1808 | 0.5169 | Low Income | | | |
| 145 | Kiribati | Oceania | Oceania | 0.3122 | 0.2101 | 0.0665 | 0.6599 | Lower Middle Income | x | | x |
| 40 | Kuwait | Asia | Western Asia | 0.7080 | 0.6522 | 0.7430 | 0.7287 | High Income | | | |
| 97 | Kyrgyzstan | Asia | Central Asia | 0.4969 | 0.4275 | 0.3123 | 0.7508 | Upper Middle Income | | x | |
| 148 | Lao People's Democratic Republic | Asia | South-Eastern Asia | 0.3090 | 0.2826 | 0.1537 | 0.4907 | Lower Middle Income | x | x | |
| 45 | Latvia | Europe | Northern Europe | 0.6810 | 0.6087 | 0.5831 | 0.8512 | High Income | | | |
| 73 | Lebanon | Asia | Western Asia | 0.5646 | 0.5145 | 0.4911 | 0.6882 | Upper Middle Income | | | |
| 154 | Lesotho | Africa | Southern Africa | 0.2770 | 0.1377 | 0.1787 | 0.5147 | Lower Middle Income | x | x | |
| 170 | Liberia | Africa | West Africa | 0.2338 | 0.2391 | 0.1041 | 0.3581 | Low Income | x | | |
| 118 | Libya | Africa | Northern Africa | 0.4322 | 0.1087 | 0.4291 | 0.7588 | Upper Middle Income | | | |
| 32 | Liechtenstein | Europe | Western Europe | 0.7313 | 0.6667 | 0.7293 | 0.7978 | High Income | | | |
| 23 | Lithuania | Europe | Northern Europe | 0.7747 | 0.8261 | 0.6262 | 0.8717 | High Income | | | |
| 25 | Luxembourg | Europe | Western Europe | 0.7705 | 0.7174 | 0.8190 | 0.7750 | High Income | | | |
| 163 | Madagascar | Africa | Eastern Africa | 0.2416 | 0.2246 | 0.0514 | 0.4488 | Low Income | x | | |
| 166 | Malawi | Africa | Eastern Africa | 0.2398 | 0.2174 | 0.0485 | 0.4535 | Low Income | x | x | |
| 60 | Malaysia | Asia | South-Eastern Asia | 0.6175 | 0.7174 | 0.4397 | 0.6953 | Upper Middle Income | | | |
| 117 | Maldives | Asia | Southern Asia | 0.4330 | 0.2319 | 0.4370 | 0.6301 | Upper Middle Income | | | x |
| 182 | Mali | Africa | West Africa | 0.1817 | 0.0942 | 0.2149 | 0.2358 | Low Income | x | x | |
| 30 | Malta | Europe | Southern Europe | 0.7424 | 0.7971 | 0.6992 | 0.7310 | High Income | | | |
| 156 | Marshall Islands | Oceania | Oceania | 0.2695 | 0.0290 | 0.0849 | 0.6947 | Upper Middle Income | | | x |
| 184 | Mauritania | Africa | West Africa | 0.1734 | 0.0652 | 0.1536 | 0.3015 | Lower Middle Income | x | | |
| 58 | Mauritius | Africa | Eastern Africa | 0.6231 | 0.7029 | 0.4596 | 0.7067 | Upper Middle Income | | | x |
| 59 | Mexico | Americas | Central America | 0.6195 | 0.8478 | 0.3114 | 0.6993 | Upper Middle Income | | | |
| 146 | Micronesia (Federated States of) | Oceania | Oceania | 0.3103 | 0.1449 | 0.1197 | 0.6663 | Lower Middle Income | | | x |
| 31 | Monaco | Europe | Western Europe | 0.7315 | 0.3188 | 1.0000 | 0.8757 | High Income | | | |
| 84 | Mongolia | Asia | Eastern Asia | 0.5194 | 0.5145 | 0.2841 | 0.7597 | Lower Middle Income | | x | |
| 47 | Montenegro | Europe | Southern Europe | 0.6733 | 0.6812 | 0.5221 | 0.8165 | Upper Middle Income | | | |
| 85 | Morocco | Africa | Northern Africa | 0.5186 | 0.7391 | 0.3429 | 0.4737 | Lower Middle Income | | | |

Table 1. Country Profiles (continued)

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 172 | Mozambique | Africa | Eastern Africa | 0.2305 | 0.2029 | 0.0993 | 0.3893 | Low Income | x | | |
| 169 | Myanmar | Asia | South-Eastern Asia | 0.2362 | 0.1594 | 0.0655 | 0.4837 | Low Income | x | | |
| 125 | Namibia | Africa | Southern Africa | 0.3682 | 0.2826 | 0.2669 | 0.5551 | Upper Middle Income | | | |
| 152 | Nauru | Oceania | Oceania | 0.2868 | 0.0942 | 0.2448 | 0.5214 | Upper Middle Income | | | x |
| 135 | Nepal | Asia | Southern Asia | 0.3458 | 0.3986 | 0.1675 | 0.4714 | Low Income | x | x | |
| 7 | Netherlands | Europe | Western Europe | 0.8659 | 0.9275 | 0.7517 | 0.9183 | High Income | | | |
| 8 | New Zealand | Oceania | Oceania | 0.8653 | 0.9420 | 0.7136 | 0.9402 | High Income | | | |
| 123 | Nicaragua | Americas | Central America | 0.3801 | 0.3841 | 0.2109 | 0.5454 | Lower Middle Income | | | |
| 192 | Niger | Africa | West Africa | 0.0593 | 0.0725 | 0.0557 | 0.0498 | Low Income | x | x | |
| 143 | Nigeria | Africa | West Africa | 0.3291 | 0.4130 | 0.1958 | 0.3784 | Lower Middle Income | | | |
| 18 | Norway | Europe | Northern Europe | 0.8117 | 0.8043 | 0.7276 | 0.9031 | High Income | | | |
| 66 | Oman | Asia | Western Asia | 0.5962 | 0.5942 | 0.5147 | 0.6796 | High Income | | | |
| 159 | Pakistan | Asia | Southern Asia | 0.2583 | 0.3261 | 0.1299 | 0.3190 | Lower Middle Income | | | |
| 111 | Palau | Oceania | Oceania | 0.4546 | 0.1087 | 0.3684 | 0.8867 | Upper Middle Income | | | x |
| 99 | Panama | Americas | Central America | 0.4903 | 0.3333 | 0.4202 | 0.7175 | Upper Middle Income | | | |
| 179 | Papua New Guinea | Oceania | Oceania | 0.1882 | 0.1667 | 0.0739 | 0.3240 | Lower Middle Income | | | x |
| 95 | Paraguay | Americas | South America | 0.4989 | 0.6014 | 0.2544 | 0.6409 | Lower Middle Income | | x | |
| 81 | Peru | Americas | South America | 0.5381 | 0.6304 | 0.2689 | 0.7151 | Upper Middle Income | | | |
| 71 | Philippines | Asia | South-Eastern Asia | 0.5765 | 0.6667 | 0.3791 | 0.6839 | Lower Middle Income | | | |
| 36 | Poland | Europe | Eastern Europe | 0.7211 | 0.7029 | 0.5857 | 0.8747 | High Income | | | |
| 38 | Portugal | Europe | Southern Europe | 0.7144 | 0.7464 | 0.5838 | 0.8129 | High Income | | | |
| 48 | Qatar | Asia | Western Asia | 0.6699 | 0.6739 | 0.6041 | 0.7317 | High Income | | | |
| 3 | Republic of Korea | Asia | Eastern Asia | 0.8915 | 0.9420 | 0.8530 | 0.8795 | High Income | | | |
| 65 | Republic of Moldova | Europe | Eastern Europe | 0.5994 | 0.5942 | 0.4850 | 0.7191 | Lower Middle Income | | x | |
| 75 | Romania | Europe | Eastern Europe | 0.5611 | 0.4565 | 0.4533 | 0.7736 | Upper Middle Income | | | |
| 35 | Russian Federation | Europe | Eastern Europe | 0.7215 | 0.7319 | 0.6091 | 0.8234 | High Income | | | |
| 138 | Rwanda | Africa | Eastern Africa | 0.3390 | 0.4565 | 0.1084 | 0.4522 | Low Income | x | x | |
| 94 | Saint Kitts and Nevis | Americas | Caribbean | 0.5034 | 0.2826 | 0.5301 | 0.6976 | High Income | | | x |
| 114 | Saint Lucia | Americas | Caribbean | 0.4531 | 0.2754 | 0.4094 | 0.6744 | Upper Middle Income | | | x |

Table 1. Country Profiles (continued)

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 115 | Saint Vincent and the Grenadines | Americas | Caribbean | 0.4494 | 0.2971 | 0.3756 | 0.6754 | Upper Middle Income | | | x |
| 121 | Samoa | Oceania | Oceania | 0.4019 | 0.3406 | 0.1576 | 0.7076 | Lower Middle Income | x | | x |
| 78 | San Marino | Europe | Southern Europe | 0.5506 | 0.2391 | 0.6128 | 0.7999 | High Income | | | |
| 168 | Sao Tome and Principe | Africa | Central Africa | 0.2390 | 0.0435 | 0.1547 | 0.5188 | Lower Middle Income | x | | x |
| 44 | Saudi Arabia | Asia | Western Asia | 0.6822 | 0.6739 | 0.5733 | 0.7995 | High Income | | | |
| 144 | Senegal | Africa | West Africa | 0.3250 | 0.3768 | 0.1958 | 0.4025 | Lower Middle Income | x | | |
| 39 | Serbia | Europe | Southern Europe | 0.7131 | 0.8188 | 0.5434 | 0.7769 | Upper Middle Income | | | |
| 86 | Seychelles | Africa | Eastern Africa | 0.5181 | 0.4058 | 0.4624 | 0.6861 | Upper Middle Income | | | x |
| 186 | Sierra Leone | Africa | West Africa | 0.1594 | 0.1159 | 0.1216 | 0.2407 | Low Income | x | | |
| 4 | Singapore | Asia | South-Eastern Asia | 0.8828 | 0.9710 | 0.8414 | 0.8360 | High Income | | | x |
| 67 | Slovakia | Europe | Eastern Europe | 0.5915 | 0.4420 | 0.5504 | 0.7822 | High Income | | | |
| 21 | Slovenia | Europe | Southern Europe | 0.7769 | 0.8478 | 0.5877 | 0.8952 | High Income | | | |
| 164 | Solomon Islands | Oceania | Oceania | 0.2406 | 0.1667 | 0.1150 | 0.4402 | Lower Middle Income | x | | x |
| 193 | Somalia | Africa | Eastern Africa | 0.0270 | 0.0145 | 0.0665 | 0.0000 | Low Income | x | | |
| 76 | South Africa | Africa | Southern Africa | 0.5546 | 0.5580 | 0.3807 | 0.7253 | Upper Middle Income | | | |
| 183 | South Sudan | Africa | Northern Africa | 0.1791 | 0.1232 | 0.0534 | 0.3607 | Low Income | x | | |
| 17 | Spain | Europe | Southern Europe | 0.8135 | 0.9130 | 0.6493 | 0.8782 | High Income | | | |
| 79 | Sri Lanka | Asia | Southern Asia | 0.5445 | 0.6522 | 0.2445 | 0.7369 | Lower Middle Income | | | |
| 161 | Sudan | Africa | Northern Africa | 0.2539 | 0.2174 | 0.1861 | 0.3581 | Lower Middle Income | x | | |
| 110 | Suriname | Americas | South America | 0.4546 | 0.2971 | 0.4116 | 0.6551 | Upper Middle Income | | | x |
| 136 | Swaziland | Africa | Southern Africa | 0.3412 | 0.2754 | 0.1601 | 0.5882 | Lower Middle Income | | x | |
| 6 | Sweden | Europe | Northern Europe | 0.8704 | 0.8768 | 0.8134 | 0.9210 | High Income | | | |
| 28 | Switzerland | Europe | Western Europe | 0.7525 | 0.6014 | 0.7980 | 0.8579 | High Income | | | |
| 137 | Syrian Arab Republic | Asia | Western Asia | 0.3404 | 0.3261 | 0.2087 | 0.4864 | Lower Middle Income | | | |
| 139 | Tajikistan | Asia | Central Asia | 0.3366 | 0.1232 | 0.1866 | 0.7001 | Low Income | | x | |
| 77 | Thailand | Asia | South-Eastern Asia | 0.5522 | 0.5507 | 0.4117 | 0.6942 | Upper Middle Income | | | |
| 69 | The former Yugoslav Republic of Macedonia | Europe | Southern Europe | 0.5885 | 0.6087 | 0.4693 | 0.6877 | Upper Middle Income | | x | |
| 160 | Timor-Leste | Asia | South-Eastern Asia | 0.2582 | 0.2174 | 0.0728 | 0.4843 | Lower Middle Income | x | | x |

Table 1. Country Profiles (continued)

| Rank | Country | Region | Sub-Region | EGDI 2016 | OSI | TII | HCI | Level of Income | LDC | LLDC | SIDS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 147 | Togo | Africa | West Africa | 0.3096 | 0.3188 | 0.1044 | 0.5056 | Low Income | x | | |
| 105 | Tonga | Oceania | Oceania | 0.4700 | 0.3696 | 0.2302 | 0.8102 | Upper Middle Income | | | x |
| 70 | Trinidad and Tobago | Americas | Caribbean | 0.5780 | 0.5290 | 0.4973 | 0.7077 | High Income | | | x |
| 72 | Tunisia | Africa | Northern Africa | 0.5682 | 0.7174 | 0.3476 | 0.6397 | Upper Middle Income | | | |
| 68 | Turkey | Asia | Western Asia | 0.5900 | 0.6014 | 0.3775 | 0.7910 | Upper Middle Income | | | |
| 140 | Turkmenistan | Asia | Central Asia | 0.3337 | 0.0870 | 0.2559 | 0.6583 | Upper Middle Income | | x | |
| 151 | Tuvalu | Oceania | Oceania | 0.2950 | 0.0217 | 0.1981 | 0.6651 | Upper Middle Income | x | | x |
| 128 | Uganda | Africa | Eastern Africa | 0.3599 | 0.5000 | 0.1129 | 0.4668 | Low Income | x | x | |
| 62 | Ukraine | Europe | Eastern Europe | 0.6076 | 0.5870 | 0.3968 | 0.8390 | Lower Middle Income | | | |
| 29 | United Arab Emirates | Asia | Western Asia | 0.7515 | 0.8913 | 0.6881 | 0.6752 | High Income | | | |
| 1 | United Kingdom of Great Britain and Northern Ireland | Europe | Northern Europe | 0.9193 | 1.0000 | 0.8177 | 0.9402 | High Income | | | |
| 130 | United Republic of Tanzania | Africa | Eastern Africa | 0.3533 | 0.5725 | 0.0900 | 0.3974 | Low Income | x | | |
| 12 | United States of America | Americas | North America | 0.8420 | 0.9275 | 0.7170 | 0.8815 | High Income | | | |
| 34 | Uruguay | Americas | South America | 0.7237 | 0.7754 | 0.6137 | 0.7820 | High Income | | | |
| 80 | Uzbekistan | Asia | Central Asia | 0.5434 | 0.6884 | 0.2463 | 0.6954 | Lower Middle Income | | x | |
| 149 | Vanuatu | Oceania | Oceania | 0.3078 | 0.1667 | 0.1684 | 0.5884 | Lower Middle Income | x | | x |
| 90 | Venezuela | Americas | South America | 0.5128 | 0.4348 | 0.3540 | 0.7498 | Upper Middle Income | | | |
| 89 | Viet Nam | Asia | South-Eastern Asia | 0.5143 | 0.5725 | 0.3715 | 0.5989 | Lower Middle Income | | | |
| 174 | Yemen | Asia | Western Asia | 0.2248 | 0.1449 | 0.1465 | 0.3829 | Lower Middle Income | x | | |
| 132 | Zambia | Africa | Eastern Africa | 0.3507 | 0.3696 | 0.1182 | 0.5643 | Lower Middle Income | x | x | |
| 134 | Zimbabwe | Africa | Eastern Africa | 0.3472 | 0.2609 | 0.2167 | 0.5641 | Low Income | | x | |

| | EGDI 2016 | OSI | TII | HCI |
|---|---|---|---|---|
| **World Average** | 0.4922 | 0.4623 | 0.3711 | 0.6433 |

## Table 2. E-Government Development Index (EGDI)

| Rank | Country | EGDI Level | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 171 | Afghanistan | Low | 0.2313 | 0.3043 | 0.1066 | 0.2830 |
| 82 | Albania | High | 0.5331 | 0.5942 | 0.3530 | 0.6520 |
| 150 | Algeria | Medium | 0.2999 | 0.0652 | 0.1934 | 0.6412 |
| 55 | Andorra | High | 0.6302 | 0.5072 | 0.6855 | 0.6978 |
| 142 | Angola | Medium | 0.3311 | 0.3478 | 0.1441 | 0.5015 |
| 100 | Antigua and Barbuda | Medium | 0.4892 | 0.1812 | 0.5412 | 0.7453 |
| 41 | Argentina | High | 0.6978 | 0.7101 | 0.5031 | 0.8802 |
| 87 | Armenia | High | 0.5179 | 0.4275 | 0.3922 | 0.7338 |
| 2 | Australia | Very high | 0.9143 | 0.9783 | 0.7646 | 1.0000 |
| 16 | Austria | Very high | 0.8208 | 0.9130 | 0.7098 | 0.8396 |
| 56 | Azerbaijan | High | 0.6274 | 0.6812 | 0.4852 | 0.7158 |
| 93 | Bahamas | High | 0.5108 | 0.4275 | 0.3842 | 0.7207 |
| 24 | Bahrain | Very high | 0.7734 | 0.8261 | 0.7762 | 0.7178 |
| 124 | Bangladesh | Medium | 0.3799 | 0.6232 | 0.1193 | 0.3973 |
| 54 | Barbados | High | 0.6310 | 0.4420 | 0.6397 | 0.8113 |
| 49 | Belarus | High | 0.6625 | 0.4855 | 0.6304 | 0.8716 |
| 19 | Belgium | Very high | 0.7874 | 0.7101 | 0.6808 | 0.9712 |
| 122 | Belize | Medium | 0.3825 | 0.3188 | 0.1834 | 0.6454 |
| 177 | Benin | Low | 0.2039 | 0.1449 | 0.1471 | 0.3196 |
| 133 | Bhutan | Medium | 0.3506 | 0.3188 | 0.2192 | 0.5139 |
| 101 | Bolivia | Medium | 0.4821 | 0.4928 | 0.2532 | 0.7004 |
| 92 | Bosnia and Herzegovina | High | 0.5118 | 0.4493 | 0.4047 | 0.6815 |
| 113 | Botswana | Medium | 0.4531 | 0.2826 | 0.4215 | 0.6553 |
| 51 | Brazil | High | 0.6377 | 0.7319 | 0.5025 | 0.6787 |
| 83 | Brunei Darussalam | High | 0.5298 | 0.5072 | 0.3512 | 0.7310 |
| 52 | Bulgaria | High | 0.6376 | 0.5652 | 0.5602 | 0.7875 |
| 185 | Burkina Faso | Low | 0.1598 | 0.1884 | 0.1232 | 0.1677 |
| 173 | Burundi | Low | 0.2277 | 0.1522 | 0.0331 | 0.4979 |
| 158 | Cambodia | Medium | 0.2593 | 0.0507 | 0.2486 | 0.4785 |
| 155 | Cameroon | Medium | 0.2759 | 0.2174 | 0.1310 | 0.4794 |
| 14 | Canada | Very high | 0.8285 | 0.9565 | 0.6717 | 0.8572 |
| 103 | Cape Verde | Medium | 0.4742 | 0.4565 | 0.3629 | 0.6031 |
| 191 | Central African Republic | Low | 0.0789 | 0.0000 | 0.0381 | 0.1985 |
| 188 | Chad | Low | 0.1256 | 0.1377 | 0.0476 | 0.1917 |
| 42 | Chile | High | 0.6949 | 0.7754 | 0.4970 | 0.8124 |
| 63 | China | High | 0.6071 | 0.7681 | 0.3673 | 0.6860 |
| 57 | Colombia | High | 0.6237 | 0.7899 | 0.3813 | 0.7000 |
| 176 | Comoros | Low | 0.2155 | 0.0507 | 0.1073 | 0.4885 |
| 162 | Congo | Low | 0.2497 | 0.0435 | 0.1713 | 0.5344 |
| 53 | Costa Rica | High | 0.6314 | 0.6377 | 0.5129 | 0.7436 |
| 175 | Côte d'Ivoire | Low | 0.2185 | 0.1884 | 0.1711 | 0.2959 |
| 37 | Croatia | High | 0.7162 | 0.7464 | 0.5974 | 0.8050 |
| 131 | Cuba | Medium | 0.3522 | 0.1957 | 0.1103 | 0.7507 |
| 64 | Cyprus | High | 0.6023 | 0.5362 | 0.4923 | 0.7782 |

Table 2. E-Government Development Index (EGDI) (continued)

| Rank | Country | EGDI Level | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 50 | Czech Republic | High | 0.6454 | 0.4783 | 0.5952 | 0.8627 |
| 153 | Democratic People's Republic of Korea | Medium | 0.2801 | 0.0217 | 0.0363 | 0.7822 |
| 180 | Democratic Republic of the Congo | Low | 0.1876 | 0.0870 | 0.0788 | 0.3970 |
| 9 | Denmark | Very high | 0.8510 | 0.7754 | 0.8247 | 0.9530 |
| 187 | Djibouti | Low | 0.1337 | 0.0217 | 0.0698 | 0.3095 |
| 109 | Dominica | Medium | 0.4577 | 0.3043 | 0.4305 | 0.6384 |
| 98 | Dominican Republic | Medium | 0.4914 | 0.5072 | 0.2992 | 0.6676 |
| 74 | Ecuador | High | 0.5625 | 0.6304 | 0.3438 | 0.7134 |
| 108 | Egypt | Medium | 0.4594 | 0.4710 | 0.3025 | 0.6048 |
| 104 | El Salvador | Medium | 0.4718 | 0.4855 | 0.3265 | 0.6035 |
| 165 | Equatorial Guinea | Low | 0.2403 | 0.0797 | 0.1237 | 0.5174 |
| 190 | Eritrea | Low | 0.0902 | 0.0217 | 0.0000 | 0.2487 |
| 13 | Estonia | Very high | 0.8334 | 0.8913 | 0.7329 | 0.8761 |
| 157 | Ethiopia | Medium | 0.2666 | 0.5290 | 0.0495 | 0.2212 |
| 96 | Fiji | Medium | 0.4989 | 0.4130 | 0.3326 | 0.7509 |
| 5 | Finland | Very high | 0.8817 | 0.9420 | 0.7590 | 0.9440 |
| 10 | France | Very high | 0.8456 | 0.9420 | 0.7502 | 0.8445 |
| 129 | Gabon | Medium | 0.3584 | 0.1522 | 0.3068 | 0.6162 |
| 167 | Gambia | Low | 0.2396 | 0.1957 | 0.1959 | 0.3274 |
| 61 | Georgia | High | 0.6108 | 0.6377 | 0.4184 | 0.7763 |
| 15 | Germany | Very high | 0.8210 | 0.8406 | 0.7342 | 0.8882 |
| 120 | Ghana | Medium | 0.4181 | 0.4493 | 0.2594 | 0.5458 |
| 43 | Greece | High | 0.6910 | 0.5797 | 0.6032 | 0.8901 |
| 88 | Grenada | High | 0.5168 | 0.3696 | 0.3988 | 0.7820 |
| 102 | Guatemala | Medium | 0.4790 | 0.6667 | 0.2358 | 0.5345 |
| 189 | Guinea | Low | 0.1226 | 0.0870 | 0.0906 | 0.1903 |
| 181 | Guinea-Bissau | Low | 0.1818 | 0.1087 | 0.0828 | 0.3538 |
| 126 | Guyana | Medium | 0.3651 | 0.2826 | 0.2432 | 0.5694 |
| 178 | Haiti | Low | 0.1931 | 0.1667 | 0.1004 | 0.3124 |
| 127 | Honduras | Medium | 0.3611 | 0.3116 | 0.2008 | 0.5709 |
| 46 | Hungary | High | 0.6745 | 0.6304 | 0.5615 | 0.8317 |
| 27 | Iceland | Very high | 0.7662 | 0.6232 | 0.7814 | 0.8940 |
| 107 | India | Medium | 0.4637 | 0.7464 | 0.1430 | 0.5019 |
| 116 | Indonesia | Medium | 0.4478 | 0.3623 | 0.3016 | 0.6796 |
| 106 | Iran (Islamic Republic of) | Medium | 0.4649 | 0.3333 | 0.3514 | 0.7101 |
| 141 | Iraq | Medium | 0.3334 | 0.3551 | 0.1647 | 0.4803 |
| 26 | Ireland | Very high | 0.7689 | 0.7246 | 0.6602 | 0.9218 |
| 20 | Israel | Very high | 0.7806 | 0.8623 | 0.6175 | 0.8619 |
| 22 | Italy | Very high | 0.7764 | 0.8696 | 0.6469 | 0.8126 |
| 112 | Jamaica | Medium | 0.4534 | 0.3551 | 0.3193 | 0.6859 |
| 11 | Japan | Very high | 0.8440 | 0.8768 | 0.8277 | 0.8274 |
| 91 | Jordan | High | 0.5123 | 0.4565 | 0.3458 | 0.7344 |
| 33 | Kazakhstan | High | 0.7250 | 0.7681 | 0.5668 | 0.8401 |
| 119 | Kenya | Medium | 0.4186 | 0.5580 | 0.1808 | 0.5169 |

Table 2. E-Government Development Index (EGDI) (continued)

| Rank | Country | EGDI Level | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 145 | Kiribati | Medium | 0.3122 | 0.2101 | 0.0665 | 0.6599 |
| 40 | Kuwait | High | 0.7080 | 0.6522 | 0.7430 | 0.7287 |
| 97 | Kyrgyzstan | Medium | 0.4969 | 0.4275 | 0.3123 | 0.7508 |
| 148 | Lao People's Democratic Republic | Medium | 0.3090 | 0.2826 | 0.1537 | 0.4907 |
| 45 | Latvia | High | 0.6810 | 0.6087 | 0.5831 | 0.8512 |
| 73 | Lebanon | High | 0.5646 | 0.5145 | 0.4911 | 0.6882 |
| 154 | Lesotho | Medium | 0.2770 | 0.1377 | 0.1787 | 0.5147 |
| 170 | Liberia | Low | 0.2338 | 0.2391 | 0.1041 | 0.3581 |
| 118 | Libya | Medium | 0.4322 | 0.1087 | 0.4291 | 0.7588 |
| 32 | Liechtenstein | High | 0.7313 | 0.6667 | 0.7293 | 0.7978 |
| 23 | Lithuania | Very high | 0.7747 | 0.8261 | 0.6262 | 0.8717 |
| 25 | Luxembourg | Very high | 0.7705 | 0.7174 | 0.8190 | 0.7750 |
| 163 | Madagascar | Low | 0.2416 | 0.2246 | 0.0514 | 0.4488 |
| 166 | Malawi | Low | 0.2398 | 0.2174 | 0.0485 | 0.4535 |
| 60 | Malaysia | High | 0.6175 | 0.7174 | 0.4397 | 0.6953 |
| 117 | Maldives | Medium | 0.4330 | 0.2319 | 0.4370 | 0.6301 |
| 182 | Mali | Low | 0.1817 | 0.0942 | 0.2149 | 0.2358 |
| 30 | Malta | High | 0.7424 | 0.7971 | 0.6992 | 0.7310 |
| 156 | Marshall Islands | Medium | 0.2695 | 0.0290 | 0.0849 | 0.6947 |
| 184 | Mauritania | Low | 0.1734 | 0.0652 | 0.1536 | 0.3015 |
| 58 | Mauritius | High | 0.6231 | 0.7029 | 0.4596 | 0.7067 |
| 59 | Mexico | High | 0.6195 | 0.8478 | 0.3114 | 0.6993 |
| 146 | Micronesia (Federated States of) | Medium | 0.3103 | 0.1449 | 0.1197 | 0.6663 |
| 31 | Monaco | High | 0.7315 | 0.3188 | 1.0000 | 0.8757 |
| 84 | Mongolia | High | 0.5194 | 0.5145 | 0.2841 | 0.7597 |
| 47 | Montenegro | High | 0.6733 | 0.6812 | 0.5221 | 0.8165 |
| 85 | Morocco | High | 0.5186 | 0.7391 | 0.3429 | 0.4737 |
| 172 | Mozambique | Low | 0.2305 | 0.2029 | 0.0993 | 0.3893 |
| 169 | Myanmar | Low | 0.2362 | 0.1594 | 0.0655 | 0.4837 |
| 125 | Namibia | Medium | 0.3682 | 0.2826 | 0.2669 | 0.5551 |
| 152 | Nauru | Medium | 0.2868 | 0.0942 | 0.2448 | 0.5214 |
| 135 | Nepal | Medium | 0.3458 | 0.3986 | 0.1675 | 0.4714 |
| 7 | Netherlands | Very high | 0.8659 | 0.9275 | 0.7517 | 0.9183 |
| 8 | New Zealand | Very high | 0.8653 | 0.9420 | 0.7136 | 0.9402 |
| 123 | Nicaragua | Medium | 0.3801 | 0.3841 | 0.2109 | 0.5454 |
| 192 | Niger | Low | 0.0593 | 0.0725 | 0.0557 | 0.0498 |
| 143 | Nigeria | Medium | 0.3291 | 0.4130 | 0.1958 | 0.3784 |
| 18 | Norway | Very high | 0.8117 | 0.8043 | 0.7276 | 0.9031 |
| 66 | Oman | High | 0.5962 | 0.5942 | 0.5147 | 0.6796 |
| 159 | Pakistan | Medium | 0.2583 | 0.3261 | 0.1299 | 0.3190 |
| 111 | Palau | Medium | 0.4546 | 0.1087 | 0.3684 | 0.8867 |
| 99 | Panama | Medium | 0.4903 | 0.3333 | 0.4202 | 0.7175 |
| 179 | Papua New Guinea | Low | 0.1882 | 0.1667 | 0.0739 | 0.3240 |
| 95 | Paraguay | Medium | 0.4989 | 0.6014 | 0.2544 | 0.6409 |

Table 2. E-Government Development Index (EGDI) (continued)

| Rank | Country | EGDI Level | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 81 | Peru | High | 0.5381 | 0.6304 | 0.2689 | 0.7151 |
| 71 | Philippines | High | 0.5765 | 0.6667 | 0.3791 | 0.6839 |
| 36 | Poland | High | 0.7211 | 0.7029 | 0.5857 | 0.8747 |
| 38 | Portugal | High | 0.7144 | 0.7464 | 0.5838 | 0.8129 |
| 48 | Qatar | High | 0.6699 | 0.6739 | 0.6041 | 0.7317 |
| 3 | Republic of Korea | Very high | 0.8915 | 0.9420 | 0.8530 | 0.8795 |
| 65 | Republic of Moldova | High | 0.5994 | 0.5942 | 0.4850 | 0.7191 |
| 75 | Romania | High | 0.5611 | 0.4565 | 0.4533 | 0.7736 |
| 35 | Russian Federation | High | 0.7215 | 0.7319 | 0.6091 | 0.8234 |
| 138 | Rwanda | Medium | 0.3390 | 0.4565 | 0.1084 | 0.4522 |
| 94 | Saint Kitts and Nevis | High | 0.5034 | 0.2826 | 0.5301 | 0.6976 |
| 114 | Saint Lucia | Medium | 0.4531 | 0.2754 | 0.4094 | 0.6744 |
| 115 | Saint Vincent and the Grenadines | Medium | 0.4494 | 0.2971 | 0.3756 | 0.6754 |
| 121 | Samoa | Medium | 0.4019 | 0.3406 | 0.1576 | 0.7076 |
| 78 | San Marino | High | 0.5506 | 0.2391 | 0.6128 | 0.7999 |
| 168 | Sao Tome and Principe | Low | 0.2390 | 0.0435 | 0.1547 | 0.5188 |
| 44 | Saudi Arabia | High | 0.6822 | 0.6739 | 0.5733 | 0.7995 |
| 144 | Senegal | Medium | 0.3250 | 0.3768 | 0.1958 | 0.4025 |
| 39 | Serbia | High | 0.7131 | 0.8188 | 0.5434 | 0.7769 |
| 86 | Seychelles | High | 0.5181 | 0.4058 | 0.4624 | 0.6861 |
| 186 | Sierra Leone | Low | 0.1594 | 0.1159 | 0.1216 | 0.2407 |
| 4 | Singapore | Very high | 0.8828 | 0.9710 | 0.8414 | 0.8360 |
| 67 | Slovakia | High | 0.5915 | 0.4420 | 0.5504 | 0.7822 |
| 21 | Slovenia | Very high | 0.7769 | 0.8478 | 0.5877 | 0.8952 |
| 164 | Solomon Islands | Low | 0.2406 | 0.1667 | 0.1150 | 0.4402 |
| 193 | Somalia | Low | 0.0270 | 0.0145 | 0.0665 | 0.0000 |
| 76 | South Africa | High | 0.5546 | 0.5580 | 0.3807 | 0.7253 |
| 183 | South Sudan | Low | 0.1791 | 0.1232 | 0.0534 | 0.3607 |
| 17 | Spain | Very high | 0.8135 | 0.9130 | 0.6493 | 0.8782 |
| 79 | Sri Lanka | High | 0.5445 | 0.6522 | 0.2445 | 0.7369 |
| 161 | Sudan | Medium | 0.2539 | 0.2174 | 0.1861 | 0.3581 |
| 110 | Suriname | Medium | 0.4546 | 0.2971 | 0.4116 | 0.6551 |
| 136 | Swaziland | Medium | 0.3412 | 0.2754 | 0.1601 | 0.5882 |
| 6 | Sweden | Very high | 0.8704 | 0.8768 | 0.8134 | 0.9210 |
| 28 | Switzerland | Very high | 0.7525 | 0.6014 | 0.7980 | 0.8579 |
| 137 | Syrian Arab Republic | Medium | 0.3404 | 0.3261 | 0.2087 | 0.4864 |
| 139 | Tajikistan | Medium | 0.3366 | 0.1232 | 0.1866 | 0.7001 |
| 77 | Thailand | High | 0.5522 | 0.5507 | 0.4117 | 0.6942 |
| 69 | The former Yugoslav Republic of Macedonia | High | 0.5885 | 0.6087 | 0.4693 | 0.6877 |
| 160 | Timor-Leste | Medium | 0.2582 | 0.2174 | 0.0728 | 0.4843 |
| 147 | Togo | Medium | 0.3096 | 0.3188 | 0.1044 | 0.5056 |
| 105 | Tonga | Medium | 0.4700 | 0.3696 | 0.2302 | 0.8102 |
| 70 | Trinidad and Tobago | High | 0.5780 | 0.5290 | 0.4973 | 0.7077 |
| 72 | Tunisia | High | 0.5682 | 0.7174 | 0.3476 | 0.6397 |

Table 2. E-Government Development Index (EGDI) (continued)

| Rank | Country | EGDI Level | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 68 | Turkey | High | 0.5900 | 0.6014 | 0.3775 | 0.7910 |
| 140 | Turkmenistan | Medium | 0.3337 | 0.0870 | 0.2559 | 0.6583 |
| 151 | Tuvalu | Medium | 0.2950 | 0.0217 | 0.1981 | 0.6651 |
| 128 | Uganda | Medium | 0.3599 | 0.5000 | 0.1129 | 0.4668 |
| 62 | Ukraine | High | 0.6076 | 0.5870 | 0.3968 | 0.8390 |
| 29 | United Arab Emirates | Very high | 0.7515 | 0.8913 | 0.6881 | 0.6752 |
| 1 | United Kingdom of Great Britain and Northern Ireland | Very high | 0.9193 | 1.0000 | 0.8177 | 0.9402 |
| 130 | United Republic of Tanzania | Medium | 0.3533 | 0.5725 | 0.0900 | 0.3974 |
| 12 | United States of America | Very high | 0.8420 | 0.9275 | 0.7170 | 0.8815 |
| 34 | Uruguay | High | 0.7237 | 0.7754 | 0.6137 | 0.7820 |
| 80 | Uzbekistan | High | 0.5434 | 0.6884 | 0.2463 | 0.6954 |
| 149 | Vanuatu | Medium | 0.3078 | 0.1667 | 0.1684 | 0.5884 |
| 90 | Venezuela | High | 0.5128 | 0.4348 | 0.3540 | 0.7498 |
| 89 | Viet Nam | High | 0.5143 | 0.5725 | 0.3715 | 0.5989 |
| 174 | Yemen | Low | 0.2248 | 0.1449 | 0.1465 | 0.3829 |
| 132 | Zambia | Medium | 0.3507 | 0.3696 | 0.1182 | 0.5643 |
| 134 | Zimbabwe | Medium | 0.3472 | 0.2609 | 0.2167 | 0.5641 |
| | **Global Average** | | **0.4922** | **0.4623** | **0.3711** | **0.6433** |

Table 3. Regional and Economic Groupings for E-Government Development Index (EGDI)

| Region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|
| Africa | 0.2882 | 0.2567 | 0.1724 | 0.4355 |
| Americas | 0.5245 | 0.4959 | 0.3844 | 0.6933 |
| Asia | 0.5132 | 0.5120 | 0.3730 | 0.6545 |
| Europe | 0.7241 | 0.6926 | 0.6438 | 0.8360 |
| Oceania | 0.4154 | 0.2966 | 0.2599 | 0.6897 |
| **World** | **0.4922** | **0.4623** | **0.3711** | **0.6433** |

| | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|
| Small Island Developing States | 0.4189 | 0.3021 | 0.3103 | 0.6442 |
| Land Locked Developing Countries | 0.3591 | 0.3474 | 0.2131 | 0.5170 |
| Least Developed Countries | 0.2350 | 0.2030 | 0.1145 | 0.3875 |

| Level of Income | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|
| High Income | 0.4980 | 0.4678 | 0.3789 | 0.6471 |
| Upper Middle Income | 0.4964 | 0.4658 | 0.3759 | 0.6476 |
| Lower Middle Income | 0.3861 | 0.3719 | 0.2292 | 0.5573 |
| Low Income | 0.2303 | 0.2101 | 0.1062 | 0.3746 |

## Table 4. E-Government Development Index (EGDI) by region - AFRICA

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 150 | Algeria | Northern Africa | 0.2999 | 0.0652 | 0.1934 | 0.6412 |
| 142 | Angola | Central Africa | 0.3311 | 0.3478 | 0.1441 | 0.5015 |
| 177 | Benin | West Africa | 0.2039 | 0.1449 | 0.1471 | 0.3196 |
| 113 | Botswana | Southern Africa | 0.4531 | 0.2826 | 0.4215 | 0.6553 |
| 185 | Burkina Faso | West Africa | 0.1598 | 0.1884 | 0.1232 | 0.1677 |
| 173 | Burundi | Eastern Africa | 0.2277 | 0.1522 | 0.0331 | 0.4979 |
| 155 | Cameroon | Central Africa | 0.2759 | 0.2174 | 0.1310 | 0.4794 |
| 103 | Cape Verde | West Africa | 0.4742 | 0.4565 | 0.3629 | 0.6031 |
| 191 | Central African Republic | Central Africa | 0.0789 | 0.0000 | 0.0381 | 0.1985 |
| 188 | Chad | Central Africa | 0.1256 | 0.1377 | 0.0476 | 0.1917 |
| 176 | Comoros | Eastern Africa | 0.2155 | 0.0507 | 0.1073 | 0.4885 |
| 162 | Congo | Central Africa | 0.2497 | 0.0435 | 0.1713 | 0.5344 |
| 175 | Côte d'Ivoire | West Africa | 0.2185 | 0.1884 | 0.1711 | 0.2959 |
| 180 | Democratic Republic of the Congo | Central Africa | 0.1876 | 0.0870 | 0.0788 | 0.3970 |
| 187 | Djibouti | Eastern Africa | 0.1337 | 0.0217 | 0.0698 | 0.3095 |
| 108 | Egypt | Northern Africa | 0.4594 | 0.4710 | 0.3025 | 0.6048 |
| 165 | Equatorial Guinea | Central Africa | 0.2403 | 0.0797 | 0.1237 | 0.5174 |
| 190 | Eritrea | Eastern Africa | 0.0902 | 0.0217 | 0.0000 | 0.2487 |
| 157 | Ethiopia | Eastern Africa | 0.2666 | 0.5290 | 0.0495 | 0.2212 |
| 129 | Gabon | Central Africa | 0.3584 | 0.1522 | 0.3068 | 0.6162 |
| 167 | Gambia | West Africa | 0.2396 | 0.1957 | 0.1959 | 0.3274 |
| 120 | Ghana | West Africa | 0.4181 | 0.4493 | 0.2594 | 0.5458 |
| 189 | Guinea | West Africa | 0.1226 | 0.0870 | 0.0906 | 0.1903 |
| 181 | Guinea-Bissau | West Africa | 0.1818 | 0.1087 | 0.0828 | 0.3538 |
| 119 | Kenya | Eastern Africa | 0.4186 | 0.5580 | 0.1808 | 0.5169 |
| 154 | Lesotho | Southern Africa | 0.2770 | 0.1377 | 0.1787 | 0.5147 |
| 170 | Liberia | West Africa | 0.2338 | 0.2391 | 0.1041 | 0.3581 |
| 118 | Libya | Northern Africa | 0.4322 | 0.1087 | 0.4291 | 0.7588 |
| 163 | Madagascar | Eastern Africa | 0.2416 | 0.2246 | 0.0514 | 0.4488 |
| 166 | Malawi | Eastern Africa | 0.2398 | 0.2174 | 0.0485 | 0.4535 |
| 182 | Mali | West Africa | 0.1817 | 0.0942 | 0.2149 | 0.2358 |
| 184 | Mauritania | West Africa | 0.1734 | 0.0652 | 0.1536 | 0.3015 |
| 58 | Mauritius | Eastern Africa | 0.6231 | 0.7029 | 0.4596 | 0.7067 |
| 85 | Morocco | Northern Africa | 0.5186 | 0.7391 | 0.3429 | 0.4737 |
| 172 | Mozambique | Eastern Africa | 0.2305 | 0.2029 | 0.0993 | 0.3893 |
| 125 | Namibia | Southern Africa | 0.3682 | 0.2826 | 0.2669 | 0.5551 |
| 192 | Niger | West Africa | 0.0593 | 0.0725 | 0.0557 | 0.0498 |
| 143 | Nigeria | West Africa | 0.3291 | 0.4130 | 0.1958 | 0.3784 |
| 138 | Rwanda | Eastern Africa | 0.3390 | 0.4565 | 0.1084 | 0.4522 |
| 168 | Sao Tome and Principe | Central Africa | 0.2390 | 0.0435 | 0.1547 | 0.5188 |
| 144 | Senegal | West Africa | 0.3250 | 0.3768 | 0.1958 | 0.4025 |
| 86 | Seychelles | Eastern Africa | 0.5181 | 0.4058 | 0.4624 | 0.6861 |

Table 4. E-Government Development Index (EGDI) by region - AFRICA (continued)

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 186 | Sierra Leone | West Africa | 0.1594 | 0.1159 | 0.1216 | 0.2407 |
| 193 | Somalia | Eastern Africa | 0.0270 | 0.0145 | 0.0665 | 0.0000 |
| 76 | South Africa | Southern Africa | 0.5546 | 0.5580 | 0.3807 | 0.7253 |
| 183 | South Sudan | Northern Africa | 0.1791 | 0.1232 | 0.0534 | 0.3607 |
| 161 | Sudan | Northern Africa | 0.2539 | 0.2174 | 0.1861 | 0.3581 |
| 136 | Swaziland | Southern Africa | 0.3412 | 0.2754 | 0.1601 | 0.5882 |
| 147 | Togo | West Africa | 0.3096 | 0.3188 | 0.1044 | 0.5056 |
| 72 | Tunisia | Northern Africa | 0.5682 | 0.7174 | 0.3476 | 0.6397 |
| 128 | Uganda | Eastern Africa | 0.3599 | 0.5000 | 0.1129 | 0.4668 |
| 130 | United Republic of Tanzania | Eastern Africa | 0.3533 | 0.5725 | 0.0900 | 0.3974 |
| 132 | Zambia | Eastern Africa | 0.3507 | 0.3696 | 0.1182 | 0.5643 |
| 134 | Zimbabwe | Eastern Africa | 0.3472 | 0.2609 | 0.2167 | 0.5641 |
| | **Regional Average (AFRICA)** | | **0.2882** | **0.2567** | **0.1724** | **0.4355** |

Table 5. E-Government Development Index (EGDI) by region - AMERICAS

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 100 | Antigua and Barbuda | Caribbean | 0.4892 | 0.1812 | 0.5412 | 0.7453 |
| 41 | Argentina | South America | 0.6978 | 0.7101 | 0.5031 | 0.8802 |
| 93 | Bahamas | Caribbean | 0.5108 | 0.4275 | 0.3842 | 0.7207 |
| 54 | Barbados | Caribbean | 0.6310 | 0.4420 | 0.6397 | 0.8113 |
| 122 | Belize | Central America | 0.3825 | 0.3188 | 0.1834 | 0.6454 |
| 101 | Bolivia | South America | 0.4821 | 0.4928 | 0.2532 | 0.7004 |
| 51 | Brazil | South America | 0.6377 | 0.7319 | 0.5025 | 0.6787 |
| 14 | Canada | North America | 0.8285 | 0.9565 | 0.6717 | 0.8572 |
| 42 | Chile | South America | 0.6949 | 0.7754 | 0.4970 | 0.8124 |
| 57 | Colombia | South America | 0.6237 | 0.7899 | 0.3813 | 0.7000 |
| 53 | Costa Rica | Central America | 0.6314 | 0.6377 | 0.5129 | 0.7436 |
| 131 | Cuba | Caribbean | 0.3522 | 0.1957 | 0.1103 | 0.7507 |
| 109 | Dominica | Caribbean | 0.4577 | 0.3043 | 0.4305 | 0.6384 |
| 98 | Dominican Republic | Caribbean | 0.4914 | 0.5072 | 0.2992 | 0.6676 |
| 74 | Ecuador | South America | 0.5625 | 0.6304 | 0.3438 | 0.7134 |
| 104 | El Salvador | Central America | 0.4718 | 0.4855 | 0.3265 | 0.6035 |
| 88 | Grenada | Caribbean | 0.5168 | 0.3696 | 0.3988 | 0.7820 |
| 102 | Guatemala | Central America | 0.4790 | 0.6667 | 0.2358 | 0.5345 |
| 126 | Guyana | South America | 0.3651 | 0.2826 | 0.2432 | 0.5694 |
| 178 | Haiti | Caribbean | 0.19a31 | 0.1667 | 0.1004 | 0.3124 |
| 127 | Honduras | Central America | 0.3611 | 0.3116 | 0.2008 | 0.5709 |
| 112 | Jamaica | Caribbean | 0.4534 | 0.3551 | 0.3193 | 0.6859 |
| 59 | Mexico | Central America | 0.6195 | 0.8478 | 0.3114 | 0.6993 |
| 123 | Nicaragua | Central America | 0.3801 | 0.3841 | 0.2109 | 0.5454 |
| 99 | Panama | Central America | 0.4903 | 0.3333 | 0.4202 | 0.7175 |
| 95 | Paraguay | South America | 0.4989 | 0.6014 | 0.2544 | 0.6409 |
| 81 | Peru | South America | 0.5381 | 0.6304 | 0.2689 | 0.7151 |
| 94 | Saint Kitts and Nevis | Caribbean | 0.5034 | 0.2826 | 0.5301 | 0.6976 |
| 114 | Saint Lucia | Caribbean | 0.4531 | 0.2754 | 0.4094 | 0.6744 |
| 115 | Saint Vincent and the Grenadines | Caribbean | 0.4494 | 0.2971 | 0.3756 | 0.6754 |
| 110 | Suriname | South America | 0.4546 | 0.2971 | 0.4116 | 0.6551 |
| 70 | Trinidad and Tobago | Caribbean | 0.5780 | 0.5290 | 0.4973 | 0.7077 |
| 12 | United States of America | North America | 0.8420 | 0.9275 | 0.7170 | 0.8815 |
| 34 | Uruguay | South America | 0.7237 | 0.7754 | 0.6137 | 0.7820 |
| 90 | Venezuela | South America | 0.5128 | 0.4348 | 0.3540 | 0.7498 |
| | **Regional Average (AMERICAS)** | | **0.5245** | **0.4959** | **0.3844** | **0.6933** |

## Table 6. E-Government Development Index (EGDI) by region - ASIA

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 171 | Afghanistan | Southern Asia | 0.2313 | 0.3043 | 0.1066 | 0.2830 |
| 87 | Armenia | Western Asia | 0.5179 | 0.4275 | 0.3922 | 0.7338 |
| 56 | Azerbaijan | Western Asia | 0.6274 | 0.6812 | 0.4852 | 0.7158 |
| 24 | Bahrain | Western Asia | 0.7734 | 0.8261 | 0.7762 | 0.7178 |
| 124 | Bangladesh | Southern Asia | 0.3799 | 0.6232 | 0.1193 | 0.3973 |
| 133 | Bhutan | Southern Asia | 0.3506 | 0.3188 | 0.2192 | 0.5139 |
| 83 | Brunei Darussalam | South-Eastern Asia | 0.5298 | 0.5072 | 0.3512 | 0.7310 |
| 158 | Cambodia | South-Eastern Asia | 0.2593 | 0.0507 | 0.2486 | 0.4785 |
| 63 | China | Eastern Asia | 0.6071 | 0.7681 | 0.3673 | 0.6860 |
| 64 | Cyprus | Western Asia | 0.6023 | 0.5362 | 0.4923 | 0.7782 |
| 153 | Democratic People's Republic of Korea | Eastern Asia | 0.2801 | 0.0217 | 0.0363 | 0.7822 |
| 61 | Georgia | Western Asia | 0.6108 | 0.6377 | 0.4184 | 0.7763 |
| 107 | India | Southern Asia | 0.4637 | 0.7464 | 0.1430 | 0.5019 |
| 116 | Indonesia | South-Eastern Asia | 0.4478 | 0.3623 | 0.3016 | 0.6796 |
| 106 | Iran (Islamic Republic of) | Southern Asia | 0.4649 | 0.3333 | 0.3514 | 0.7101 |
| 141 | Iraq | Western Asia | 0.3334 | 0.3551 | 0.1647 | 0.4803 |
| 20 | Israel | Western Asia | 0.7806 | 0.8623 | 0.6175 | 0.8619 |
| 11 | Japan | Eastern Asia | 0.8440 | 0.8768 | 0.8277 | 0.8274 |
| 91 | Jordan | Western Asia | 0.5123 | 0.4565 | 0.3458 | 0.7344 |
| 33 | Kazakhstan | Central Asia | 0.7250 | 0.7681 | 0.5668 | 0.8401 |
| 40 | Kuwait | Western Asia | 0.7080 | 0.6522 | 0.7430 | 0.7287 |
| 97 | Kyrgyzstan | Central Asia | 0.4969 | 0.4275 | 0.3123 | 0.7508 |
| 148 | Lao People's Democratic Republic | South-Eastern Asia | 0.3090 | 0.2826 | 0.1537 | 0.4907 |
| 73 | Lebanon | Western Asia | 0.5646 | 0.5145 | 0.4911 | 0.6882 |
| 60 | Malaysia | South-Eastern Asia | 0.6175 | 0.7174 | 0.4397 | 0.6953 |
| 117 | Maldives | Southern Asia | 0.4330 | 0.2319 | 0.4370 | 0.6301 |
| 84 | Mongolia | Eastern Asia | 0.5194 | 0.5145 | 0.2841 | 0.7597 |
| 169 | Myanmar | South-Eastern Asia | 0.2362 | 0.1594 | 0.0655 | 0.4837 |
| 135 | Nepal | Southern Asia | 0.3458 | 0.3986 | 0.1675 | 0.4714 |
| 66 | Oman | Western Asia | 0.5962 | 0.5942 | 0.5147 | 0.6796 |
| 159 | Pakistan | Southern Asia | 0.2583 | 0.3261 | 0.1299 | 0.3190 |
| 71 | Philippines | South-Eastern Asia | 0.5765 | 0.6667 | 0.3791 | 0.6839 |
| 48 | Qatar | Western Asia | 0.6699 | 0.6739 | 0.6041 | 0.7317 |
| 3 | Republic of Korea | Eastern Asia | 0.8915 | 0.9420 | 0.8530 | 0.8795 |
| 44 | Saudi Arabia | Western Asia | 0.6822 | 0.6739 | 0.5733 | 0.7995 |
| 4 | Singapore | South-Eastern Asia | 0.8828 | 0.9710 | 0.8414 | 0.8360 |
| 79 | Sri Lanka | Southern Asia | 0.5445 | 0.6522 | 0.2445 | 0.7369 |
| 137 | Syrian Arab Republic | Western Asia | 0.3404 | 0.3261 | 0.2087 | 0.4864 |
| 139 | Tajikistan | Central Asia | 0.3366 | 0.1232 | 0.1866 | 0.7001 |
| 77 | Thailand | South-Eastern Asia | 0.5522 | 0.5507 | 0.4117 | 0.6942 |
| 160 | Timor-Leste | South-Eastern Asia | 0.2582 | 0.2174 | 0.0728 | 0.4843 |
| 68 | Turkey | Western Asia | 0.5900 | 0.6014 | 0.3775 | 0.7910 |

Table 6. E-Government Development Index (EGDI) by region - ASIA (continued)

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 140 | Turkmenistan | Central Asia | 0.3337 | 0.0870 | 0.2559 | 0.6583 |
| 29 | United Arab Emirates | Western Asia | 0.7515 | 0.8913 | 0.6881 | 0.6752 |
| 80 | Uzbekistan | Central Asia | 0.5434 | 0.6884 | 0.2463 | 0.6954 |
| 89 | Viet Nam | South-Eastern Asia | 0.5143 | 0.5725 | 0.3715 | 0.5989 |
| 174 | Yemen | Western Asia | 0.2248 | 0.1449 | 0.1465 | 0.3829 |
| | **Regional Average (ASIA)** | | **0.5132** | **0.5120** | **0.3730** | **0.6545** |

## Table 7. E-Government Development Index (EGDI) by region - EUROPE

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 82 | Albania | Southern Europe | 0.5331 | 0.5942 | 0.3530 | 0.6520 |
| 55 | Andorra | Southern Europe | 0.6302 | 0.5072 | 0.6855 | 0.6978 |
| 16 | Austria | Western Europe | 0.8208 | 0.9130 | 0.7098 | 0.8396 |
| 49 | Belarus | Eastern Europe | 0.6625 | 0.4855 | 0.6304 | 0.8716 |
| 19 | Belgium | Western Europe | 0.7874 | 0.7101 | 0.6808 | 0.9712 |
| 92 | Bosnia and Herzegovina | Southern Europe | 0.5118 | 0.4493 | 0.4047 | 0.6815 |
| 52 | Bulgaria | Eastern Europe | 0.6376 | 0.5652 | 0.5602 | 0.7875 |
| 37 | Croatia | Southern Europe | 0.7162 | 0.7464 | 0.5974 | 0.8050 |
| 50 | Czech Republic | Eastern Europe | 0.6454 | 0.4783 | 0.5952 | 0.8627 |
| 9 | Denmark | Northern Europe | 0.8510 | 0.7754 | 0.8247 | 0.9530 |
| 13 | Estonia | Northern Europe | 0.8334 | 0.8913 | 0.7329 | 0.8761 |
| 5 | Finland | Northern Europe | 0.8817 | 0.9420 | 0.7590 | 0.9440 |
| 10 | France | Western Europe | 0.8456 | 0.9420 | 0.7502 | 0.8445 |
| 15 | Germany | Western Europe | 0.8210 | 0.8406 | 0.7342 | 0.8882 |
| 43 | Greece | Southern Europe | 0.6910 | 0.5797 | 0.6032 | 0.8901 |
| 46 | Hungary | Eastern Europe | 0.6745 | 0.6304 | 0.5615 | 0.8317 |
| 27 | Iceland | Northern Europe | 0.7662 | 0.6232 | 0.7814 | 0.8940 |
| 26 | Ireland | Northern Europe | 0.7689 | 0.7246 | 0.6602 | 0.9218 |
| 22 | Italy | Southern Europe | 0.7764 | 0.8696 | 0.6469 | 0.8126 |
| 45 | Latvia | Northern Europe | 0.6810 | 0.6087 | 0.5831 | 0.8512 |
| 32 | Liechtenstein | Western Europe | 0.7313 | 0.6667 | 0.7293 | 0.7978 |
| 23 | Lithuania | Northern Europe | 0.7747 | 0.8261 | 0.6262 | 0.8717 |
| 25 | Luxembourg | Western Europe | 0.7705 | 0.7174 | 0.8190 | 0.7750 |
| 30 | Malta | Southern Europe | 0.7424 | 0.7971 | 0.6992 | 0.7310 |
| 31 | Monaco | Western Europe | 0.7315 | 0.3188 | 1.0000 | 0.8757 |
| 47 | Montenegro | Southern Europe | 0.6733 | 0.6812 | 0.5221 | 0.8165 |
| 7 | Netherlands | Western Europe | 0.8659 | 0.9275 | 0.7517 | 0.9183 |
| 18 | Norway | Northern Europe | 0.8117 | 0.8043 | 0.7276 | 0.9031 |
| 36 | Poland | Eastern Europe | 0.7211 | 0.7029 | 0.5857 | 0.8747 |
| 38 | Portugal | Southern Europe | 0.7144 | 0.7464 | 0.5838 | 0.8129 |
| 65 | Republic of Moldova | Eastern Europe | 0.5994 | 0.5942 | 0.4850 | 0.7191 |
| 75 | Romania | Eastern Europe | 0.5611 | 0.4565 | 0.4533 | 0.7736 |
| 35 | Russian Federation | Eastern Europe | 0.7215 | 0.7319 | 0.6091 | 0.8234 |
| 78 | San Marino | Southern Europe | 0.5506 | 0.2391 | 0.6128 | 0.7999 |
| 39 | Serbia | Southern Europe | 0.7131 | 0.8188 | 0.5434 | 0.7769 |
| 67 | Slovakia | Eastern Europe | 0.5915 | 0.4420 | 0.5504 | 0.7822 |
| 21 | Slovenia | Southern Europe | 0.7769 | 0.8478 | 0.5877 | 0.8952 |
| 17 | Spain | Southern Europe | 0.8135 | 0.9130 | 0.6493 | 0.8782 |
| 6 | Sweden | Northern Europe | 0.8704 | 0.8768 | 0.8134 | 0.9210 |
| 28 | Switzerland | Western Europe | 0.7525 | 0.6014 | 0.7980 | 0.8579 |
| 69 | The former Yugoslav Republic of Macedonia | Southern Europe | 0.5885 | 0.6087 | 0.4693 | 0.6877 |

Table 7. E-Government Development Index (EGDI) by region - EUROPE (continued)

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 62 | Ukraine | Eastern Europe | 0.6076 | 0.5870 | 0.3968 | 0.8390 |
| 1 | United Kingdom of Great Britain and Northern Ireland | Northern Europe | 0.9193 | 1.0000 | 0.8177 | 0.9402 |
| | **Regional Average (EUROPE)** | | **0.7241** | **0.6926** | **0.6438** | **0.8360** |

Table 8. E-Government Development Index (EGDI) by region - OCEANIA

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 2 | Australia | Oceania | 0.9143 | 0.9783 | 0.7646 | 1.0000 |
| 96 | Fiji | Oceania | 0.4989 | 0.4130 | 0.3326 | 0.7509 |
| 145 | Kiribati | Oceania | 0.3122 | 0.2101 | 0.0665 | 0.6599 |
| 156 | Marshall Islands | Oceania | 0.2695 | 0.0290 | 0.0849 | 0.6947 |
| 146 | Micronesia (Federated States of) | Oceania | 0.3103 | 0.1449 | 0.1197 | 0.6663 |
| 152 | Nauru | Oceania | 0.2868 | 0.0942 | 0.2448 | 0.5214 |
| 8 | New Zealand | Oceania | 0.8653 | 0.9420 | 0.7136 | 0.9402 |
| 111 | Palau | Oceania | 0.4546 | 0.1087 | 0.3684 | 0.8867 |
| 179 | Papua New Guinea | Oceania | 0.1882 | 0.1667 | 0.0739 | 0.3240 |
| 121 | Samoa | Oceania | 0.4019 | 0.3406 | 0.1576 | 0.7076 |
| 164 | Solomon Islands | Oceania | 0.2406 | 0.1667 | 0.1150 | 0.4402 |
| 105 | Tonga | Oceania | 0.4700 | 0.3696 | 0.2302 | 0.8102 |
| 151 | Tuvalu | Oceania | 0.2950 | 0.0217 | 0.1981 | 0.6651 |
| 149 | Vanuatu | Oceania | 0.3078 | 0.1667 | 0.1684 | 0.5884 |
| | **Regional Average (OCEANIA)** | | **0.4154** | **0.2966** | **0.2599** | **0.6897** |

## Table 9. E-Government Development Index (EGDI) of Least Developed Countries (LDCs)

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 171 | Afghanistan | Southern Asia | 0.2313 | 0.3043 | 0.1066 | 0.2830 |
| 142 | Angola | Central Africa | 0.3311 | 0.3478 | 0.1441 | 0.5015 |
| 124 | Bangladesh | Southern Asia | 0.3799 | 0.6232 | 0.1193 | 0.3973 |
| 177 | Benin | West Africa | 0.2039 | 0.1449 | 0.1471 | 0.3196 |
| 133 | Bhutan | Southern Asia | 0.3506 | 0.3188 | 0.2192 | 0.5139 |
| 185 | Burkina Faso | West Africa | 0.1598 | 0.1884 | 0.1232 | 0.1677 |
| 173 | Burundi | Eastern Africa | 0.2277 | 0.1522 | 0.0331 | 0.4979 |
| 158 | Cambodia | South-Eastern Asia | 0.2593 | 0.0507 | 0.2486 | 0.4785 |
| 191 | Central African Republic | Central Africa | 0.0789 | 0.0000 | 0.0381 | 0.1985 |
| 188 | Chad | Central Africa | 0.1256 | 0.1377 | 0.0476 | 0.1917 |
| 176 | Comoros | Eastern Africa | 0.2155 | 0.0507 | 0.1073 | 0.4885 |
| 180 | Democratic Republic of the Congo | Central Africa | 0.1876 | 0.0870 | 0.0788 | 0.3970 |
| 187 | Djibouti | Eastern Africa | 0.1337 | 0.0217 | 0.0698 | 0.3095 |
| 165 | Equatorial Guinea | Central Africa | 0.2403 | 0.0797 | 0.1237 | 0.5174 |
| 190 | Eritrea | Eastern Africa | 0.0902 | 0.0217 | 0.0000 | 0.2487 |
| 157 | Ethiopia | Eastern Africa | 0.2666 | 0.5290 | 0.0495 | 0.2212 |
| 167 | Gambia | West Africa | 0.2396 | 0.1957 | 0.1959 | 0.3274 |
| 189 | Guinea | West Africa | 0.1226 | 0.0870 | 0.0906 | 0.1903 |
| 181 | Guinea-Bissau | West Africa | 0.1818 | 0.1087 | 0.0828 | 0.3538 |
| 178 | Haiti | Caribbean | 0.1931 | 0.1667 | 0.1004 | 0.3124 |
| 145 | Kiribati | Oceania | 0.3122 | 0.2101 | 0.0665 | 0.6599 |
| 148 | Lao People's Democratic Republic | South-Eastern Asia | 0.3090 | 0.2826 | 0.1537 | 0.4907 |
| 154 | Lesotho | Southern Africa | 0.2770 | 0.1377 | 0.1787 | 0.5147 |
| 170 | Liberia | West Africa | 0.2338 | 0.2391 | 0.1041 | 0.3581 |
| 163 | Madagascar | Eastern Africa | 0.2416 | 0.2246 | 0.0514 | 0.4488 |
| 166 | Malawi | Eastern Africa | 0.2398 | 0.2174 | 0.0485 | 0.4535 |
| 182 | Mali | West Africa | 0.1817 | 0.0942 | 0.2149 | 0.2358 |
| 184 | Mauritania | West Africa | 0.1734 | 0.0652 | 0.1536 | 0.3015 |
| 172 | Mozambique | Eastern Africa | 0.2305 | 0.2029 | 0.0993 | 0.3893 |
| 169 | Myanmar | South-Eastern Asia | 0.2362 | 0.1594 | 0.0655 | 0.4837 |
| 135 | Nepal | Southern Asia | 0.3458 | 0.3986 | 0.1675 | 0.4714 |
| 192 | Niger | West Africa | 0.0593 | 0.0725 | 0.0557 | 0.0498 |
| 138 | Rwanda | Eastern Africa | 0.3390 | 0.4565 | 0.1084 | 0.4522 |
| 168 | Sao Tome and Principe | Central Africa | 0.2390 | 0.0435 | 0.1547 | 0.5188 |
| 144 | Senegal | West Africa | 0.3250 | 0.3768 | 0.1958 | 0.4025 |
| 186 | Sierra Leone | West Africa | 0.1594 | 0.1159 | 0.1216 | 0.2407 |
| 164 | Solomon Islands | Oceania | 0.2406 | 0.1667 | 0.1150 | 0.4402 |
| 193 | Somalia | Eastern Africa | 0.0270 | 0.0145 | 0.0665 | 0.0000 |
| 183 | South Sudan | Northern Africa | 0.1791 | 0.1232 | 0.0534 | 0.3607 |
| 161 | Sudan | Northern Africa | 0.2539 | 0.2174 | 0.1861 | 0.3581 |
| 160 | Timor-Leste | South-Eastern Asia | 0.2582 | 0.2174 | 0.0728 | 0.4843 |
| 147 | Togo | West Africa | 0.3096 | 0.3188 | 0.1044 | 0.5056 |

Table 9. E-Government Development Index (EGDI) of Least Developed Countries (LDCs) (continued)

| Rank | Country | Sub-region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 151 | Tuvalu | Oceania | 0.2950 | 0.0217 | 0.1981 | 0.6651 |
| 128 | Uganda | Eastern Africa | 0.3599 | 0.5000 | 0.1129 | 0.4668 |
| 130 | United Republic of Tanzania | Eastern Africa | 0.3533 | 0.5725 | 0.0900 | 0.3974 |
| 149 | Vanuatu | Oceania | 0.3078 | 0.1667 | 0.1684 | 0.5884 |
| 174 | Yemen | Western Asia | 0.2248 | 0.1449 | 0.1465 | 0.3829 |
| 132 | Zambia | Eastern Africa | 0.3507 | 0.3696 | 0.1182 | 0.5643 |
| | **LDCs Average** | | **0.2350** | **0.2030** | **0.1145** | **0.3875** |

## Table 10. E-Government Development Index (EGDI) of Small Island Developing States (SIDS)

| Rank | Country | Sub-Region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 100 | Antigua and Barbuda | Caribbean | 0.4892 | 0.1812 | 0.5412 | 0.7453 |
| 93 | Bahamas | Caribbean | 0.5108 | 0.4275 | 0.3842 | 0.7207 |
| 54 | Barbados | Caribbean | 0.6310 | 0.4420 | 0.6397 | 0.8113 |
| 122 | Belize | Central America | 0.3825 | 0.3188 | 0.1834 | 0.6454 |
| 103 | Cape Verde | West Africa | 0.4742 | 0.4565 | 0.3629 | 0.6031 |
| 176 | Comoros | Eastern Africa | 0.2155 | 0.0507 | 0.1073 | 0.4885 |
| 131 | Cuba | Caribbean | 0.3522 | 0.1957 | 0.1103 | 0.7507 |
| 109 | Dominica | Caribbean | 0.4577 | 0.3043 | 0.4305 | 0.6384 |
| 98 | Dominican Republica | Caribbean | 0.4914 | 0.5072 | 0.2992 | 0.6676 |
| 96 | Fiji | Oceania | 0.4989 | 0.4130 | 0.3326 | 0.7509 |
| 88 | Grenada | Caribbean | 0.5168 | 0.3696 | 0.3988 | 0.7820 |
| 181 | Guinea-Bissau | West Africa | 0.1818 | 0.1087 | 0.0828 | 0.3538 |
| 126 | Guyana | South America | 0.3651 | 0.2826 | 0.2432 | 0.5694 |
| 178 | Haiti | Caribbean | 0.1931 | 0.1667 | 0.1004 | 0.3124 |
| 112 | Jamaica | Caribbean | 0.4534 | 0.3551 | 0.3193 | 0.6859 |
| 145 | Kiribati | Oceania | 0.3122 | 0.2101 | 0.0665 | 0.6599 |
| 117 | Maldives | Southern Asia | 0.4330 | 0.2319 | 0.4370 | 0.6301 |
| 156 | Marshall Islands | Oceania | 0.2695 | 0.0290 | 0.0849 | 0.6947 |
| 58 | Mauritius | Eastern Africa | 0.6231 | 0.7029 | 0.4596 | 0.7067 |
| 146 | Micronesia (Federated States of) | Oceania | 0.3103 | 0.1449 | 0.1197 | 0.6663 |
| 152 | Nauru | Oceania | 0.2868 | 0.0942 | 0.2448 | 0.5214 |
| 111 | Palau | Oceania | 0.4546 | 0.1087 | 0.3684 | 0.8867 |
| 179 | Papua New Guinea | Oceania | 0.1882 | 0.1667 | 0.0739 | 0.3240 |
| 94 | Saint Kitts and Nevis | Caribbean | 0.5034 | 0.2826 | 0.5301 | 0.6976 |
| 114 | Saint Lucia | Caribbean | 0.4531 | 0.2754 | 0.4094 | 0.6744 |
| 115 | Saint Vincent and the Grenadines | Caribbean | 0.4494 | 0.2971 | 0.3756 | 0.6754 |
| 121 | Samoa | Oceania | 0.4019 | 0.3406 | 0.1576 | 0.7076 |
| 168 | Sao Tome and Principe | Central Africa | 0.2390 | 0.0435 | 0.1547 | 0.5188 |
| 86 | Seychelles | Eastern Africa | 0.5181 | 0.4058 | 0.4624 | 0.6861 |
| 4 | Singapore | South-Eastern Asia | 0.8828 | 0.9710 | 0.8414 | 0.8360 |
| 164 | Solomon Islands | Oceania | 0.2406 | 0.1667 | 0.1150 | 0.4402 |
| 110 | Suriname | South America | 0.4546 | 0.2971 | 0.4116 | 0.6551 |
| 160 | Timor-Leste | South-Eastern Asia | 0.2582 | 0.2174 | 0.0728 | 0.4843 |
| 105 | Tonga | Oceania | 0.4700 | 0.3696 | 0.2302 | 0.8102 |
| 70 | Trinidad and Tobago | Caribbean | 0.5780 | 0.5290 | 0.4973 | 0.7077 |
| 151 | Tuvalu | Oceania | 0.2950 | 0.0217 | 0.1981 | 0.6651 |
| 149 | Vanuatu | Oceania | 0.3078 | 0.1667 | 0.1684 | 0.5884 |
| | **SIDS Average** | | **0.4093** | **0.2879** | **0.2977** | **0.6422** |

Table 11. E-Government Development Index (EGDI) of Landlocked Developing Countries (LLDCs)

| Rank | Country | Sub-Region | EGDI | Online Service Component | Telecomm. Infrastructure Component | Human Capital Component |
|---|---|---|---|---|---|---|
| 171 | Afghanistan | Southern Asia | 0.2313 | 0.3043 | 0.1066 | 0.2830 |
| 87 | Armenia | Western Asia | 0.5179 | 0.4275 | 0.3922 | 0.7338 |
| 56 | Azerbaijan | Western Asia | 0.6274 | 0.6812 | 0.4852 | 0.7158 |
| 133 | Bhutan | Southern Asia | 0.3506 | 0.3188 | 0.2192 | 0.5139 |
| 101 | Bolivia | South America | 0.4821 | 0.4928 | 0.2532 | 0.7004 |
| 113 | Botswana | Southern Africa | 0.4531 | 0.2826 | 0.4215 | 0.6553 |
| 185 | Burkina Faso | West Africa | 0.1598 | 0.1884 | 0.1232 | 0.1677 |
| 173 | Burundi | Eastern Africa | 0.2277 | 0.1522 | 0.0331 | 0.4979 |
| 191 | Central African Republic | Central Africa | 0.0789 | 0.0000 | 0.0381 | 0.1985 |
| 188 | Chad | Central Africa | 0.1256 | 0.1377 | 0.0476 | 0.1917 |
| 157 | Ethiopia | Eastern Africa | 0.2666 | 0.5290 | 0.0495 | 0.2212 |
| 33 | Kazakhstan | Central Asia | 0.7250 | 0.7681 | 0.5668 | 0.8401 |
| 97 | Kyrgyzstan | Central Asia | 0.4969 | 0.4275 | 0.3123 | 0.7508 |
| 148 | Lao People's Democratic Republic | South-Eastern Asia | 0.3090 | 0.2826 | 0.1537 | 0.4907 |
| 154 | Lesotho | Southern Africa | 0.2770 | 0.1377 | 0.1787 | 0.5147 |
| 166 | Malawi | Eastern Africa | 0.2398 | 0.2174 | 0.0485 | 0.4535 |
| 182 | Mali | West Africa | 0.1817 | 0.0942 | 0.2149 | 0.2358 |
| 84 | Mongolia | Eastern Asia | 0.5194 | 0.5145 | 0.2841 | 0.7597 |
| 135 | Nepal | Southern Asia | 0.3458 | 0.3986 | 0.1675 | 0.4714 |
| 192 | Niger | West Africa | 0.0593 | 0.0725 | 0.0557 | 0.0498 |
| 95 | Paraguay | South America | 0.4989 | 0.6014 | 0.2544 | 0.6409 |
| 65 | Republic of Moldova | Eastern Europe | 0.5994 | 0.5942 | 0.4850 | 0.7191 |
| 138 | Rwanda | Eastern Africa | 0.3390 | 0.4565 | 0.1084 | 0.4522 |
| 183 | South Sudan | Northern Africa | 0.1791 | 0.1232 | 0.0534 | 0.3607 |
| 136 | Swaziland | Southern Africa | 0.3412 | 0.2754 | 0.1601 | 0.5882 |
| 139 | Tajikistan | Central Asia | 0.3366 | 0.1232 | 0.1866 | 0.7001 |
| 69 | The former Yugoslav Republic of Macedonia | Southern Europe | 0.5885 | 0.6087 | 0.4693 | 0.6877 |
| 140 | Turkmenistan | Central Asia | 0.3337 | 0.0870 | 0.2559 | 0.6583 |
| 128 | Uganda | Eastern Africa | 0.3599 | 0.5000 | 0.1129 | 0.4668 |
| 80 | Uzbekistan | Central Asia | 0.5434 | 0.6884 | 0.2463 | 0.6954 |
| 132 | Zambia | Eastern Africa | 0.3507 | 0.3696 | 0.1182 | 0.5643 |
| 134 | Zimbabwe | Eastern Africa | 0.3472 | 0.2609 | 0.2167 | 0.5641 |
| | **LLDCs Average** | | **0.3591** | **0.3474** | **0.2131** | **0.5170** |

## Table 12. E-Participation Index (EPI) and its utilisation by stages

| Rank | Country | EPI | Total % | Stage 1 % | Stage 2% | Stage 3% |
|---|---|---|---|---|---|---|
| 104 | Afghanistan | 0.4237 | 43.3% | 61.8% | 26.3% | 0.0% |
| 55 | Albania | 0.6441 | 65.0% | 73.5% | 68.4% | 14.3% |
| 167 | Algeria | 0.1186 | 13.3% | 17.6% | 10.5% | 0.0% |
| 101 | Andorra | 0.4407 | 45.0% | 64.7% | 26.3% | 0.0% |
| 101 | Angola | 0.4407 | 45.0% | 70.6% | 15.8% | 0.0% |
| 157 | Antigua and Barbuda | 0.1695 | 18.3% | 26.5% | 10.5% | 0.0% |
| 60 | Argentina | 0.6271 | 63.3% | 88.2% | 42.1% | 0.0% |
| 84 | Armenia | 0.5254 | 53.3% | 70.6% | 42.1% | 0.0% |
| 2 | Australia | 0.9831 | 98.3% | 100.0% | 100.0% | 85.7% |
| 14 | Austria | 0.8814 | 88.3% | 94.1% | 84.2% | 71.4% |
| 47 | Azerbaijan | 0.6780 | 68.3% | 79.4% | 73.7% | 0.0% |
| 122 | Bahamas | 0.3390 | 35.0% | 47.1% | 21.1% | 14.3% |
| 32 | Bahrain | 0.7458 | 75.0% | 85.3% | 73.7% | 28.6% |
| 84 | Bangladesh | 0.5254 | 53.3% | 73.5% | 36.8% | 0.0% |
| 104 | Barbados | 0.4237 | 43.3% | 50.0% | 42.1% | 14.3% |
| 76 | Belarus | 0.5593 | 56.7% | 61.8% | 68.4% | 0.0% |
| 55 | Belgium | 0.6441 | 65.0% | 85.3% | 52.6% | 0.0% |
| 138 | Belize | 0.2542 | 26.7% | 38.2% | 15.8% | 0.0% |
| 157 | Benin | 0.1695 | 18.3% | 23.5% | 15.8% | 0.0% |
| 118 | Bhutan | 0.3559 | 36.7% | 47.1% | 31.6% | 0.0% |
| 72 | Bolivia | 0.5763 | 58.3% | 76.5% | 47.4% | 0.0% |
| 89 | Bosnia and Herzegovina | 0.5085 | 51.7% | 70.6% | 36.8% | 0.0% |
| 127 | Botswana | 0.2881 | 30.0% | 38.2% | 21.1% | 14.3% |
| 37 | Brazil | 0.7288 | 73.3% | 85.3% | 78.9% | 0.0% |
| 114 | Brunei | 0.3729 | 38.3% | 50.0% | 31.6% | 0.0% |
| 43 | Bulgaria | 0.6949 | 70.0% | 76.5% | 78.9% | 14.3% |
| 143 | Burkina Faso | 0.2373 | 25.0% | 38.2% | 10.5% | 0.0% |
| 161 | Burundi | 0.1525 | 16.7% | 23.5% | 5.3% | 14.3% |
| 179 | Cambodia | 0.0678 | 8.3% | 14.7% | 0.0% | 0.0% |
| 157 | Cameroon | 0.1695 | 18.3% | 23.5% | 15.8% | 0.0% |
| 8 | Canada | 0.9153 | 91.7% | 97.1% | 84.2% | 85.7% |
| 97 | Cape Verde | 0.4746 | 48.3% | 67.6% | 31.6% | 0.0% |
| 191 | Central African Republic | 0.0000 | 1.7% | 2.9% | 0.0% | 0.0% |
| 161 | Chad | 0.1525 | 16.7% | 26.5% | 5.3% | 0.0% |
| 32 | Chile | 0.7458 | 75.0% | 82.4% | 78.9% | 28.6% |
| 22 | China | 0.8136 | 81.7% | 94.1% | 84.2% | 14.3% |
| 27 | Colombia | 0.7627 | 76.7% | 85.3% | 78.9% | 28.6% |
| 188 | Comoros | 0.0169 | 3.3% | 2.9% | 5.3% | 0.0% |
| 173 | Congo, Republic of | 0.0847 | 10.0% | 11.8% | 10.5% | 0.0% |
| 55 | Costa Rica | 0.6441 | 65.0% | 70.6% | 78.9% | 0.0% |
| 161 | Cote d'Ivoire | 0.1525 | 16.7% | 20.6% | 15.8% | 0.0% |
| 25 | Croatia | 0.7797 | 78.3% | 73.5% | 89.5% | 71.4% |
| 124 | Cuba | 0.3220 | 33.3% | 55.9% | 5.3% | 0.0% |
| 84 | Cyprus | 0.5254 | 53.3% | 58.8% | 57.9% | 14.3% |
| 76 | Czech Republic | 0.5593 | 56.7% | 73.5% | 42.1% | 14.3% |

Table 12. E-Participation Index (EPI) and its utilisation by stages (continued)

| Rank | Country | EPI | Total % | Stage 1 % | Stage 2% | Stage 3% |
|---|---|---|---|---|---|---|
| 188 | Democratic People's Republic of Korea | 0.0169 | 3.3% | 5.9% | 0.0% | 0.0% |
| 173 | Democratic Republic of the Congo | 0.0847 | 10.0% | 14.7% | 5.3% | 0.0% |
| 22 | Denmark | 0.8136 | 81.7% | 94.1% | 63.2% | 71.4% |
| 191 | Djibouti | 0.0000 | 1.7% | 2.9% | 0.0% | 0.0% |
| 156 | Dominica | 0.1864 | 20.0% | 29.4% | 10.5% | 0.0% |
| 91 | Dominican Republic | 0.4915 | 50.0% | 70.6% | 31.6% | 0.0% |
| 72 | Ecuador | 0.5763 | 58.3% | 70.6% | 57.9% | 0.0% |
| 107 | Egypt | 0.4068 | 41.7% | 55.9% | 31.6% | 0.0% |
| 76 | El Salvador | 0.5593 | 56.7% | 67.6% | 57.9% | 0.0% |
| 173 | Equatorial Guinea | 0.0847 | 10.0% | 17.6% | 0.0% | 0.0% |
| 188 | Eritrea | 0.0169 | 3.3% | 5.9% | 0.0% | 0.0% |
| 22 | Estonia | 0.8136 | 81.7% | 94.1% | 89.5% | 0.0% |
| 91 | Ethiopia | 0.4915 | 50.0% | 61.8% | 47.4% | 0.0% |
| 127 | Fiji | 0.2881 | 30.0% | 38.2% | 21.1% | 14.3% |
| 8 | Finland | 0.9153 | 91.7% | 97.1% | 89.5% | 71.4% |
| 12 | France | 0.8983 | 90.0% | 100.0% | 84.2% | 57.1% |
| 179 | Gabon | 0.0678 | 8.3% | 11.8% | 5.3% | 0.0% |
| 149 | Gambia | 0.2034 | 21.7% | 32.4% | 10.5% | 0.0% |
| 76 | Georgia | 0.5593 | 56.7% | 73.5% | 47.4% | 0.0% |
| 27 | Germany | 0.7627 | 76.7% | 91.2% | 78.9% | 0.0% |
| 98 | Ghana | 0.4576 | 46.7% | 55.9% | 47.4% | 0.0% |
| 65 | Greece | 0.6102 | 61.7% | 58.8% | 78.9% | 28.6% |
| 124 | Grenada | 0.3220 | 33.3% | 35.3% | 36.8% | 14.3% |
| 60 | Guatemala | 0.6271 | 63.3% | 76.5% | 63.2% | 0.0% |
| 173 | Guinea | 0.0847 | 10.0% | 11.8% | 10.5% | 0.0% |
| 157 | Guinea-Bissau | 0.1695 | 18.3% | 29.4% | 5.3% | 0.0% |
| 138 | Guyana | 0.2542 | 26.7% | 29.4% | 26.3% | 14.3% |
| 164 | Haiti | 0.1356 | 15.0% | 17.6% | 15.8% | 0.0% |
| 111 | Honduras | 0.3898 | 40.0% | 47.1% | 42.1% | 0.0% |
| 91 | Hungary | 0.4915 | 50.0% | 67.6% | 36.8% | 0.0% |
| 50 | Iceland | 0.6610 | 66.7% | 79.4% | 68.4% | 0.0% |
| 27 | India | 0.7627 | 76.7% | 79.4% | 94.7% | 14.3% |
| 114 | Indonesia | 0.3729 | 38.3% | 41.2% | 47.4% | 0.0% |
| 149 | Iran (Islamic Rep. of) | 0.2034 | 21.7% | 29.4% | 15.8% | 0.0% |
| 104 | Iraq | 0.4237 | 43.3% | 61.8% | 26.3% | 0.0% |
| 39 | Ireland | 0.7119 | 71.7% | 88.2% | 68.4% | 0.0% |
| 17 | Israel | 0.8305 | 83.3% | 91.2% | 89.5% | 28.6% |
| 8 | Italy | 0.9153 | 91.7% | 94.1% | 94.7% | 71.4% |
| 133 | Jamaica | 0.2712 | 28.3% | 35.3% | 26.3% | 0.0% |
| 2 | Japan | 0.9831 | 98.3% | 100.0% | 94.7% | 100.0% |
| 98 | Jordan | 0.4576 | 46.7% | 55.9% | 47.4% | 0.0% |
| 67 | Kazakhstan | 0.5932 | 60.0% | 82.4% | 42.1% | 0.0% |
| 84 | Kenya | 0.5254 | 53.3% | 70.6% | 42.1% | 0.0% |
| 138 | Kiribati | 0.2542 | 26.7% | 35.3% | 21.1% | 0.0% |
| 55 | Kuwait | 0.6441 | 65.0% | 82.4% | 57.9% | 0.0% |

Table 12. E-Participation Index (EPI) and its utilisation by stages (continued)

| Rank | Country | EPI | Total % | Stage 1 % | Stage 2% | Stage 3% |
|---|---|---|---|---|---|---|
| 67 | Kyrgyzstan | 0.5932 | 60.0% | 58.8% | 68.4% | 42.9% |
| 133 | Lao | 0.2712 | 28.3% | 35.3% | 26.3% | 0.0% |
| 84 | Latvia | 0.5254 | 53.3% | 58.8% | 57.9% | 14.3% |
| 91 | Lebanon | 0.4915 | 50.0% | 70.6% | 31.6% | 0.0% |
| 167 | Lesotho | 0.1186 | 13.3% | 17.6% | 10.5% | 0.0% |
| 127 | Liberia | 0.2881 | 30.0% | 38.2% | 26.3% | 0.0% |
| 170 | Libya | 0.1017 | 11.7% | 17.6% | 5.3% | 0.0% |
| 60 | Liechtenstein | 0.6271 | 63.3% | 85.3% | 47.4% | 0.0% |
| 17 | Lithuania | 0.8305 | 83.3% | 91.2% | 89.5% | 28.6% |
| 43 | Luxembourg | 0.6949 | 70.0% | 82.4% | 63.2% | 28.6% |
| 149 | Madagascar | 0.2034 | 21.7% | 26.5% | 21.1% | 0.0% |
| 127 | Malawi | 0.2881 | 30.0% | 47.1% | 10.5% | 0.0% |
| 47 | Malaysia | 0.6780 | 68.3% | 79.4% | 73.7% | 0.0% |
| 146 | Maldives | 0.2203 | 23.3% | 29.4% | 21.1% | 0.0% |
| 179 | Mali | 0.0678 | 8.3% | 14.7% | 0.0% | 0.0% |
| 25 | Malta | 0.7797 | 78.3% | 61.8% | 100.0% | 100.0% |
| 184 | Marshall Islands | 0.0508 | 6.7% | 8.8% | 5.3% | 0.0% |
| 184 | Mauritania | 0.0508 | 6.7% | 8.8% | 5.3% | 0.0% |
| 50 | Mauritus | 0.6610 | 66.7% | 91.2% | 47.4% | 0.0% |
| 14 | Mexico | 0.8814 | 88.3% | 97.1% | 94.7% | 28.6% |
| 146 | Micronesia (Federated States of) | 0.2203 | 23.3% | 41.2% | 0.0% | 0.0% |
| 127 | Monaco | 0.2881 | 30.0% | 41.2% | 21.1% | 0.0% |
| 39 | Mongolia | 0.7119 | 71.7% | 70.6% | 89.5% | 28.6% |
| 17 | Montenegro | 0.8305 | 83.3% | 85.3% | 84.2% | 71.4% |
| 17 | Morocco | 0.8305 | 83.3% | 85.3% | 100.0% | 28.6% |
| 149 | Mozambique | 0.2034 | 21.7% | 23.5% | 26.3% | 0.0% |
| 170 | Myanmar (ex-Birma) | 0.1017 | 11.7% | 11.8% | 15.8% | 0.0% |
| 143 | Namibia | 0.2373 | 25.0% | 38.2% | 10.5% | 0.0% |
| 173 | Nauru | 0.0847 | 10.0% | 14.7% | 5.3% | 0.0% |
| 89 | Nepal | 0.5085 | 51.7% | 58.8% | 57.9% | 0.0% |
| 5 | Netherlands | 0.9492 | 95.0% | 97.1% | 94.7% | 85.7% |
| 5 | New Zealand | 0.9492 | 95.0% | 97.1% | 94.7% | 85.7% |
| 107 | Nicaragua | 0.4068 | 41.7% | 52.9% | 36.8% | 0.0% |
| 173 | Niger | 0.0847 | 10.0% | 14.7% | 5.3% | 0.0% |
| 118 | Nigeria | 0.3559 | 36.7% | 41.2% | 42.1% | 0.0% |
| 27 | Norway | 0.7627 | 76.7% | 88.2% | 73.7% | 28.6% |
| 76 | Oman | 0.5593 | 56.7% | 73.5% | 47.4% | 0.0% |
| 114 | Pakistan | 0.3729 | 38.3% | 52.9% | 26.3% | 0.0% |
| 186 | Palau | 0.0339 | 5.0% | 5.9% | 5.3% | 0.0% |
| 114 | Panama | 0.3729 | 38.3% | 50.0% | 26.3% | 14.3% |
| 149 | Papau New Guinea | 0.2034 | 21.7% | 26.5% | 21.1% | 0.0% |
| 72 | Paraguay | 0.5763 | 58.3% | 70.6% | 57.9% | 0.0% |
| 82 | Peru | 0.5424 | 55.0% | 73.5% | 42.1% | 0.0% |
| 67 | Philippines | 0.5932 | 60.0% | 67.6% | 57.9% | 28.6% |
| 14 | Poland | 0.8814 | 88.3% | 91.2% | 89.5% | 71.4% |

Table 12. E-Participation Index (EPI) and its utilisation by stages (continued)

| Rank | Country | EPI | Total % | Stage 1 % | Stage 2% | Stage 3% |
|---|---|---|---|---|---|---|
| 50 | Portugal | 0.6610 | 66.7% | 85.3% | 57.9% | 0.0% |
| 55 | Qatar | 0.6441 | 65.0% | 67.6% | 73.7% | 28.6% |
| 4 | Republic of Korea | 0.9661 | 96.7% | 97.1% | 100.0% | 85.7% |
| 50 | Republic of Moldova | 0.6610 | 66.7% | 73.5% | 73.7% | 14.3% |
| 60 | Romania | 0.6271 | 63.3% | 70.6% | 57.9% | 42.9% |
| 32 | Russia | 0.7458 | 75.0% | 91.2% | 63.2% | 28.6% |
| 91 | Rwanda | 0.4915 | 50.0% | 67.6% | 36.8% | 0.0% |
| 133 | Saint Kitts and Nevis | 0.2712 | 28.3% | 35.3% | 26.3% | 0.0% |
| 143 | Saint Lucia | 0.2373 | 25.0% | 29.4% | 26.3% | 0.0% |
| 133 | Saint Vincent and the Grenadines | 0.2712 | 28.3% | 26.5% | 42.1% | 0.0% |
| 126 | Samoa | 0.3051 | 31.7% | 35.3% | 26.3% | 28.6% |
| 164 | San Marino | 0.1356 | 15.0% | 23.5% | 5.3% | 0.0% |
| 179 | São Tomé and Príncipe | 0.0678 | 8.3% | 14.7% | 0.0% | 0.0% |
| 39 | Saudi Arabia | 0.7119 | 71.7% | 79.4% | 73.7% | 28.6% |
| 111 | Senegal | 0.3898 | 40.0% | 52.9% | 31.6% | 0.0% |
| 17 | Serbia | 0.8305 | 83.3% | 91.2% | 78.9% | 57.1% |
| 107 | Seychelles | 0.4068 | 41.7% | 50.0% | 36.8% | 14.3% |
| 167 | Sierra Leone | 0.1186 | 13.3% | 20.6% | 5.3% | 0.0% |
| 8 | Singapore | 0.9153 | 91.7% | 94.1% | 100.0% | 57.1% |
| 82 | Slovakia | 0.5424 | 55.0% | 76.5% | 36.8% | 0.0% |
| 37 | Slovenia | 0.7288 | 73.3% | 94.1% | 63.2% | 0.0% |
| 146 | Solomon Islands | 0.2203 | 23.3% | 29.4% | 21.1% | 0.0% |
| 186 | Somalia | 0.0339 | 5.0% | 5.9% | 5.3% | 0.0% |
| 76 | South Africa | 0.5593 | 56.7% | 61.8% | 68.4% | 0.0% |
| 170 | South Sudan | 0.1017 | 11.7% | 17.6% | 5.3% | 0.0% |
| 7 | Spain | 0.9322 | 93.3% | 100.0% | 94.7% | 57.1% |
| 50 | Sri Lanka | 0.6610 | 66.7% | 79.4% | 63.2% | 14.3% |
| 138 | Sudan | 0.2542 | 26.7% | 41.2% | 10.5% | 0.0% |
| 122 | Suriname | 0.3390 | 35.0% | 50.0% | 21.1% | 0.0% |
| 138 | Swaziland | 0.2542 | 26.7% | 35.3% | 21.1% | 0.0% |
| 27 | Sweden | 0.7627 | 76.7% | 97.1% | 68.4% | 0.0% |
| 72 | Switzerland | 0.5763 | 58.3% | 70.6% | 52.6% | 14.3% |
| 98 | Syria | 0.4576 | 46.7% | 64.7% | 31.6% | 0.0% |
| 149 | Tajikistan | 0.2034 | 21.7% | 29.4% | 15.8% | 0.0% |
| 67 | Thailand | 0.5932 | 60.0% | 73.5% | 57.9% | 0.0% |
| 65 | The former Yugoslav Republic of Macedonia | 0.6102 | 61.7% | 73.5% | 63.2% | 0.0% |
| 133 | Timor-Leste | 0.2712 | 28.3% | 41.2% | 15.8% | 0.0% |
| 111 | Togo | 0.3898 | 40.0% | 52.9% | 31.6% | 0.0% |
| 118 | Tonga | 0.3559 | 36.7% | 50.0% | 26.3% | 0.0% |
| 101 | Trinidad and Tobago | 0.4407 | 45.0% | 55.9% | 42.1% | 0.0% |
| 43 | Tunisia | 0.6949 | 70.0% | 88.2% | 63.2% | 0.0% |
| 60 | Turkey | 0.6271 | 63.3% | 73.5% | 68.4% | 0.0% |
| 179 | Turkmenistan | 0.0678 | 8.3% | 14.7% | 0.0% | 0.0% |
| 191 | Tuvalu | 0.0000 | 1.7% | 2.9% | 0.0% | 0.0% |
| 91 | Uganda | 0.4915 | 50.0% | 73.5% | 26.3% | 0.0% |

Table 12. E-Participation Index (EPI) and its utilisation by stages (continued)

| Rank | Country | EPI | Total % | Stage 1 % | Stage 2% | Stage 3% |
|---|---|---|---|---|---|---|
| 32 | Ukraine | 0.7458 | 75.0% | 76.5% | 84.2% | 42.9% |
| 32 | United Arab Emirates | 0.7458 | 75.0% | 91.2% | 73.7% | 0.0% |
| 1 | United Kingdom | 1.0000 | 100.0% | 100.0% | 100.0% | 100.0% |
| 67 | United Republic of Tanzania | 0.5932 | 60.0% | 67.6% | 63.2% | 14.3% |
| 12 | United States | 0.8983 | 90.0% | 97.1% | 100.0% | 28.6% |
| 39 | Uruguay | 0.7119 | 71.7% | 91.2% | 57.9% | 14.3% |
| 47 | Uzbekistan | 0.6780 | 68.3% | 88.2% | 57.9% | 0.0% |
| 149 | Vanuatu | 0.2034 | 21.7% | 29.4% | 15.8% | 0.0% |
| 107 | Venezuela | 0.4068 | 41.7% | 44.1% | 52.6% | 0.0% |
| 43 | Vietnam | 0.6949 | 70.0% | 64.7% | 68.4% | 100.0% |
| 164 | Yemen | 0.1356 | 15.0% | 20.6% | 10.5% | 0.0% |
| 118 | Zambia | 0.3559 | 36.7% | 52.9% | 15.8% | 14.3% |
| 127 | Zimbabwe | 0.2881 | 30.0% | 47.1% | 10.5% | 0.0% |
| | **Global Average** | **0.4625** | **47.1%** | **56.4%** | **43.1%** | **12.9%** |

## Table 13. Regional and Economic Groupings for E-Participation Index (EPI)

| | EPI | Total | Stage 1 | Stage 2 | Stage 3 |
|---|---|---|---|---|---|
| Small island Developing States | 0.2868 | 29.90% | 38.30% | 23.80% | 5.30% |
| Land Locked Developing Countries | 0.3718 | 38.20% | 49.10% | 31.40% | 4.00% |
| Least Developed Countries | 0.2161 | 22.90% | 31.30% | 16.00% | 0.90% |
| | | | | | |
| High Income | 0.6952 | 70% | 79.40% | 67.50% | 31.70% |
| Upper Middle Income | 0.4440 | 45.30% | 55.60% | 41.10% | 6.90% |
| Lower Middle Income | 0.3943 | 40.40% | 49.30% | 36.80% | 7.10% |
| Low Income | 0.2227 | 23.60% | 31.90% | 17.10% | 0.80% |
| | | | | | |
| Africa | 0.2599 | 27.20% | 36.20% | 20.60% | 1.90% |
| Americas | 0.4765 | 48.50% | 58.70% | 45.10% | 8.20% |
| Asia | 0.5182 | 52.60% | 62.30% | 49.90% | 13.10% |
| Europe | 0.6985 | 70.30% | 80.10% | 67.90% | 29.60% |
| Oceania | 0.2966 | 30.80% | 36.80% | 25.90% | 15.30% |
| World | 0.4625 | 47.10% | 56.40% | 43.10% | 12.90% |

## Table 14. Telecommunication Infrastructure Index (TII) and its components

| Country | TII | Percentage of Individuals using the Internet | Fixed-telephone subscriptions per 100 inhabitants | Mobile-cellular telephone subscriptions per 100 inhabitants | Fixed (wired)-broadband subscriptions per 100 inhabitants | Wireless broadband subscriptions per 100 inhabitants |
|---|---|---|---|---|---|---|
| Afghanistan | 0.1066 | 6.39 | 0.33 | 74.88 | 0.00 | 1.20 |
| Albania | 0.3530 | 60.10 | 7.76 | 105.47 | 6.57 | 28.20 |
| Algeria | 0.1934 | 18.09 | 7.75 | 93.31 | 4.01 | 0.00 |
| Andorra | 0.6855 | 95.90 | 47.71 | 82.64 | 35.89 | 52.30 |
| Angola | 0.1441 | 21.26 | 1.27 | 63.48 | 0.41 | 12.50 |
| Antigua & Barbuda | 0.5412 | 64.00 | 35.64 | 120.02 | 15.07 | 48.90 |
| Argentina | 0.5031 | 64.70 | 22.58 | 158.74 | 14.69 | 19.80 |
| Armenia | 0.3922 | 46.30 | 18.92 | 115.92 | 9.13 | 31.30 |
| Australia | 0.7646 | 84.56 | 38.89 | 131.23 | 25.76 | 111.10 |
| Austria | 0.7098 | 81.00 | 38.31 | 151.91 | 27.54 | 64.50 |
| Azerbaijan | 0.4852 | 61.00 | 18.87 | 110.91 | 19.83 | 45.10 |
| Bahamas | 0.3842 | 76.92 | 35.99 | 71.44 | 3.61 | 12.90 |
| Bahrain | 0.7762 | 91.00 | 21.18 | 173.27 | 21.39 | 119.00 |
| Bangladesh | 0.1193 | 9.60 | 0.69 | 75.92 | 1.19 | 0.50 |
| Barbados | 0.6397 | 76.67 | 52.92 | 106.78 | 26.97 | 41.50 |
| Belarus | 0.6304 | 59.02 | 48.50 | 122.50 | 28.84 | 46.00 |
| Belgium | 0.6808 | 85.00 | 42.12 | 114.27 | 35.99 | 46.00 |
| Belize | 0.1834 | 38.70 | 6.68 | 50.71 | 2.91 | 10.20 |
| Benin | 0.1471 | 5.30 | 1.85 | 101.71 | 0.40 | 0.40 |
| Bhutan | 0.2192 | 34.37 | 3.11 | 82.07 | 3.26 | 15.60 |
| Bolivia (Plurinational State of) | 0.2532 | 39.02 | 8.08 | 96.34 | 1.59 | 14.00 |
| Bosnia and Herzegovina | 0.4047 | 60.80 | 22.20 | 91.28 | 14.15 | 23.90 |
| Botswana | 0.4215 | 18.50 | 8.30 | 167.30 | 1.63 | 74.30 |
| Brazil | 0.5025 | 57.60 | 21.84 | 138.95 | 11.46 | 52.00 |
| Brunei Darussalam | 0.3512 | 68.77 | 11.40 | 110.06 | 7.15 | 6.50 |
| Bulgaria | 0.5602 | 55.49 | 25.35 | 137.71 | 20.74 | 58.60 |
| Burkina Faso | 0.1232 | 9.40 | 0.72 | 71.74 | 0.03 | 9.00 |
| Burundi | 0.0331 | 1.38 | 0.21 | 30.46 | 0.02 | 0.50 |
| Cambodia | 0.2486 | 9.00 | 2.84 | 155.11 | 0.21 | 10.10 |
| Cameroon | 0.1310 | 11.00 | 4.61 | 75.69 | 0.07 | 1.70 |
| Canada | 0.6717 | 87.12 | 46.65 | 82.98 | 34.98 | 57.90 |
| Cape Verde | 0.3629 | 40.26 | 11.62 | 121.79 | 3.79 | 42.60 |
| Central African Rep. | 0.0381 | 4.03 | 0.02 | 31.36 | 0.01 | 0.10 |
| Chad | 0.0476 | 2.50 | 0.18 | 39.75 | 0.08 | 0.00 |
| Chile | 0.4970 | 72.35 | 19.17 | 133.26 | 14.08 | 35.60 |
| China | 0.3673 | 49.30 | 17.90 | 92.27 | 14.38 | 21.40 |
| Colombia | 0.3813 | 52.57 | 14.68 | 113.08 | 10.27 | 25.10 |
| Comoros | 0.1073 | 6.98 | 3.12 | 50.90 | 0.21 | 14.50 |

Table 14. Telecommunication Infrastructure Index (TII) and its components (continued)

| Country | TII | Percentage of Individuals using the Internet | Fixed-telephone subscriptions per 100 inhabitants | Mobile-cellular telephone subscriptions per 100 inhabitants | Fixed (wired)-broadband subscriptions per 100 inhabitants | Wireless broadband subscriptions per 100 inhabitants |
|---|---|---|---|---|---|---|
| Congo | 0.1713 | 7.11 | 0.36 | 108.15 | 0.01 | 10.50 |
| Costa Rica | 0.5129 | 49.41 | 17.85 | 143.83 | 10.45 | 72.30 |
| Côte d'Ivoire | 0.1711 | 14.60 | 1.17 | 106.25 | 0.28 | 1.70 |
| Croatia | 0.5974 | 68.57 | 36.72 | 104.43 | 23.04 | 66.10 |
| Cuba | 0.1103 | 30.00 | 11.23 | 22.48 | 0.07 | 0.00 |
| Cyprus | 0.4923 | 69.33 | 28.44 | 96.34 | 21.13 | 31.80 |
| Czech Republic | 0.5952 | 79.71 | 17.57 | 130.03 | 27.64 | 54.40 |
| Demo. People's Republic of Korea | 0.0363 | 0.00 | 4.71 | 11.19 | 0.00 | 11.20 |
| Democratic Republic of Congo | 0.0788 | 3.00 | 0.00 | 53.49 | 0.00 | 6.70 |
| Denmark | 0.8247 | 95.99 | 33.32 | 125.96 | 41.38 | 107.50 |
| Djibouti | 0.0698 | 10.71 | 2.47 | 32.39 | 2.27 | 0.00 |
| Dominica | 0.4305 | 62.86 | 24.33 | 127.45 | 15.76 | 0.00 |
| Dominican Rep. | 0.2992 | 49.58 | 11.65 | 78.86 | 5.70 | 25.80 |
| Ecuador | 0.3438 | 43.00 | 15.28 | 103.90 | 7.81 | 26.70 |
| Egypt | 0.3025 | 31.70 | 7.57 | 114.31 | 3.68 | 31.10 |
| El Salvador | 0.3265 | 29.70 | 14.85 | 144.03 | 5.00 | 7.50 |
| Equatorial Guinea | 0.1237 | 18.86 | 1.94 | 66.39 | 0.50 | 0.00 |
| Eritrea | 0.0000 | 0.99 | 0.98 | 6.39 | 0.00 | 0.00 |
| Estonia | 0.7329 | 84.24 | 31.73 | 160.69 | 27.37 | 78.90 |
| Ethiopia | 0.0495 | 2.90 | 0.85 | 31.59 | 0.49 | 4.90 |
| Fiji | 0.3326 | 41.80 | 8.43 | 98.78 | 1.40 | 53.50 |
| Finland | 0.7590 | 92.38 | 11.74 | 139.66 | 32.30 | 123.60 |
| France | 0.7502 | 83.75 | 60.03 | 100.36 | 40.18 | 55.90 |
| Gabon | 0.3068 | 9.81 | 1.01 | 210.37 | 0.63 | 0.50 |
| Gambia | 0.1959 | 15.56 | 2.93 | 119.63 | 0.12 | 1.40 |
| Georgia | 0.4184 | 48.90 | 25.39 | 124.94 | 12.15 | 17.40 |
| Germany | 0.7342 | 86.19 | 56.89 | 120.42 | 35.78 | 44.80 |
| Ghana | 0.2594 | 18.90 | 0.98 | 114.82 | 0.27 | 40.20 |
| Greece | 0.6032 | 63.21 | 46.90 | 114.96 | 28.36 | 36.10 |
| Grenada | 0.3988 | 37.38 | 26.90 | 126.53 | 17.87 | 0.80 |
| Guatemala | 0.2358 | 23.40 | 10.83 | 106.63 | 2.41 | 6.20 |
| Guinea | 0.0906 | 1.72 | 0.00 | 72.10 | 0.01 | 0.00 |
| Guinea-Bissau | 0.0828 | 3.32 | 0.29 | 63.48 | 0.08 | 0.00 |
| Guyana | 0.2432 | 37.35 | 19.87 | 70.54 | 5.63 | 0.10 |
| Haiti | 0.1004 | 11.40 | 0.39 | 64.71 | 0.00 | 0.20 |
| Honduras | 0.2008 | 19.08 | 6.45 | 93.52 | 1.39 | 11.70 |
| Hungary | 0.5615 | 76.13 | 30.32 | 118.05 | 27.35 | 27.50 |
| Iceland | 0.7814 | 98.16 | 51.49 | 111.08 | 35.92 | 74.70 |
| India | 0.1430 | 18.00 | 2.13 | 74.48 | 1.24 | 3.20 |
| Indonesia | 0.3016 | 17.14 | 11.72 | 126.18 | 1.19 | 36.00 |
| Iran (Islamic Republic of) | 0.3514 | 39.35 | 38.98 | 87.79 | 9.46 | 2.50 |

Table 14. Telecommunication Infrastructure Index (TII) and its components (continued)

| Country | TII | Percentage of Individuals using the Internet | Fixed-telephone subscriptions per 100 inhabitants | Mobile-cellular telephone subscriptions per 100 inhabitants | Fixed (wired)-broadband subscriptions per 100 inhabitants | Wireless broadband subscriptions per 100 inhabitants |
|---|---|---|---|---|---|---|
| Iraq | 0.1647 | 11.30 | 5.60 | 94.91 | 0.01 | 3.60 |
| Ireland | 0.6602 | 79.69 | 43.24 | 104.26 | 26.91 | 68.60 |
| Israel | 0.6175 | 71.45 | 37.07 | 121.45 | 26.18 | 52.50 |
| Italy | 0.6469 | 61.96 | 33.68 | 154.25 | 23.53 | 65.90 |
| Jamaica | 0.3193 | 40.50 | 9.06 | 102.92 | 5.41 | 33.10 |
| Japan | 0.8277 | 90.58 | 50.09 | 120.23 | 29.31 | 120.50 |
| Jordan | 0.3458 | 44.00 | 5.00 | 147.80 | 4.66 | 17.80 |
| Kazakhstan | 0.5668 | 54.89 | 26.12 | 168.62 | 12.93 | 56.60 |
| Kenya | 0.1808 | 43.40 | 0.40 | 73.84 | 0.19 | 3.10 |
| Kiribati | 0.0665 | 12.25 | 8.85 | 17.41 | 1.15 | 0.00 |
| Kuwait | 0.7430 | 78.70 | 14.20 | 218.43 | 1.38 | 139.80 |
| Kyrgyzstan | 0.3123 | 28.30 | 7.88 | 134.46 | 4.16 | 22.70 |
| Lao People's Dem. Rep. | 0.1537 | 14.26 | 13.36 | 66.99 | 0.16 | 2.40 |
| Latvia | 0.5831 | 75.83 | 18.96 | 124.20 | 24.74 | 61.20 |
| Lebanon | 0.4911 | 74.70 | 19.45 | 88.35 | 22.80 | 43.00 |
| Lesotho | 0.1787 | 11.00 | 2.44 | 101.90 | 0.11 | 11.50 |
| Liberia | 0.1041 | 5.41 | 0.23 | 73.35 | 0.14 | 1.90 |
| Libya | 0.4291 | 17.76 | 11.30 | 161.12 | 1.00 | 80.60 |
| Liechtenstein | 0.7293 | 95.21 | 48.39 | 104.32 | 40.33 | 48.40 |
| Lithuania | 0.6262 | 72.13 | 19.50 | 147.04 | 31.46 | 53.80 |
| Luxembourg | 0.8190 | 94.67 | 49.63 | 148.37 | 33.27 | 80.00 |
| Madagascar | 0.0514 | 3.70 | 1.06 | 38.22 | 0.11 | 0.50 |
| Malawi | 0.0485 | 5.83 | 0.38 | 30.50 | 0.05 | 3.90 |
| Malaysia | 0.4397 | 67.50 | 14.61 | 148.83 | 10.14 | 14.10 |
| Maldives | 0.4370 | 49.28 | 6.11 | 189.38 | 5.64 | 26.20 |
| Mali | 0.2149 | 7.00 | 1.00 | 149.02 | 0.02 | 1.80 |
| Malta | 0.6992 | 73.17 | 53.55 | 126.98 | 35.23 | 41.20 |
| Marshall Islands | 0.0849 | 16.80 | 4.47 | 29.37 | 2.60 | 0.00 |
| Mauritania | 0.1536 | 10.70 | 1.29 | 94.20 | 0.20 | 5.60 |
| Mauritius | 0.4596 | 41.44 | 29.80 | 132.25 | 14.57 | 29.20 |
| Mexico | 0.3114 | 44.39 | 17.04 | 82.54 | 11.56 | 11.50 |
| Micronesia | 0.1197 | 29.65 | 6.76 | 30.32 | 2.98 | 0.00 |
| Monaco | 1.0000 | 92.40 | 132.95 | 88.46 | 46.76 | 53.70 |
| Mongolia | 0.2841 | 27.00 | 7.92 | 105.06 | 6.85 | 24.70 |
| Montenegro | 0.5221 | 61.00 | 26.49 | 163.03 | 15.20 | 23.10 |
| Morocco | 0.3429 | 56.80 | 7.43 | 131.71 | 2.96 | 15.00 |
| Mozambique | 0.0993 | 5.94 | 0.26 | 69.67 | 0.05 | 1.70 |
| Myanmar | 0.0655 | 2.10 | 0.98 | 49.47 | 0.27 | 1.00 |
| Namibia | 0.2669 | 14.84 | 7.78 | 113.76 | 1.76 | 34.20 |
| Nauru | 0.2448 | 54.00 | 0.00 | 67.78 | 9.48 | 9.97 |
| Nepal | 0.1675 | 15.44 | 2.98 | 82.49 | 0.81 | 13.00 |
| Netherlands | 0.7517 | 93.17 | 42.41 | 116.42 | 41.02 | 62.30 |
| New Zealand | 0.7136 | 85.50 | 40.65 | 112.05 | 30.45 | 81.90 |

Table 14. Telecommunication Infrastructure Index (TII) and its components (continued)

| Country | TII | Percentage of Individuals using the Internet | Fixed-telephone subscriptions per 100 inhabitants | Mobile-cellular telephone subscriptions per 100 inhabitants | Fixed (wired)-broadband subscriptions per 100 inhabitants | Wireless broadband subscriptions per 100 inhabitants |
|---|---|---|---|---|---|---|
| Nicaragua | 0.2109 | 17.60 | 5.51 | 114.57 | 2.48 | 1.30 |
| Niger | 0.0557 | 1.95 | 0.57 | 44.44 | 0.05 | 0.90 |
| Nigeria | 0.1958 | 42.68 | 0.10 | 77.84 | 0.01 | 10.10 |
| Norway | 0.7276 | 96.30 | 22.72 | 116.51 | 38.14 | 86.50 |
| Oman | 0.5147 | 70.22 | 9.56 | 157.75 | 4.51 | 68.90 |
| Pakistan | 0.1299 | 13.80 | 2.65 | 73.33 | 1.08 | 0.80 |
| Palau | 0.3684 | 26.97 | 33.89 | 90.60 | 9.36 | 32.31 |
| Panama | 0.4202 | 44.92 | 14.99 | 158.05 | 7.90 | 25.20 |
| Papua New Guinea | 0.0739 | 9.38 | 1.94 | 44.93 | 0.18 | 0,00 |
| Paraguay | 0.2544 | 43.00 | 5.38 | 105.60 | 2.45 | 5.60 |
| Peru | 0.2689 | 40.20 | 9.86 | 102.92 | 5.74 | 3.00 |
| Philippines | 0.3791 | 39.69 | 3.09 | 111.22 | 23.22 | 27.20 |
| Poland | 0.5857 | 66.60 | 13.18 | 156.45 | 23.83 | 59.50 |
| Portugal | 0.5838 | 64.59 | 43.25 | 111.80 | 26.68 | 36.70 |
| Qatar | 0.6041 | 91.49 | 18.41 | 145.76 | 9.90 | 76.80 |
| Republic of Korea | 0.8530 | 84.33 | 59.54 | 115.54 | 38.78 | 105.30 |
| Republic of Moldova | 0.4850 | 46.60 | 35.20 | 108.00 | 14.71 | 47.30 |
| Romania | 0.4533 | 54.08 | 21.26 | 105.91 | 18.52 | 37.70 |
| Russian Federatian | 0.6091 | 70.52 | 27.67 | 155.14 | 17.45 | 60.20 |
| Rwanda | 0.1084 | 10.60 | 0.41 | 64.02 | 0.11 | 5.80 |
| Saint Kitts and Nevis | 0.5301 | 65.40 | 34.86 | 139.81 | 23.73 | 5.50 |
| Saint Lucia | 0.4094 | 51.00 | 17.88 | 102.59 | 15.36 | 32.70 |
| Saint Vincent and the Grenadines | 0.3756 | 56.48 | 21.85 | 105.16 | 14.92 | 0.00 |
| Samoa | 0.1576 | 21.20 | 6.14 | 55.53 | 1.05 | 16.40 |
| San Marino | 0.6128 | 49.60 | 58.79 | 118.85 | 36.98 | 11.20 |
| Sao Tomé & Principe | 0.1547 | 24.41 | 3.44 | 64.94 | 0.56 | 9.80 |
| Saudi Arabia | 0.5733 | 63.70 | 13.36 | 179.56 | 10.36 | 70.60 |
| Senegal | 0.1958 | 17.70 | 2.14 | 98.84 | 0.71 | 15.30 |
| Serbia | 0.5434 | 53.50 | 37.33 | 122.13 | 15.57 | 55.70 |
| Seychelles | 0.4624 | 54.26 | 22.73 | 162.19 | 12.68 | 10.30 |
| Sierra Leone | 0.1216 | 2.10 | 0.27 | 76.66 | 0.00 | 13.00 |
| Singapore | 0.8414 | 82.00 | 35.52 | 158.13 | 27.79 | 136.60 |
| Slovakia | 0.5504 | 79.98 | 16.84 | 116.94 | 21.84 | 54.90 |
| Slovenia | 0.5877 | 71.59 | 37.08 | 112.08 | 26.55 | 42.10 |
| Solomon Islands | 0.1150 | 9.00 | 1.31 | 65.76 | 0.23 | 8.00 |
| Somalia | 0.0665 | 1.63 | 0.53 | 50.90 | 0.56 | 1.00 |
| South Africa | 0.3807 | 49.00 | 8.10 | 149.68 | 3.21 | 28.70 |
| South Sudan | 0.0534 | 15.90 | 0.00 | 24.50 | 0.00 | 1.30 |
| Spain | 0.6493 | 76.19 | 40.56 | 107.85 | 27.27 | 67.20 |
| Sri Lanka | 0.2445 | 25.80 | 12.49 | 103.16 | 2.65 | 7.80 |

## Table 14. Telecommunication Infrastructure Index (TII) and its components (continued)

| Country | TII | Percentage of Individuals using the Internet | Fixed-telephone subscriptions per 100 inhabitants | Mobile-cellular telephone subscriptions per 100 inhabitants | Fixed (wired)-broadband subscriptions per 100 inhabitants | Wireless broadband subscriptions per 100 inhabitants |
|---|---|---|---|---|---|---|
| Sudan | 0.1861 | 24.64 | 1.08 | 72.20 | 0.05 | 26.80 |
| Suriname | 0.4116 | 40.08 | 15.61 | 170.57 | 8.53 | 13.10 |
| Swaziland | 0.1601 | 27.10 | 3.50 | 72.32 | 0.40 | 4.40 |
| Sweden | 0.8134 | 92.52 | 39.67 | 127.84 | 34.19 | 110.30 |
| Switzerland | 0.7980 | 87.00 | 53.63 | 140.54 | 45.97 | 44.30 |
| Syrian Arab Republic | 0.2087 | 28.09 | 18.13 | 70.95 | 1.68 | 3.20 |
| Tajikistan | 0.1866 | 17.49 | 5.24 | 95.13 | 0.07 | 9.50 |
| Thailand | 0.4117 | 34.89 | 8.46 | 144.44 | 8.21 | 52.50 |
| The Former Yugoslav Republic of Macedonia | 0.4693 | 68.06 | 18.62 | 109.10 | 16.19 | 39.40 |
| Timor-Leste | 0.0728 | 1.14 | 0.26 | 58.74 | 0.07 | 0.60 |
| Togo | 0.1044 | 5.70 | 0.90 | 68.97 | 0.11 | 4.10 |
| Tonga | 0.2302 | 40.00 | 11.34 | 64.28 | 1.70 | 19.30 |
| Trinidad & Tobago | 0.4973 | 65.10 | 21.43 | 147.34 | 17.47 | 20.20 |
| Tunisia | 0.3476 | 46.16 | 8.54 | 128.49 | 4.44 | 26.10 |
| Turkey | 0.3775 | 51.04 | 16.52 | 94.79 | 11.69 | 32.30 |
| Turkmenistan | 0.2559 | 12.20 | 11.77 | 135.78 | 0.04 | 10.90 |
| Tuvalu | 0.1981 | 37.00 | 15.16 | 38.41 | 9.10 | 0.00 |
| Uganda | 0.1129 | 17.71 | 0.84 | 52.43 | 0.29 | 8.60 |
| Ukraine | 0.3968 | 43.40 | 24.64 | 144.08 | 8.42 | 6.70 |
| United Arab Emirates | 0.6881 | 90.40 | 22.26 | 178.06 | 11.51 | 89.10 |
| United Kingdom of Great Britain and Northern Island | 0.8177 | 91.61 | 52.35 | 123.58 | 37.38 | 87.20 |
| United Republic of Tanzania | 0.0900 | 4.86 | 0.30 | 62.77 | 0.17 | 2.70 |
| United States of America | 0.7170 | 87.36 | 40.12 | 98.41 | 30.37 | 93.60 |
| Uruguay | 0.6137 | 61.46 | 31.68 | 160.80 | 24.58 | 43.50 |
| Uzbekistan | 0.2463 | 43.55 | 8.55 | 73.79 | 1.33 | 22.80 |
| Vanuatu | 0.1684 | 18.80 | 2.22 | 60.41 | 1.77 | 26.20 |
| Venezuela (Bolivarian Republic of) | 0.3540 | 57.00 | 25.31 | 98.95 | 7.82 | 3.80 |
| Viet Nam | 0.3715 | 48.31 | 6.01 | 147.11 | 6.48 | 21.80 |
| Yemen | 0.1465 | 22.55 | 4.68 | 68.49 | 1.36 | 0.30 |
| Zambia | 0.1182 | 17.34 | 0.76 | 67.34 | 0.14 | 0.70 |
| Zimbabwe | 0.2167 | 19.89 | 2.26 | 80.82 | 1.04 | 37.80 |

**Note: Last accessed in September 2015**

Source: International Telecommunications Union (ITU).
Year: 2014 or most recent data available.
" * 2012
** 0108
*** 2008
**** 2007
***** 2005"

Table 14. Telecommunication Infrastructure Index (TII) and its components (continued)

| TII average | TII | Percentage of Individuals using the Internet | Fixed-telephone subscriptions per 100 inhabitants | Mobile-cellular telephone subscriptions per 100 inhabitants | Fixed(wired)-broadban subscriptions per 100 inhabitants | Wireless broadband subscriptions per 100 inhabitants |
|---|---|---|---|---|---|---|
| Africa | 0.1724 | 16.40 | 3.33 | 83.99 | 1.20 | 12.02 |
| Americas | 0.3844 | 49.64 | 19.84 | 109.86 | 11.03 | 21.75 |
| Asia | 0.3730 | 42.95 | 14.35 | 114.03 | 8.68 | 34.63 |
| Europe | 0.6438 | 75.28 | 37.68 | 122.92 | 28.31 | 55.68 |
| Oceania | 0.2599 | 34.78 | 12.86 | 64.78 | 6.94 | 27.59 |
| World | 0.3711 | 43.34 | 17.35 | 103.28 | 11.26 | 30.16 |
| | | | | | | |
| Small island Developing States | 0.3103 | 39.85 | 15.29 | 90.70 | 8.07 | 21.61 |
| Land Locked Developing Countries | 0.2131 | 22.84 | 6.71 | 85.14 | 3.06 | 16.49 |
| Least Developed Countries | 0.1145 | 10.53 | 1.91 | 64.60 | 0.58 | 5.13 |
| | | | | | | |
| High Income | 0.6607 | 78.77 | 36.51 | 126.97 | 26.78 | 64.02 |
| Upper Middle Income | 0.3734 | 44.54 | 16.42 | 115.59 | 9.63 | 25.99 |
| Lower Middle Income | 0.2292 | 27.21 | 8.32 | 89.71 | 3.34 | 14.03 |
| Low Income | 0.1062 | 7.98 | 1.08 | 65.27 | 0.19 | 5.08 |

Table 15. Human Capital Index (HCI) and its components

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Afghanistan | 0.2830 | 38.16 | 2015 | UNESCO | 62.38 | 2011 | UNESCO | 9.27 | 2011 | UNESCO | 3.20 | 2012 | UNDP |
| Albania | 0.6520 | 97.62 | 2015 | UNESCO | 65.58 | 2003 | UNESCO | 10.83 | 2003 | UNESCO | 9.26 | 2011 | UNESCO |
| Algeria | 0.6412 | 80.20 | 2015 | UNESCO | 79.19 | 2011 | UNESCO | 13.97 | 2011 | UNESCO | 7.60 | 2012 | UNDP |
| Andorra | 0.6978 | 99.00 | 2014 | UNESCO | 69.00 | 2014 | UNESCO | 11.67 | 2012 | UNDP (HDI) | 10.40 | 2012 | UNDP |
| Angola | 0.5015 | 71.14 | 2015 | UNESCO | 73.02 | 2011 | UNESCO | 11.32 | 2011 | UNESCO | 4.70 | 2012 | UNDP |
| Antigua and Barbuda | 0.7453 | 98.95 | 2012 | UNESCO | 82.03 | 2012 | UNESCO | 13.95 | 2012 | UNESCO | 8.90 | 2012 | UNDP |
| Argentina | 0.8802 | 98.09 | 2015 | UNESCO | 104.93 | 2012 | UNESCO | 17.95 | 2012 | UNESCO | 9.79 | 2003 | UNESCO |
| Armenia | 0.7338 | 99.65 | 2015 | UNESCO | 78.22 | 2009 | UNESCO | 12.32 | 2009 | UNESCO | 10.27 | 2001 | UNESCO |
| Australia | 1.0000 | 99.00 | 2014 | UNESCO | 115.19 | 2013 | UNESCO | 20.25 | 2013 | UNESCO | 13.18 | 2012 | UNESCO |
| Austria | 0.8396 | 99.00 | 2014 | UNESCO | 94.61 | 2013 | UNESCO | 15.90 | 2013 | UNESCO | 10.80 | 2012 | UNDP |
| Azerbaijan | 0.7158 | 99.82 | 2015 | UNESCO | 71.11 | 2012 | UNESCO | 11.80 | 2012 | UNDP (HDI) | 10.85 | 2009 | UNESCO |
| Bahamas | 0.7207 | 95.80 | 2014 | UNESCO | 74.00 | 2014 | UNESCO | 12.57 | 2012 | UNDP (HDI) | 10.94 | 2000 | UNESCO |
| Bahrain | 0.7178 | 95.70 | 2015 | UNESCO | 78.62 | 2009 | UNESCO | 13.13 | 1999 | UNESCO | 9.40 | 2012 | UNDP |
| Bangladesh | 0.3973 | 61.55 | 2015 | UNESCO | 59.39 | 2011 | UNESCO | 9.98 | 1999 | UNESCO | 4.25 | 2001 | UNESCO |
| Barbados | 0.8113 | 99.70 | 2014 | UNESCO | 96.13 | 2011 | UNESCO | 15.42 | 1999 | UNESCO | 8.99 | 2000 | UNESCO |
| Belarus | 0.8716 | 99.73 | 2015 | UNESCO | 100.09 | 2013 | UNESCO | 15.66 | 2013 | UNESCO | 11.94 | 2009 | UNESCO |
| Belgium | 0.9712 | 99.00 | 2014 | UNESCO | 117.94 | 2013 | UNESCO | 19.80 | 2013 | UNESCO | 11.27 | 2012 | UNESCO |
| Belize | 0.6454 | 70.30 | 1991 | UNESCO | 81.46 | 2013 | UNESCO | 13.55 | 2013 | UNESCO | 10.49 | 2010 | UNESCO |
| Benin | 0.3196 | 38.45 | 2015 | UNESCO | 67.84 | 2011 | UNESCO | 11.07 | 2011 | UNESCO | 2.73 | 2002 | UNESCO |
| Bhutan | 0.5139 | 64.89 | 2015 | UNESCO | 68.78 | 2013 | UNESCO | 12.62 | 2013 | UNESCO | 6.60 | 2005 | UNESCO |
| Bolivia (Plurinational State of) | 0.7004 | 95.65 | 2015 | UNESCO | 79.25 | 2007 | UNESCO | 13.15 | 2007 | UNESCO | 8.15 | 2012 | UNESCO |
| Bosnia and Herzegovina | 0.6815 | 98.48 | 2015 | UNESCO | 71.00 | 2014 | UNESCO | 13.60 | 2012 | UNDP (HDI) | 7.21 | 2011 | UNESCO |
| Botswana | 0.6553 | 88.46 | 2015 | UNESCO | 73.58 | 2008 | UNESCO | 12.49 | 2008 | UNESCO | 8.80 | 2012 | UNDP |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Brazil | 0.6787 | 92.58 | 2015 | UNESCO | 71.00 | 2014 | UNESCO | 15.19 | 2012 | UNDP (HDI) | 6.99 | 2011 | UNESCO |
| Brunei Darussalam | 0.7310 | 95.98 | 2015 | UNESCO | 80.10 | 2013 | UNESCO | 14.35 | 2013 | UNESCO | 8.70 | 2012 | UNDP |
| Bulgaria | 0.7875 | 98.39 | 2015 | UNESCO | 87.65 | 2013 | UNESCO | 14.80 | 2013 | UNESCO | 9.92 | 2001 | UNESCO |
| Burkina Faso | 0.1677 | 36.02 | 2015 | UNESCO | 46.90 | 2013 | UNESCO | 7.77 | 2013 | UNESCO | 0.56 | 2007 | UNESCO |
| Burundi | 0.4979 | 85.62 | 2015 | UNESCO | 63.84 | 2013 | UNESCO | 10.90 | 2013 | UNESCO | 2.70 | 2012 | UNDP |
| Cambodia | 0.4785 | 77.19 | 2015 | UNESCO | 63.81 | 2008 | UNESCO | 10.90 | 2008 | UNESCO | 3.67 | 2009 | UNESCO |
| Cameroon | 0.4794 | 74.99 | 2015 | UNESCO | 61.56 | 2011 | UNESCO | 10.40 | 2011 | UNESCO | 5.21 | 2010 | UNESCO |
| Canada | 0.8572 | 99.00 | 2014 | UNESCO | 93.04 | 2000 | UNESCO | 15.81 | 2000 | UNESCO | 12.30 | 2012 | UNDP |
| Cape Verde | 0.6031 | 87.58 | 2015 | UNESCO | 78.73 | 2013 | UNESCO | 13.74 | 2013 | UNESCO | 3.50 | 2012 | UNDP |
| Central African Republic | 0.1985 | 36.75 | 2015 | UNESCO | 43.42 | 2012 | UNESCO | 7.24 | 2012 | UNESCO | 3.50 | 2012 | UNDP |
| Chad | 0.1917 | 40.17 | 2015 | UNESCO | 46.80 | 2011 | UNESCO | 7.40 | 2011 | UNESCO | 1.40 | 2004 | UNESCO |
| Chile | 0.8124 | 97.51 | 2015 | UNESCO | 92.57 | 2013 | UNESCO | 15.91 | 2013 | UNESCO | 9.79 | 2010 | UNESCO |
| China | 0.6860 | 96.38 | 2015 | UNESCO | 77.25 | 2013 | UNESCO | 13.24 | 2013 | UNESCO | 7.31 | 2010 | UNESCO |
| Colombia | 0.7000 | 94.68 | 2015 | UNESCO | 84.49 | 2010 | UNESCO | 13.55 | 2010 | UNESCO | 7.07 | 2010 | UNESCO |
| Comoros | 0.4885 | 77.76 | 2015 | UNESCO | 68.13 | 2013 | UNESCO | 11.50 | 2013 | UNESCO | 2.80 | 2012 | UNDP |
| Congo | 0.5344 | 79.31 | 2015 | UNESCO | 66.15 | 2012 | UNESCO | 11.11 | 2012 | UNESCO | 6.10 | 2012 | UNDP |
| Costa Rica | 0.7436 | 97.76 | 2015 | UNESCO | 86.69 | 2013 | UNESCO | 13.86 | 2013 | UNESCO | 8.37 | 2012 | UNESCO |
| Côte d'Ivoire | 0.2959 | 43.11 | 2015 | UNESCO | 54.22 | 2013 | UNESCO | 9.15 | 2013 | UNESCO | 4.30 | 2012 | UNDP |
| Croatia | 0.8050 | 99.27 | 2015 | UNESCO | 86.47 | 2012 | UNESCO | 14.81 | 2012 | UNESCO | 11.03 | 2011 | UNESCO |
| Cuba | 0.7507 | 99.85 | 2015 | UNESCO | 80.26 | 2013 | UNESCO | 13.83 | 2013 | UNESCO | 9.45 | 2002 | UNESCO |
| Cyprus | 0.7782 | 99.07 | 2015 | UNESCO | 78.42 | 2011 | UNESCO | 13.97 | 2012 | UNESCO | 11.62 | 2012 | UNESCO |
| Czech Republic | 0.8627 | 99.00 | 2014 | UNESCO | 91.32 | 2013 | UNESCO | 16.52 | 2013 | UNESCO | 12.26 | 2012 | UNESCO |
| Democratic People's Republic of Korea | 0.7822 | 100.00 | 2015 | UNESCO | 100.00 | 2014 | UNESCO | 11.00 | 2014 | UNESCO | 10.76 | 2012 | UNDP |
| Democratic Republic of the Congo | 0.3970 | 63.82 | 2015 | UNESCO | 63.69 | 2013 | UNESCO | 9.75 | 2013 | UNESCO | 3.10 | 2012 | UNDP |
| Denmark | 0.9530 | 99.00 | 2014 | UNESCO | 106.26 | 2013 | UNESCO | 19.24 | 2013 | UNESCO | 12.73 | 2008 | UNESCO |
| Djibouti | 0.3095 | 70.30 | 2014 | UNESCO | 37.11 | 2011 | UNESCO | 6.39 | 2011 | UNESCO | 3.80 | 2012 | UNDP |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Dominica | 0.6384 | 88.00 | 2014 | UNESCO | 73.00 | 2014 | UNESCO | 12.65 | 2012 | UNDP (HDI) | 7.78 | 2001 | UNESCO |
| Dominican Republic | 0.6676 | 91.79 | 2015 | UNESCO | 77.39 | 2012 | UNESCO | 13.08 | 2012 | UNESCO | 7.46 | 2012 | UNESCO |
| Ecuador | 0.7134 | 94.46 | 2015 | UNESCO | 83.73 | 2012 | UNESCO | 14.17 | 2012 | UNESCO | 7.50 | 2010 | UNESCO |
| Egypt | 0.6048 | 73.75 | 2015 | UNESCO | 82.58 | 2013 | UNESCO | 13.91 | 2013 | UNESCO | 6.40 | | UNDP |
| El Salvador | 0.6035 | 87.99 | 2015 | UNESCO | 70.03 | 2013 | UNESCO | 12.19 | 2013 | UNESCO | 6.51 | 2012 | UNESCO |
| Equatorial Guinea | 0.5174 | 95.26 | 2015 | UNESCO | 55.00 | 2014 | UNESCO | 8.48 | 2000 | UNESCO | 5.40 | 2012 | UNDP |
| Eritrea | 0.2487 | 73.77 | 2015 | UNESCO | 25.0 | | UNDP | 4.10 | 2012 | UNDP (HDI) | 3.40 | 2012 | UNDP |
| Estonia | 0.8761 | 99.83 | 2015 | UNESCO | 97.72 | 2013 | UNESCO | 16.32 | 2013 | UNESCO | 11.97 | 2000 | UNESCO |
| Ethiopia | 0.2212 | 49.09 | 2015 | UNESCO | 43.07 | 2005 | UNESCO | 6.60 | 2005 | UNESCO | 2.41 | 2011 | UNESCO |
| Fiji | 0.7509 | 94.40 | 2014 | UNESCO | 88.0 | | UNDP | 13.88 | 2004 | UNESCO | 9.47 | 2007 | UNESCO |
| Finland | 0.9440 | 99.00 | 2014 | UNESCO | 115.32 | 2013 | UNESCO | 19.48 | 2013 | UNESCO | 10.30 | 2012 | UNDP |
| France | 0.8445 | 99.00 | 2014 | UNESCO | 94.12 | 2013 | UNESCO | 15.97 | 2013 | UNESCO | 11.13 | 2012 | UNESCO |
| Gabon | 0.6162 | 83.18 | 2015 | UNESCO | 76.15 | 2001 | UNESCO | 12.30 | 2012 | UNDP (HDI) | 7.40 | 2012 | UNDP |
| Gambia | 0.3274 | 55.55 | 2015 | UNESCO | 55.94 | 2010 | UNESCO | 9.10 | 2012 | UNDP (HDI) | 2.80 | 2012 | UNDP |
| Georgia | 0.7763 | 99.76 | 2015 | UNESCO | 76.11 | 2013 | UNESCO | 13.80 | 2013 | UNESCO | 11.89 | 2002 | UNESCO |
| Germany | 0.8882 | 99.00 | 2014 | UNESCO | 93.62 | 2013 | UNESCO | 16.67 | 2013 | UNESCO | 13.35 | 2012 | UNESCO |
| Ghana | 0.5458 | 76.57 | 2015 | UNESCO | 67.47 | 2013 | UNESCO | 11.72 | 2013 | UNESCO | 6.72 | 2010 | UNESCO |
| Greece | 0.8901 | 97.69 | 2015 | UNESCO | 108.84 | 2012 | UNESCO | 17.63 | 2012 | UNESCO | 10.16 | 2010 | UNESCO |
| Grenada | 0.7820 | 96.00 | 2005 | UNDP | 91.05 | 2009 | UNESCO | 15.80 | 2009 | UNESCO | 8.60 | 2012 | UNDP |
| Guatemala | 0.5345 | 81.55 | 2015 | UNESCO | 68.61 | 2013 | UNESCO | 10.59 | 2013 | UNESCO | 5.60 | 2012 | UNESCO |
| Guinea | 0.1903 | 30.41 | 2015 | UNESCO | 52.36 | 2012 | UNESCO | 8.70 | 2012 | UNESCO | 1.60 | 2012 | UNDP |
| Guinea-Bissau | 0.3538 | 59.91 | 2015 | UNESCO | 62.46 | 2006 | UNESCO | 9.00 | 2012 | | 2.30 | 2012 | UNDP |
| Guyana | 0.5694 | 88.50 | 2015 | UNESCO | 68.11 | 2012 | UNESCO | 10.29 | 2012 | UNESCO | 6.41 | 2002 | UNESCO |
| Haiti | 0.3124 | 60.73 | 2015 | UNESCO | 39.40 | 2014 | UNESCO | 7.60 | 2012 | UNDP (HDI) | 4.90 | 2012 | UNDP |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Honduras | 0.5709 | 88.48 | 2015 | UNESCO | 69.33 | 2013 | UNESCO | 11.10 | 2013 | UNESCO | 5.48 | 2012 | UNESCO |
| Hungary | 0.8317 | 99.05 | 2015 | UNESCO | 92.64 | 2013 | UNESCO | 15.76 | 2013 | UNESCO | 10.76 | 2005 | UNESCO |
| Iceland | 0.8940 | 99.00 | 2014 | UNESCO | 99.38 | 2012 | UNESCO | 18.98 | 2012 | UNESCO | 10.40 | 2012 | UNDP |
| India | 0.5019 | 71.24 | 2015 | UNESCO | 71.20 | 2012 | UNESCO | 11.94 | 2012 | UNESCO | 4.40 | 2012 | UNDP |
| Indonesia | 0.6796 | 93.88 | 2015 | UNESCO | 78.87 | 2012 | UNESCO | 12.99 | 2012 | UNESCO | 7.51 | 2011 | UNESCO |
| Iran (Islamic Republic of) | 0.7101 | 86.85 | 2015 | UNESCO | 86.96 | 2012 | UNESCO | 15.09 | 2012 | UNESCO | 7.80 | 2012 | UNDP |
| Iraq | 0.4803 | 79.69 | 2015 | UNESCO | 54.48 | 2000 | UNESCO | 10.08 | 2004 | UNESCO | 5.60 | 2012 | UNDP |
| Ireland | 0.9218 | 99.00 | 2014 | UNESCO | 105.04 | 2012 | UNESCO | 18.57 | 2012 | UNESCO | 11.60 | 2012 | UNDP |
| Israel | 0.8619 | 97.76 | 2011 | UNESCO | 94.21 | 2013 | UNESCO | 15.99 | 2013 | UNESCO | 12.54 | 2012 | UNESCO |
| Italy | 0.8126 | 99.15 | 2015 | UNESCO | 88.59 | 2012 | UNESCO | 16.04 | 2012 | UNESCO | 9.94 | 2012 | UNESCO |
| Jamaica | 0.6859 | 88.69 | 2015 | UNESCO | 79.86 | 2004 | UNESCO | 12.49 | 2004 | UNESCO | 9.60 | 2012 | UNDP |
| Japan | 0.8274 | 99.00 | 2014 | UNESCO | 89.45 | 2012 | UNESCO | 15.33 | 2012 | UNESCO | 11.50 | 2012 | UNDP |
| Jordan | 0.7344 | 95.37 | 2015 | UNESCO | 80.17 | 2012 | UNESCO | 13.51 | 2012 | UNESCO | 9.91 | 2010 | UNESCO |
| Kazakhstan | 0.8401 | 99.79 | 2015 | UNESCO | 92.17 | 2013 | UNESCO | 14.94 | 2013 | UNESCO | 12.02 | 2007 | UNESCO |
| Kenya | 0.5169 | 77.97 | 2015 | UNESCO | 66.78 | 2009 | UNESCO | 10.98 | 2009 | UNESCO | 5.33 | 2010 | UNESCO |
| Kiribati | 0.6599 | 93.00 | 2014 | UN E-Gov Survey | 75.14 | 2008 | UNESCO | 12.32 | 2008 | UNESCO | 7.80 | 2012 | UNDP |
| Kuwait | 0.7287 | 96.27 | 2015 | UNESCO | 85.65 | 2004 | UNESCO | 14.64 | 2004 | UNESCO | 7.21 | 2012 | UNESCO |
| Kyrgyzstan | 0.7508 | 99.52 | 2015 | UNESCO | 79.14 | 2013 | UNESCO | 13.05 | 2013 | UNESCO | 10.51 | 2009 | UNESCO |
| Lao People's Democratic Republic | 0.4907 | 79.86 | 2015 | UNESCO | 60.87 | 2013 | UNESCO | 10.58 | 2013 | UNESCO | 4.60 | 2012 | UNDP |
| Latvia | 0.8512 | 99.89 | 2015 | UNESCO | 90.56 | 2013 | UNESCO | 15.58 | 2013 | UNESCO | 12.35 | 2006 | UNESCO |
| Lebanon | 0.6882 | 93.94 | 2015 | UNESCO | 77.12 | 2013 | UNESCO | 13.75 | 2013 | UNESCO | 7.59 | 2007 | UNESCO |
| Lesotho | 0.5147 | 79.36 | 2015 | UNESCO | 65.12 | 2012 | UNESCO | 10.69 | 2006 | UNESCO | 5.41 | 2008 | UNESCO |
| Liberia | 0.3581 | 47.60 | 2015 | UNESCO | 63.92 | 2000 | UNESCO | 10.67 | 2000 | UNESCO | 3.90 | 2012 | UNDP |
| Libya | 0.7588 | 91.02 | 2015 | UNESCO | 94.38 | 2003 | UNESCO | 16.12 | 2003 | UNESCO | 7.50 | 2012 | UNDP |
| Liechtenstein | 0.7978 | 99.00 | 2014 | UN E-Gov Survey | 87.13 | 2012 | UNESCO | 15.03 | 2012 | UNESCO | 10.30 | 2012 | UNDP |
| Lithuania | 0.8717 | 99.82 | 2015 | UNESCO | 94.41 | 2013 | UNESCO | 16.21 | 2013 | UNESCO | 12.38 | 2012 | UNESCO |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Luxembourg | 0.7750 | 99.00 | 2014 | UNESCO | 77.48 | 2012 | UNESCO | 13.85 | 2012 | UNESCO | 11.71 | 2007 | UNESCO |
| Madagascar | 0.4488 | 64.66 | 2015 | UNESCO | 65.86 | 2013 | UNESCO | 10.39 | 2013 | UNESCO | 5.20 | 2012 | UNDP |
| Malawi | 0.4535 | 65.79 | 2015 | UNESCO | 69.45 | 2011 | UNESCO | 10.75 | 2011 | UNESCO | 4.20 | 2012 | UNDP |
| Malaysia | 0.6953 | 94.64 | 2015 | UNESCO | 71.08 | 2005 | UNESCO | 12.73 | 2005 | UNESCO | 9.96 | 2010 | UNESCO |
| Maldives | 0.6301 | 99.31 | 2015 | UNESCO | 76.76 | 2003 | UNESCO | 12.66 | 2003 | UNESCO | 3.58 | 2006 | UNESCO |
| Mali | 0.2358 | 38.70 | 2015 | UNESCO | 55.66 | 2011 | UNESCO | 8.43 | 2011 | UNESCO | 2.04 | 2011 | UNESCO |
| Malta | 0.7310 | 94.44 | 2015 | UNESCO | 76.75 | 2012 | UNESCO | 14.16 | 2012 | UNESCO | 9.89 | 2012 | UNESCO |
| Marshall Islands | 0.6947 | 94.00 | 2014 | UN E-Gov Survey | 74.62 | 2002 | UNESCO | 12.35 | 2002 | UNESCO | 9,85 | 2011 | HDI WB=IID |
| Mauritania | 0.3015 | 52.10 | 2015 | UNESCO | 49.91 | 2013 | UNESCO | 8.50 | 2013 | UNESCO | 3.70 | 2012 | UNDP |
| Mauritius | 0.7067 | 90.62 | 2015 | UNESCO | 85.82 | 2012 | UNESCO | 15.58 | 2012 | UNESCO | 6.30 | 2000 | UNESCO |
| Mexico | 0.6993 | 95.14 | 2015 | UNESCO | 77.62 | 2013 | UNESCO | 13.19 | 2013 | UNESCO | 8.47 | 2012 | UNESCO |
| Micronesia (Federated States of) | 0.6663 | 94.00 | 2014 | UNESCO | 75.43 | 2004 | UNESCO | 11.41 | 2012 | UNDP (HDI) | 8.80 | 2012 | UNDP |
| Monaco | 0.8757 | 99.00 | 2014 | UN E-Gov Survey | 99.00 | 2014 | UNDP HDI | 17.50 | 2011 | UNDP (HDI) | 10.76 | 2012 | UNDP |
| Mongolia | 0.7597 | 98.38 | 2015 | UNESCO | 79.40 | 2006 | UNESCO | 14.59 | 2010 | UNESCO | 9.80 | 2010 | UNESCO |
| Montenegro | 0.8165 | 98.73 | 2015 | UNESCO | 88.62 | 2010 | UNESCO | 15.18 | 2010 | UNESCO | 11.16 | 2011 | UNESCO |
| Morocco | 0.4737 | 68.49 | 2015 | UNESCO | 67.15 | 2011 | UNESCO | 11.56 | 2011 | UNESCO | 4.40 | 2012 | UNDP |
| Mozambique | 0.3893 | 58.77 | 2015 | UNESCO | 60.33 | 2013 | UNESCO | 9.28 | 2013 | UNESCO | 4.99 | 2009 | UNESCO |
| Myanmar | 0.4837 | 93.09 | 2015 | UNESCO | 53.00 | 2007 | UNESCO | 8.63 | 2007 | UNESCO | 4.00 | 2012 | UNDP |
| Namibia | 0.5551 | 81.94 | 2015 | UNESCO | 70.28 | 2006 | UNESCO | 11.34 | 2006 | UNESCO | 5.77 | 2001 | UNESCO |
| Nauru | 0.5214 | 92.00 | 2014 | UN E-Gov Survey | 56.13 | 2008 | UNESCO | 9.35 | 2010 | UNESCO | 5.45 | 2012 | UNDP |
| Nepal | 0.4714 | 63.95 | 2015 | UNESCO | 75.45 | 2013 | UNESCO | 12.34 | 2013 | UNESCO | 3.20 | 2012 | UNDP |
| Netherlands | 0.9183 | 99.00 | 2014 | UNESCO | 105.75 | 2012 | UNESCO | 17.92 | 2012 | UNESCO | 11.89 | 2012 | UNESCO |
| New Zealand | 0.9402 | 99.00 | 2014 | UNESCO | 104.55 | 2013 | UNESCO | 18.95 | 2013 | UNESCO | 12.50 | 2012 | UNDP |
| Nicaragua | 0.5454 | 82.82 | 2015 | UNESCO | 70.00 | 2014 | UNESCO | 10.51 | 2002 | UNESCO | 5.80 | 2012 | UNDP |
| Niger | 0.0498 | 19.13 | 2015 | UNESCO | 37.51 | 2012 | UNESCO | 5.42 | 2012 | UNESCO | 1.40 | 2012 | UNDP |
| Nigeria | 0.3784 | 59.57 | 2015 | UNESCO | 55.66 | 2005 | UNESCO | 8.99 | 2005 | UNESCO | 5.20 | 2012 | UNDP |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Norway | 0.9031 | 99.00 | 2014 | UNESCO | 98.53 | 2013 | UNESCO | 17.71 | 2013 | UNESCO | 12.40 | 2007 | UNESCO |
| Oman | 0.6796 | 91.14 | 2015 | UNESCO | 76.54 | 2011 | UNESCO | 13.64 | 2011 | UNESCO | 8.00 | 2008 | UNESCO |
| Pakistan | 0.3190 | 57.94 | 2015 | UNESCO | 45.82 | 2013 | UNESCO | 7.79 | 2013 | UNESCO | 4.73 | 2011 | UNESCO |
| Palau | 0.8867 | 99.52 | 2015 | UNESCO | 97.67 | 2013 | UNESCO | 16.86 | 2013 | UNESCO | 12.20 | 2012 | UNDP |
| Panama | 0.7175 | 95.05 | 2015 | UNESCO | 78.93 | 2012 | UNESCO | 13.28 | 2012 | UNESCO | 9.35 | 2010 | UNESCO |
| Papua New Guinea | 0.3240 | 64.23 | 2015 | UNESCO | "36.98186 | | | | | | | | |
| " | 1998 | UNESCO | 8.86 | 2012 | UNDP (HDI) | 3.90 | 2012 | UNDP | | | | | |
| Paraguay | 0.6409 | 95.56 | 2015 | UNESCO | 69.42 | 2010 | UNESCO | 11.91 | 2010 | UNESCO | 7.31 | 2008 | UNESCO |
| Peru | 0.7151 | 94.48 | 2015 | UNESCO | 81.99 | 2010 | UNESCO | 13.07 | 2010 | UNESCO | 9.01 | 2012 | UNESCO |
| Philippines | 0.6839 | 96.29 | 2015 | UNESCO | 81.48 | 2010 | UNESCO | 12.11 | 2013 | UNESCO | 7.56 | 2000 | UNESCO |
| Poland | 0.8747 | 99.79 | 2015 | UNESCO | 97.50 | 2013 | UNESCO | 16.42 | 2013 | UNESCO | 11.82 | 2012 | UNESCO |
| Portugal | 0.8129 | 95.68 | 2015 | UNESCO | 99.96 | 2013 | UNESCO | 16.66 | 2013 | UNESCO | 8.25 | 2012 | UNESCO |
| Qatar | 0.7317 | 97.30 | 2015 | UNESCO | 79.47 | 2005 | UNESCO | 13.79 | 2005 | UNESCO | 9.07 | 2012 | UNESCO |
| Republic of Korea | 0.8795 | 99.00 | 2014 | UNESCO | 98.58 | 2014 | UNESCO | 16.81 | 2014 | UNESCO | 11.77 | 2010 | UNESCO |
| Republic of Moldova | 0.7191 | 99.36 | 2015 | UNESCO | 70.71 | 2013 | UNESCO | 11.87 | 2013 | UNESCO | 11.19 | 2011 | UNESCO |
| Romania | 0.7736 | 98.77 | 2015 | UNESCO | 80.56 | 2011 | UNESCO | 14.21 | 2011 | UNESCO | 10.78 | 2012 | UNESCO |
| Russian Federation | 0.8234 | 99.72 | 2015 | UNESCO | 88.95 | 2012 | UNESCO | 14.51 | 2012 | UNESCO | 11.95 | 2010 | UNESCO |
| Rwanda | 0.4522 | 70.52 | 2015 | UNESCO | 67.28 | 2013 | UNESCO | 10.27 | 2013 | UNESCO | 3.74 | 2012 | UNESCO |
| Saint Kitts and Nevis | 0.6976 | 97.80 | 2014 | UNESCO | 75.22 | 2008 | UNESCO | 12.88 | 2008 | UNESCO | 8.40 | 2012 | UNDP |
| Saint Lucia | 0.6744 | 94.80 | 2014 | UNESCO | 73.53 | 2007 | UNESCO | 12.57 | 2007 | UNESCO | 8.30 | 2012 | UNDP |
| Saint Vincent and the Grenadines | 0.6754 | 88.10 | 2014 | UNESCO | 78.28 | 2004 | UNESCO | 13.26 | 2004 | UNESCO | 8.60 | 2012 | UNDP |
| Samoa | 0.7076 | 98.97 | 2015 | UNESCO | 71.32 | 2000 | UNESCO | 12.00 | 2000 | UNESCO | 10.30 | 2012 | UNDP |
| San Marino | 0.7999 | 99.00 | 2014 | UN E-Gov Survey | 85.33 | 2012 | UNESCO | 15.02 | 2012 | UNESCO | 10.76 | 2012 | UNDP |
| Sao Tome and Principe | 0.5188 | 74.92 | 2015 | UNESCO | 73.86 | 2012 | UNESCO | 11.29 | 2011 | UNESCO | 4.70 | 2012 | UNDP |
| Saudi Arabia | 0.7995 | 94.65 | 2015 | UNESCO | 100.32 | 2013 | UNESCO | 16.95 | 2013 | UNESCO | 7.30 | 2004 | UNESCO |
| Senegal | 0.4025 | 57.67 | 2015 | UNESCO | 48.25 | 2010 | UNESCO | 7.95 | 2000 | UNESCO | 9.61 | 2013 | UNESCO |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Serbia | 0.7769 | 98.11 | 2015 | UNESCO | 83.55 | 2013 | UNESCO | 14.39 | 2013 | UNESCO | 10.46 | 2011 | UNESCO |
| Seychelles | 0.6861 | 91.84 | 2012 | UNESCO | 72.11 | 2013 | UNESCO | 13.26 | 2013 | UNESCO | 9.40 | 2012 | UNDP |
| Sierra Leone | 0.2407 | 48.09 | 2015 | UNESCO | 45.43 | 2001 | UNESCO | 7.22 | 2001 | UNESCO | 2.90 | 2012 | UNDP |
| Singapore | 0.8360 | 96.76 | 2015 | UNESCO | 102.80 | 2014 | UNESCO | 15.40 | 2012 | UNDP (HDI) | 10.20 | 2012 | UNDP |
| Slovakia | 0.7822 | 99.00 | 2014 | UNESCO | 82.20 | 2013 | UNESCO | 15.07 | 2013 | UNESCO | 10.12 | 2001 | UNESCO |
| Slovenia | 0.8952 | 99.72 | 2015 | UNESCO | 98.41 | 2013 | UNESCO | 17.54 | 2013 | UNESCO | 11.89 | 2012 | UNESCO |
| Solomon Islands | 0.4402 | 76.60 | 1999 | UNESCO | 55.42 | 2007 | UNESCO | 9.24 | 2007 | UNESCO | 4.50 | 2012 | UNDP |
| Somalia | 0.0000 | 24.00 | 2014 | UN E-Gov Survey | 17.00 | 2014 | UNDP HDI | 2.40 | 2013 | UNDP (HDI) | 3.56 | 2012 | UNDP |
| South Africa | 0.7253 | 94.27 | 2015 | UNESCO | 78.00 | 2012 | UNESCO | 13.56 | 2012 | UNESCO | 9.94 | 2012 | UNESCO |
| South Sudan | 0.3607 | 70.21 | 2014 | UNESCO | 38.00 | 2014 | UNESCO | 8.00 | 2014 | UNESCO | 5.37 | 2008 | UNESCO |
| Spain | 0.8782 | 98.10 | 2015 | UNESCO | 107.54 | 2013 | UNESCO | 17.56 | 2013 | UNESCO | 9.58 | 2012 | UNESCO |
| Sri Lanka | 0.7369 | 92.63 | 2015 | UNESCO | 77.91 | 2013 | UNESCO | 13.79 | 2013 | UNESCO | 10.91 | 2001 | UNESCO |
| Sudan | 0.3581 | 75.90 | 2015 | UNESCO | 46.55 | 2012 | UNESCO | 7.09 | 2012 | UNESCO | 3.10 | 2012 | UNDP |
| Suriname | 0.6551 | 95.57 | 2015 | UNESCO | 72.21 | 2002 | UNESCO | 12.00 | 2012 | UNDP (HDI) | 7.65 | 2004 | UNESCO |
| Swaziland | 0.5882 | 87.47 | 2015 | UNESCO | 66.73 | 2011 | UNESCO | 11.33 | 2011 | UNESCO | 7.10 | 2012 | UNDP |
| Sweden | 0.9210 | 99.00 | 2014 | UNESCO | 104.89 | 2013 | UNESCO | 18.04 | 2013 | UNESCO | 12.10 | 2012 | UNESCO |
| Switzerland | 0.8579 | 99.00 | 2014 | UNESCO | 86.95 | 2012 | UNESCO | 15.79 | 2012 | UNESCO | 13.46 | 2009 | UNESCO |
| Syrian Arab Republic | 0.4864 | 86.43 | 2015 | UNESCO | 50.60 | 2013 | UNESCO | 8.39 | 2013 | UNESCO | 6.60 | 2009 | UNESCO |
| Tajikistan | 0.7001 | 99.77 | 2015 | UNESCO | 69.73 | 2012 | UNESCO | 11.24 | 2012 | UNESCO | 10.65 | 2000 | UNESCO |
| Thailand | 0.6942 | 96.67 | 2015 | UNESCO | 78.68 | 2013 | UNESCO | 13.42 | 2013 | UNESCO | 7.32 | 2010 | UNESCO |
| The former Yugoslav Republic of Macedonia | 0.6877 | 97.83 | 2015 | UNESCO | 70.01 | 2012 | UNESCO | 13.35 | 2012 | UNESCO | 8.20 | 2012 | UNDP |
| Timor-Leste | 0.4843 | 67.52 | 2015 | UNESCO | 71.82 | 2010 | UNESCO | 11.67 | 2010 | UNESCO | 4.40 | 2012 | UNDP |
| Togo | 0.5056 | 66.55 | 2015 | UNESCO | 72.80 | 2011 | UNESCO | 12.23 | 2011 | UNESCO | 5.30 | 2012 | UNDP |
| Tonga | 0.8102 | 99.40 | 2015 | UNESCO | 88.50 | 2003 | UNESCO | 14.71 | 2003 | UNESCO | 11.06 | 2011 | UNESCO |
| Trinidad and Tobago | 0.7077 | 98.96 | 2015 | UNESCO | 67.31 | 2004 | UNESCO | 12.27 | 2004 | UNESCO | 10.76 | 2009 | UNESCO |

Table 15. Human Capital Index (HCI) and its components (continued)

| Country | HCI | Adult Literacy (%) | | | Gross enrolment ratio (%) | | | Expected years of schooling | | | Mean years of schooling | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source | Index value | Year | Source |
| Tunisia | 0.6397 | 81.78 | 2015 | UNESCO | 78.94 | 2013 | UNESCO | 14.60 | 2013 | UNESCO | 6.50 | 2012 | UNDP |
| Turkey | 0.7910 | 95.01 | 2015 | UNESCO | 97.23 | 2013 | UNESCO | 16.58 | 2013 | UNESCO | 7.56 | 2012 | UNESCO |
| Turkmenistan | 0.6583 | 99.69 | 2015 | UNESCO | 61.29 | 2014 | UNESCO | 10.80 | 2014 | UNESCO | 9.90 | 2012 | UNDP |
| Tuvalu | 0.6651 | 98.00 | 2014 | UN E-Gov Survey | 72.33 | 2001 | UNESCO | 10.80 | 2001 | UNESCO | 8.83 | 2012 | UNDP |
| Uganda | 0.4668 | 78.39 | 2015 | UNESCO | 61.32 | 2011 | UNESCO | 9.77 | 2011 | UNESCO | 4.17 | 2002 | UNESCO |
| Ukraine | 0.8390 | 99.76 | 2015 | UNESCO | 94.68 | 2013 | UNESCO | 15.14 | 2013 | UNESCO | 11.30 | 2012 | UNDP |
| United Arab Emirates | 0.6752 | 93.84 | 2015 | UNESCO | 67.00 | 2014 | UNESCO | 13.33 | 2012 | UNDP (HDI) | 9.00 | 2005 | UNESCO |
| United Kingdom of Great Britain and Northern Ireland | 0.9402 | 99.00 | 2014 | UNESCO | 101.78 | 2013 | UNESCO | 18.18 | 2013 | UNESCO | 13.75 | 2011 | UNESCO |
| United Republic of Tanzania | 0.3974 | 70.60 | 2015 | UNESCO | 53.45 | 2013 | UNESCO | 8.59 | 2013 | UNESCO | 4.30 | 2002 | UNESCO |
| United States of America | 0.8815 | 99.00 | 2014 | UNESCO | 95.44 | 2013 | UNESCO | 16.34 | 2013 | UNESCO | 12.93 | 2009 | UNESCO |
| Uruguay | 0.7820 | 98.49 | 2015 | UNESCO | 89.88 | 2010 | UNESCO | 15.50 | 2010 | UNESCO | 8.45 | 2012 | UNESCO |
| Uzbekistan | 0.6954 | 99.59 | 2015 | UNESCO | 70.39 | 2011 | UNESCO | 11.51 | 2011 | UNESCO | 10.00 | 2012 | UNDP |
| Vanuatu | 0.5884 | 85.23 | 2015 | UNESCO | 63.51 | 2004 | UNESCO | 10.60 | 2004 | UNESCO | 9.00 | 2012 | UNDP |
| Venezuela (Bolivarian Republic of) | 0.7498 | 96.32 | 2015 | UNESCO | 88.92 | 2009 | UNESCO | 14.22 | 2009 | UNESCO | 8.39 | 2009 | UNESCO |
| Viet Nam | 0.5989 | 94.51 | 2015 | UNESCO | 66.00 | 2014 | UNESCO | 11.90 | 2012 | UNDP (HDI) | 5.50 | 2012 | UNDP |
| Yemen | 0.3829 | 70.07 | 2015 | UNESCO | 55.97 | 2011 | UNESCO | 9.15 | 2011 | UNESCO | 2.50 | 2012 | UNDP |
| Zambia | 0.5643 | 63.38 | 2015 | UNESCO | 85.0 | | UNDP | 13.50 | 2012 | UNDP (HDI) | 6.50 | 2012 | UNDP |
| Zimbabwe | 0.5641 | 86.50 | 2015 | UNESCO | 61.55 | 2012 | UNESCO | 10.85084 | 2012 | UNESCO | 7.2 | 2012 | UNDP |

Sources: UNESCO Institute of Statistics http://data.uis.unesco.org/ (Last accessed September 2015)
UNDP Human Development Report 2014 http://hdr.undp.org/en/content/human-development-report-2014 (Last accessed September 2015)

Table 15. Human Capital Index (HCI) and its components (continued)

| Region | HCI | Adult Literacy | Gross Enrolment Ratio | Expected Years of Schooling | Mean years of Schooling |
|---|---|---|---|---|---|
| Africa | 0.4355 | 66.83 | 61.70 | 10.16 | 4.78 |
| Americas | 0.6933 | 92.52 | 79.00 | 13.31 | 8.41 |
| Asia | 0.6545 | 89.35 | 75.57 | 12.71 | 7.94 |
| Europe | 0.8360 | 98.81 | 92.01 | 15.93 | 11.04 |
| Oceania | 0.6897 | 91.95 | 79.15 | 12.97 | 9.00 |
| World | 0.6433 | 85.92 | 76.36 | 12.84 | 7.90 |
| | | | | | |
| Small island Developing States | 0.6442 | 89.07 | 75.29 | 12.47 | 7.71 |
| Land Locked Developing Countries | 0.5170 | 75.85 | 64.47 | 10.84 | 6.34 |
| Least Developed Countries | 0.3875 | 63.34 | 57.58 | 9.32 | 4.14 |
| | | | | | |
| High Income | 0.8270 | 98.17 | 91.65 | 15.85 | 10.78 |
| Upper Middle Income | 0.7061 | 93.34 | 79.62 | 13.57 | 8.61 |
| Lower Middle Income | 0.5573 | 81.49 | 67.53 | 11.23 | 6.69 |
| Low Income | 0.3746 | 61.35 | 58.29 | 9.18 | 3.99 |

## Table 16. Regional and Economic Groupings for E-Government Development Index (EDGI)

| Country | Region | Sub-Region | EGDI Level | Level of Income | GNI Per Capita (US dollars) |
|---|---|---|---|---|---|
| Afghanistan | Asia | Southern Asia | Low | Low Income | 670 |
| Albania | Europe | Southern Europe | High | Upper Middle Income | 4460 |
| Algeria | Africa | Northern Africa | Medium | Upper Middle Income | 5480 |
| Andorra | Europe | Southern Europe | High | High Income | 43270* |
| Angola | Africa | Middle Africa | Medium | Upper Middle Income | 4850 |
| Antigua and Barbuda | Americas | Caribbean | Medium | High Income | 13360 |
| Argentina | Americas | South America | High | High Income | 14160 |
| Armenia | Asia | Western Asia | High | Lower Middle Income | 3780 |
| Australia | Oceania | Oceania | Very high | High Income | 64680 |
| Austria | Europe | Western Europe | Very high | High Income | 50390* |
| Azerbaijan | Asia | Western Asia | High | Upper Middle Income | 7590 |
| Bahamas | Americas | Caribbean | High | High Income | 20980 |
| Bahrain | Asia | Western Asia | Very high | High Income | 21050* |
| Bangladesh | Asia | Southern Asia | Medium | Lower Middle Income | 1080 |
| Barbados | Americas | Caribbean | High | High Income | 14960** |
| Belarus | Europe | Eastern Europe | High | Upper Middle Income | 7340 |
| Belgium | Europe | Western Europe | Very high | High Income | 47030 |
| Belize | Americas | Central America | Medium | Upper Middle Income | 4350* |
| Benin | Africa | West Africa | Low | Low Income | 810 |
| Bhutan | Asia | Southern Asia | Medium | Lower Middle Income | 2390 |
| Bolivia | Americas | South America | Medium | Lower Middle Income | 2910 |
| Bosnia and Herzegovina | Europe | Southern Europe | High | Upper Middle Income | 4780 |
| Botswana | Africa | Southern Africa | Medium | Upper Middle Income | 7240 |
| Brazil | Americas | South America | High | Upper Middle Income | 11530 |
| Brunei Darussalam | Asia | South-Eastern Asia | High | High Income | 37320** |
| Bulgaria | Europe | Eastern Europe | High | Upper Middle Income | 7420 |
| Burkina Faso | Africa | West Africa | Low | Low Income | 710 |
| Burundi | Africa | Eastern Africa | Low | Low Income | 270 |
| Cabo Verde | Africa | West Africa | Medium | Lower Middle Income | 3450 |
| Cambodia | Asia | South-Eastern Asia | Medium | Low Income | 1020 |
| Cameroon | Africa | Middle Africa | Very high | Lower Middle Income | 1360 |
| Canada | Americas | North America | Medium | High Income | 51690 |
| Central African Republic | Africa | Middle Africa | Low | Low Income | 330 |
| Chad | Africa | Middle Africa | Low | Low Income | 980 |
| Chile | Americas | South America | High | High Income | 14910 |
| China | Asia | Eastern Asia | High | Upper Middle Income | 7380 |
| Colombia | Americas | South America | High | Upper Middle Income | 7970 |
| Comoros | Africa | Eastern Africa | Low | Low Income | 820 |
| Congo | Africa | Middle Africa | Low | Lower Middle Income | 2710 |
| Costa Rica | Americas | Central America | High | Upper Middle Income | 10120 |
| Côte d'Ivoire | Africa | West Africa | Low | Lower Middle Income | 1460 |
| Croatia | Europe | Southern Europe | High | High Income | 13020 |
| Cuba | Americas | Caribbean | Medium | Upper Middle Income | 5880*** |

Table 16. Regional and Economic Grouping for E-Government Development Index (EDGI) (Continued)

| Country | Region | Sub-Region | EGDI Level | Level of Income | GNI Per Capita (US dollars) |
|---|---|---|---|---|---|
| Cyprus | Asia | Western Asia | High | High Income | 26370 |
| Czech Republic | Europe | Eastern Europe | High | High Income | 18970* |
| Democratic People's Republic of Korea | Asia | Eastern Asia | Medium | Low Income | 506~ |
| Democratic Republic of the Congo | Africa | Middle Africa | Low | Low Income | 380 |
| Denmark | Europe | Northern Europe | Very high | High Income | 61310 |
| Djibouti | Africa | Eastern Africa | Low | Lower Middle Income | 1030& |
| Dominica | Americas | Caribbean | Medium | Upper Middle Income | 7070 |
| Dominican Republic | Americas | Caribbean | Medium | Upper Middle Income | 6030 |
| Ecuador | Americas | South America | High | Upper Middle Income | 6070 |
| Egypt | Africa | Northern Africa | Medium | Lower Middle Income | 3050 |
| El Salvador | Americas | Central America | Medium | Lower Middle Income | 3950 |
| Equatorial Guinea | Africa | Middle Africa | Low | High Income | 12640 |
| Eritrea | Africa | Eastern Africa | Low | Low Income | 680 |
| Estonia | Europe | Northern Europe | Very high | High Income | 18530 |
| Ethiopia | Africa | Eastern Africa | Medium | Low Income | 550 |
| Fiji | Oceania | Oceania | Medium | Upper Middle Income | 4540 |
| Finland | Europe | Northern Europe | Very high | High Income | 48910* |
| France | Europe | Western Europe | Very high | High Income | 43070 |
| Gabon | Africa | Middle Africa | Medium | Upper Middle Income | 9450 |
| Gambia | Africa | West Africa | Low | Low Income | 440 |
| Georgia | Asia | Western Asia | High | Lower Middle Income | 3720 |
| Germany | Europe | Western Europe | Very high | High Income | 47640 |
| Ghana | Africa | West Africa | Medium | Lower Middle Income | 1600 |
| Greece | Europe | Southern Europe | High | High Income | 22090 |
| Grenada | Americas | Caribbean | High | Upper Middle Income | 7850 |
| Guatemala | Americas | Central America | Medium | Lower Middle Income | 3410 |
| Guinea | Africa | West Africa | Low | Low Income | 470 |
| Guinea-Bissau | Africa | West Africa | Low | Low Income | 550 |
| Guyana | Americas | South America | Medium | Lower Middle Income | 4170 |
| Haiti | Americas | Caribbean | Low | Low Income | 820 |
| Honduras | Americas | Central America | Medium | Lower Middle Income | 2280 |
| Hungary | Europe | Eastern Europe | High | High Income | 13470 |
| Iceland | Europe | Northern Europe | Very high | High Income | 47640 |
| India | Asia | Southern Asia | Medium | Lower Middle Income | 1570 |
| Indonesia | Asia | South-Eastern Asia | Medium | Lower Middle Income | 3630 |
| Iran (Islamic Republic of) | Asia | Southern Asia | Medium | Upper Middle Income | 6840* |
| Iraq | Asia | Western Asia | Medium | Upper Middle Income | 6320 |
| Ireland | Europe | Northern Europe | Very high | High Income | 44660 |
| Israel | Asia | Western Asia | Very high | High Income | 34990 |
| Italy | Europe | Southern Europe | Very high | High Income | 34280 |
| Jamaica | Americas | Caribbean | Medium | Upper Middle Income | 5220* |
| Japan | Asia | Eastern Asia | Very high | High Income | 42000 |

Table 16. Regional and Economic Grouping for E-Government Development Index (EDGI) (Continued)

| Country | Region | Sub-Region | EGDI Level | Level of Income | GNI Per Capita (US dollars) |
|---|---|---|---|---|---|
| Jordan | Asia | Western Asia | High | Upper Middle Income | 5160 |
| Kazakhstan | Asia | Central Asia | High | Upper Middle Income | 11670 |
| Kenya | Africa | Eastern Africa | Medium | Lower Middle Income | 1290 |
| Kiribati | Oceania | Oceania | Medium | Lower Middle Income | 2150 |
| Kuwait | Asia | Western Asia | High | High Income | 52000* |
| Kyrgyzstan | Asia | Central Asia | Medium | Lower Middle income | 1250 |
| Lao People's Democratic Republic | Asia | South-Eastern Asia | Medium | Lower Middle Income | 1650 |
| Latvia | Europe | Northern Europe | High | High Income | 15660 |
| Lebanon | Asia | Western Asia | High | Upper Middle Income | 9800 |
| Lesotho | Africa | Southern Africa | Medium | Lower Middle Income | 1340 |
| Liberia | Africa | West Africa | Low | Low Income | 370 |
| Libya | Africa | Northern Africa | Medium | Upper Middle Income | 7910 |
| Liechtenstein | Europe | Western Europe | High | High Income | 115530^ |
| Lithuania | Europe | Northern Europe | Very high | High Income | 15380 |
| Luxembourg | Europe | Western Europe | Very high | High Income | 69880* |
| Madagascar | Africa | Eastern Africa | Low | Low Income | 440 |
| Malawi | Africa | Eastern Africa | Low | Low Income | 250 |
| Malaysia | Asia | South-Eastern Asia | High | Upper Middle Income | 10760 |
| Maldives | Asia | Southern Asia | Medium | Upper Middle Income | 7170 |
| Mali | Africa | West Africa | Low | Low Income | 660 |
| Malta | Europe | Southern Europe | High | High Income | 21000* |
| Marshall Islands | Oceania | Oceania | Medium | Upper Middle Income | 4300* |
| Mauritania | Africa | West Africa | Low | Lower Middle Income | 1270 |
| Mauritius | Africa | Eastern Africa | High | Upper Middle Income | 9710 |
| Mexico | Americas | Central America | High | Upper Middle Income | 9860 |
| Micronesia (Federated States of) | Oceania | Oceania | Medium | Lower Middle Income | 3270 |
| Monaco | Europe | Western Europe | High | High Income | 186710^^ |
| Mongolia | Asia | Eastern Asia | High | Upper Middle Income | 4280 |
| Montenegro | Europe | Southern Europe | High | Upper Middle Income | 7240 |
| Morocco | Africa | Northern Africa | High | Lower Middle Income | 2980 |
| Mozambique | Africa | Eastern Africa | Low | Low Income | 620 |
| Myanmar | Asia | South-Eastern Asia | Low | Lower Middle Income | 1270 |
| Namibia | Africa | Southern Africa | Medium | Upper Middle Income | 5680 |
| Nauru | Oceania | Oceania | Medium | Upper Middle Income | 6746~ |
| Nepal | Asia | Southern Asia | Medium | Low Income | 730 |
| Netherlands | Europe | Western Europe | Very high | High Income | 51210 |
| New Zealand | Oceania | Oceania | Very high | High Income | 39300* |
| Nicaragua | Americas | Central America | Medium | Lower Middle Income | 1870 |
| Niger | Africa | West Africa | Low | Low Income | 420 |
| Nigeria | Africa | West Africa | Medium | Lower Middle Income | 2970 |
| Norway | Europe | Northern Europe | Very high | High Income | 103050 |
| Oman | Asia | Western Asia | High | High Income | 16870* |
| Pakistan | Asia | Southern Asia | Medium | Lower Middle Income | 1410 |

Table 16. Regional and Economic Grouping for E-Government Development Index (EDGI) (Continued)

| Country | Region | Sub-Region | EGDI Level | Level of Income | GNI Per Capita (US dollars) |
|---|---|---|---|---|---|
| Palau | Oceania | Oceania | Medium | Upper Middle Income | 11110 |
| Panama | Americas | Central America | Medium | Upper Middle Income | 11130 |
| Papua New Guinea | Oceania | Oceania | Low | Lower Middle Income | 2030* |
| Paraguay | Americas | South America | Medium | Upper Middle Income | 4380 |
| Peru | Americas | South America | High | Upper Middle Income | 6370 |
| Philippines | Asia | South-Eastern Asia | High | Lower Middle Income | 3470 |
| Poland | Europe | Eastern Europe | High | High Income | 13730 |
| Portugal | Europe | Southern Europe | High | High Income | 21320 |
| Qatar | Asia | Western Asia | High | High Income | 94410 |
| Republic of Korea | Asia | Eastern Asia | Very high | High Income | 27090 |
| Republic of Moldova | Europe | Eastern Europe | High | Lower Middle Income | 2550 |
| Romania | Europe | Eastern Europe | High | Upper Middle Income | 9370 |
| Russian Federation | Europe | Eastern Europe | High | High Income | 13210 |
| Rwanda | Africa | Eastern Africa | Medium | Low Income | 700 |
| Saint Kitts and Nevis | Americas | Caribbean | High | High Income | 14490 |
| Saint Lucia | Americas | Caribbean | Medium | Upper Middle Income | 7080 |
| Saint Vincent and the Grenadines | Americas | Caribbean | Medium | Upper Middle Income | 6560 |
| Samoa | Oceania | Oceania | Medium | Lower Middle Income | 4050 |
| San Marino | Europe | Southern Europe | High | High Income | 52140^^ |
| Sao Tome and Principe | Africa | Middle Africa | Low | Lower Middle Income | 1670 |
| Saudi Arabia | Asia | Western Asia | High | High Income | 25140* |
| Senegal | Africa | West Africa | Medium | Lower Middle Income | 1040 |
| Serbia | Europe | Southern Europe | High | Upper Middle Income | 5820 |
| Seychelles | Africa | Eastern Africa | High | High Income | 13990 |
| Sierra Leone | Africa | West Africa | Low | Low Income | 710 |
| Singapore | Asia | South-Eastern Asia | Very high | High Income | 55150 |
| Slovakia | Europe | Eastern Europe | High | High Income | 17810* |
| Slovenia | Europe | Southern Europe | Very high | High Income | 23220* |
| Solomon Islands | Oceania | Oceania | Low | Lower Middle Income | 1830 |
| Somalia | Africa | Eastern Africa | Low | Low Income | 107~ |
| South Africa | Africa | Southern Africa | High | Upper Middle Income | 6800 |
| South Sudan | Africa | Eastern Africa | Low | Low Income | 940 |
| Spain | Europe | Southern Europe | Very high | High Income | 29940* |
| Sri Lanka | Asia | Southern Asia | High | Lower Middle Income | 3400 |
| Sudan | Africa | Northern Africa | Medium | Lower Middle Income | 1710 |
| Suriname | Americas | South America | Medium | Upper Middle Income | 9470* |
| Swaziland | Africa | Southern Africa | Medium | Lower Middle Income | 2700 |
| Sweden | Europe | Northern Europe | Very high | High Income | 61600 |
| Switzerland | Europe | Western Europe | Very high | High Income | 90670* |
| Syrian Arab Republic | Asia | Western Asia | Medium | Lower Middle Income | 1860^^^ |
| Tajikistan | Asia | Central Asia | Medium | Lower Middle Income | 1080 |
| Thailand | Asia | South-Eastern Asia | High | Upper Middle Income | 5370 |

## Table 16. Regional and Economic Grouping for E-Government Development Index (EDGI) (Continued)

| Country | Region | Sub-Region | EGDI Level | Level of Income | GNI Per Capita (US dollars) |
|---|---|---|---|---|---|
| The former Yugoslav Republic of Macedonia | Europe | Southern Europe | High | Upper Middle Income | 5150 |
| Timor-Leste | Asia | South-Eastern Asia | Medium | Lower Middle Income | 3120 |
| Togo | Africa | West Africa | Medium | Low Income | 570 |
| Tonga | Oceania | Oceania | Medium | Upper Middle Income | 4290 |
| Trinidad and Tobago | Americas | Caribbean | High | High Income | 15550* |
| Tunisia | Africa | Northern Africa | High | Upper Middle Income | 4210* |
| Turkey | Asia | Western Asia | High | Upper Middle Income | 10840 |
| Turkmenistan | Asia | Central Asia | Medium | Upper Middle Income | 8020 |
| Tuvalu | Oceania | Oceania | Medium | Upper Middle Income | 5840* |
| Uganda | Africa | Eastern Africa | Medium | Low Income | 680 |
| Ukraine | Europe | Eastern Europe | High | Lower Middle Income | 3560 |
| United Arab Emirates | Asia | Western Asia | Very high | High Income | 45200 |
| United Kingdom of Great Britain and Northern Ireland | Europe | Northern Europe | Very high | High Income | 42690 |
| United Republic of Tanzania | Africa | Eastern Africa | Medium | Low Income | 930 |
| United States of America | Americas | North America | Very high | High Income | 55200 |
| Uruguay | Americas | South America | High | High Income | 16350 |
| Uzbekistan | Asia | Central Asia | High | Lower Middle Income | 2090 |
| Vanuatu | Oceania | Oceania | Medium | Lower Middle Income | 3090* |
| Venezuela | Americas | South America | High | High Income | 12890 |
| Viet Nam | Asia | South-Eastern Asia | High | Lower Middle Income | 1890 |
| Yemen | Asia | Western Asia | Low | Lower Middle Income | 1300* |
| Zambia | Africa | Eastern Africa | Medium | Lower Middle Income | 1680 |
| Zimbabwe | Africa | Eastern Africa | Medium | Low Income | 830 |

Source: World Bank 2015 World Development Indicators (Accessed 18 September 2015)
http://data.worldbank.org/data-catalog/world-development-indicators
Year: 2014 or most recent data available (as indicated
* 2013
** 2012
*** 2011
^ 2009
^^ 2008
^^^ 2007
& 2005
~ 2014 (UN Data)

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