

eGovernment

ITU e-Government Implementation Toolkit

A Framework for e-Government
Readiness and Action Priorities

1



INTERNATIONAL TELECOMMUNICATION UNION E-GOVERNMENT IMPLEMENTATION TOOLKIT

INTRODUCTION: E-GOVERNMENT READINESS ASSESSMENT FRAMEWORK

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The views expressed in this paper are those of the authors and do not necessarily reflect the opinions of ITU or of its membership.

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1 ABOUT THIS E-GOVERNMENT READINESS ASSESSMENT FRAMEWORK

This paper on e-government readiness assessment serves as an introduction to the “ITU e-Government Implementation Toolkit”. The Toolkit, to be developed in several modules, will examine key dimensions of the e-government environment to help decision makers identify priority areas for action, based on their level of readiness and national development strategies.

The e-Government Readiness Assessment Framework aims to assist decision makers from low, lower middle and upper middle income countries in determining the condition of e-government in their countries; comparing it to the status of e-government in other economies, and identifying priority areas for further action. To this end, the framework provides a comprehensive overview of publicly and freely available data, collected by United Nations agencies, international finance institutions, business organisations and non-governmental organisations (NGOs), which can be used to understand the e-government readiness of a country. Our purpose is not to collect new data, but to promote the understanding and use of existing e-government data collections by calling attention to the aspects they provide information about, as well as to their strengths and weaknesses.

To further facilitate the assessment of national e-government readiness, the framework includes an “e-Government Readiness Quick-check Tool”, a hands-on IT-tool, developed by ITU, that assembles data from five recognised indices and a pragmatic choice of indicators discussed in this framework. The tool provides a graphical illustration of a country’s readiness status on four dimensions of the e-government environment: Infrastructure, policy, governance and outreach. The Quick-check tool also allows users to display simultaneous graphs to compare one country’s scores to those of another, of its peer group –as defined in the World Bank’s income groups–, as well as to those of an ITU world region (Africa, the Americas, Arab States, Asia & Pacific, Europe and CIS countries).

Finally, based on the analysis of available data and a review of relevant literature, this framework suggests topics to be examined in future Toolkit modules and indicates the topics that might be most relevant to a country, according to its income level classification.

The ITU e-Government Implementation Toolkit is structured so that each module can be used as a stand-alone tool on a specific topic. Once all the modules have been completed, with the input of ITU’s membership, this introduction will be reviewed to reflect the final structure of the Toolkit.

The following chapter defines the term e-government and describes some of its most significant benefits. A more extensive overview of the concept of e-government and its application in developing countries can be found in the 2008 ITU report “*Electronic Government for Developing Countries*”.¹

2 POTENTIAL BENEFITS OF IMPLEMENTING E-GOVERNMENT

Electronic government or “e-Government” is defined as “the use of information and communication technologies in government to provide public services, to improve managerial effectiveness and to promote democratic values; as well as a regulatory framework that facilitates information intensive initiatives and fosters the knowledge society”.² Governments use information and communication technologies (ICTs) for the exchange of information with citizens and businesses on topics such as tax compliance, public utility services, as well as vehicle and voting registration. Often, the introduction of e-government services goes along with a change towards a more customer friendly culture.

¹ This report can be downloaded from ITU’s website at <http://www.itu.int/ITU-D/cyb/publications/index.html>.

² Gant, Jon P., 2008, p. 15.

While e-government, per se, is technology neutral, the Internet became an important infrastructure for government services. Online government followed the path of business services and private transactions, which had discovered first the usefulness of the Internet as information infrastructure. Beyond the Internet, other technologies and applications can be used for e-government services, such as telephones (fixed or mobile), messaging systems (SMS or MMS), fax, biometric identification, smart cards, radio-frequency ID (RFID) chips, as well as television or radio-based government services used to provide disaster warnings, electronic newsletters, education management systems and traffic control systems.

e-Government is often associated with government web portals because most governments, national or local, have created web sites and umbrella portals, operating as gateways and guidance to information and services. Some governments have moved forward by introducing personalized e-government services that go beyond the provision of general information to allow case sensitive interaction with the user.

The introduction of e-government applications has been beneficial to governments in several ways. Most significantly, in the area of public procurement, electronic applications have expanded government access to potential suppliers and increased the number of offers received in a timely manner. e-Government applications also provide a valuable development tool by increasing the effectiveness of aid provision and procurement. One example is the Aid Management Platform (AMP), created by the Development Gateway Foundation. This platform provides governments a virtual workspace where state employees and donors can share aid information online, supporting planning, execution and implementation activities.³

The time and funds required to provide government services can be a burden to citizens, businesses and to administrations, particularly for those in developing countries and rural areas. By introducing e-government services, governments can dramatically reduce transaction costs and improve internal planning mechanisms. Moreover, the introduction of e-government and the integration of services usually require governments to streamline their administrative processes. Streamlining improves efficiency, reduces costs and generates savings, lowering the cost of government services. In some cases, generated revenues may be used to reduce or abolish service fees, or can be reinvested into more sophisticated e-government applications and services.

The case of the Indian e-government centre “Jan Seva Kendra”, discussed in Box 1 below, illustrates the effect that re-engineering processes and documenting administrative actions—activities required for e-government provision—may have in reducing corruption, increasing transparency and trust in administrations, as well as in facilitating improved citizens’ involvement in government.

Further, e-government can support democratization (e-Democracy) by enabling citizens to participate in political consultations in real-time and in a cost effective manner. These applications also provide the means for politicians to be better informed about public opinions. Moreover, increasing use of ICTs for social networking is giving citizens a powerful instrument to influence political processes; increased citizen involvement through e-government tends to be mirrored by intensified government efforts to improve transparency and accountability.

Finally, e-government is considered a means to reach national environmental targets, as it eases the process towards a “paper free office”. Nevertheless, more studies are needed to evaluate the environmental impact that the implementation of e-government may have on other areas, such as increased electricity consumption of ICT infrastructure or the disposal of obsolete equipment, also known as “e-waste”.

³ See <http://amp.developmentgateway.org/index.do>.

Box 1: “Jan Seva Kendra”: One-stop e-Governance centre for Gandhinagar, India

ICT enabled public service delivery mechanism

Project overview

Gandhinagar, capital city of the state of Gujarat, India, is a district collectorate, that is, an administrative unit, typically composed of 500 to 600 villages. With an estimated population 1.4 million inhabitants, providing public services in the district represented a challenge for the state government. To address this problem, in 2006, the District Collector, Ms. Sonal Mishra, started an e-Governance project aimed to deliver government services to citizens in the district in a transparent, efficient and economical manner, using a single interface known as “Jan Seva Kendra” (JSK).

The one-stop centre provides over 97 different public services, including processes relating to land revenue issues, pensions, grants, licensing and certifications. While the project does not abolish paper-based processes, it intends to improve them by establishing a bar code system that gives a unique identification code to each submitted request. A bar code sticker, attached to each form, allows the system to identify the type of services required and estimate the waiting time, based on the services requested and staff availability. The officer receiving the form does the necessary identification of the applicant and confirms reception of the form with a software-issued barcode acknowledgement slip. The applicant receives one copy for confirmation, showing the help line number and indicating the delivery date and time; a second copy is attached to the application.

At the back-office, the application’s bar codes are scanned and assigned to the institution in charge. Services are delivered from the district headquarters at Gandhinagar or through linked sub-district centres. A list of papers sent to each institution is printed out and sent to the relevant institution, together with the paper forms. The receiving institution needs to confirm reception of the list of documents. The form and processing status can be tracked online by every department at any time, via short message service (SMS) or by requesting printouts.

Technology

The technological infrastructure at the JSK centre includes personal computers (PCs) with barcode scanners for traceability, Interactive Voice Response Services (IVRS) for anytime response, SMS for alerts, web-cams for instant photos, biometrics for identification and a Management Information System (MIS) for continuous monitoring, tracking and reforms.

The software system designed for the project, called “Jan Setu”, seeks to accomplish three key targets: Transparency, efficiency and utility. To fulfil some of the goals described in Figure 1 below, the software has the capacity to generate reports that facilitate monitoring payment collection, processing times, and delays, among others, thus facilitating further improvement of administrative processes. The system also lets applicants follow up the status of their applications by sending an SMS query, calling a computerized hotline, visiting the website or by visiting the e-Governance centre.

The project has not yet reached all its goals. In further steps, the back-office should be improved by introducing workflow management systems. When this is achieved, further district level services should be provided, like education, health and agriculture. It is expected for private providers to take over the provision of some of the services once well-monitored processes have been established and a better understanding of the involved resources has been generated. A constant task within the project is to raise awareness among citizens about the options available and the possibilities for improvement. In order to make the centres more sustainable, citizen to citizen (C2C) and business to citizen (B2C) services are being considered.

Costs

The cost of launching the project was 3.5 million Rupees (Rs), of which 0.9 million Rs were covered by the State Government and 2.6 million Rs. by public-private partnerships.

Impact

A report from a Gandhinagar District Collector noted that, by 2007, the JSK centre was processing an average of 400 applications per day. Since its inception in 2006, JSK had successfully processed over 120,000 applications, covering a wide range of public services, with a 94 percent on-time delivery record. The time citizens spent waiting at the district offices to submit an application had been reduced

service.

Significantly, the report notes that the transparency of the system has improved the attitudes of officers and the citizen's perception of government. Based on the positive results obtained so far, the project is being replicated in other Gujarat districts and is being considered for adoption in other Indian states.

Figure 1: Goals of Jan Seva Kendra

- **Transparency:** Information about the status of the work-in-process to the applicant
- **Accountability:** Time deadlines for every issue of public service, written Commitment to the applicant about the latest date of completion of work, compliance of the time limits with due alerts and reminders to the office staff and higher level officers
- **Efficiency:** Increase in the quality and quantity of output of the office staff by minimizing undue status queries by citizens and by ensuring the computer based acceptance of applications, complete in all respects
- **Fairness:** Computer enforced in-turn processing, computer assisted application scrutiny, smart token-counter system for service delivery front-end
- **Speed:** Minimized queries and so single pass processing, reduced interactions to handle inquiries and undue expectations of applicants
- **Services to remote locations:** Laptop and mobile connectivity based village camps to cater services to poor and illiterate citizens in remote areas
- **Public-Private Partnership:** Involvement of citizens, institutions as sponsors
- **Cost Savings:** Prescribed fees, no agents or touts, computer based front-end to accept applications, deliveries in committed time, no need for personal follow-ups
- **Convenience:** Mobile based service deliveries, home delivery of processed papers, no need for office visits and follow ups, no need to approach different offices for different work, Clarity on requirements

Source: Sonal Mishra, Stockholm Challenge, <http://event.stockholmchallenge.se/print/1528> (downloaded 22.01.2009); Sonal Mishra, "ICT enabled Public Service Delivery Centre Jan Seva Kendra", <http://www.capam.org/assets/ind019.pdf> (downloaded 08.11.09); India Development Gateway, http://www.indg.gov.in/e-governance/ict-initiatives-in-states-uts/e-governance/ict-initiatives-in-states-uts/e-governance-in-gujarat/view?set_language=en (downloaded 22.01.2009).

As the Jan Seva Kendra example illustrates, it is considered that e-government can improve effectiveness in delivering public services, enhancing transparency and strengthening democracy.⁴ To fulfil the potential benefits highlighted in this chapter, however, is necessary for policymakers to take into consideration all the dimensions involved in the planning and implementation of e-government, as is discussed in the following chapter.

3 THE FOUR DIMENSIONS OF THE E-GOVERNMENT ENVIRONMENT

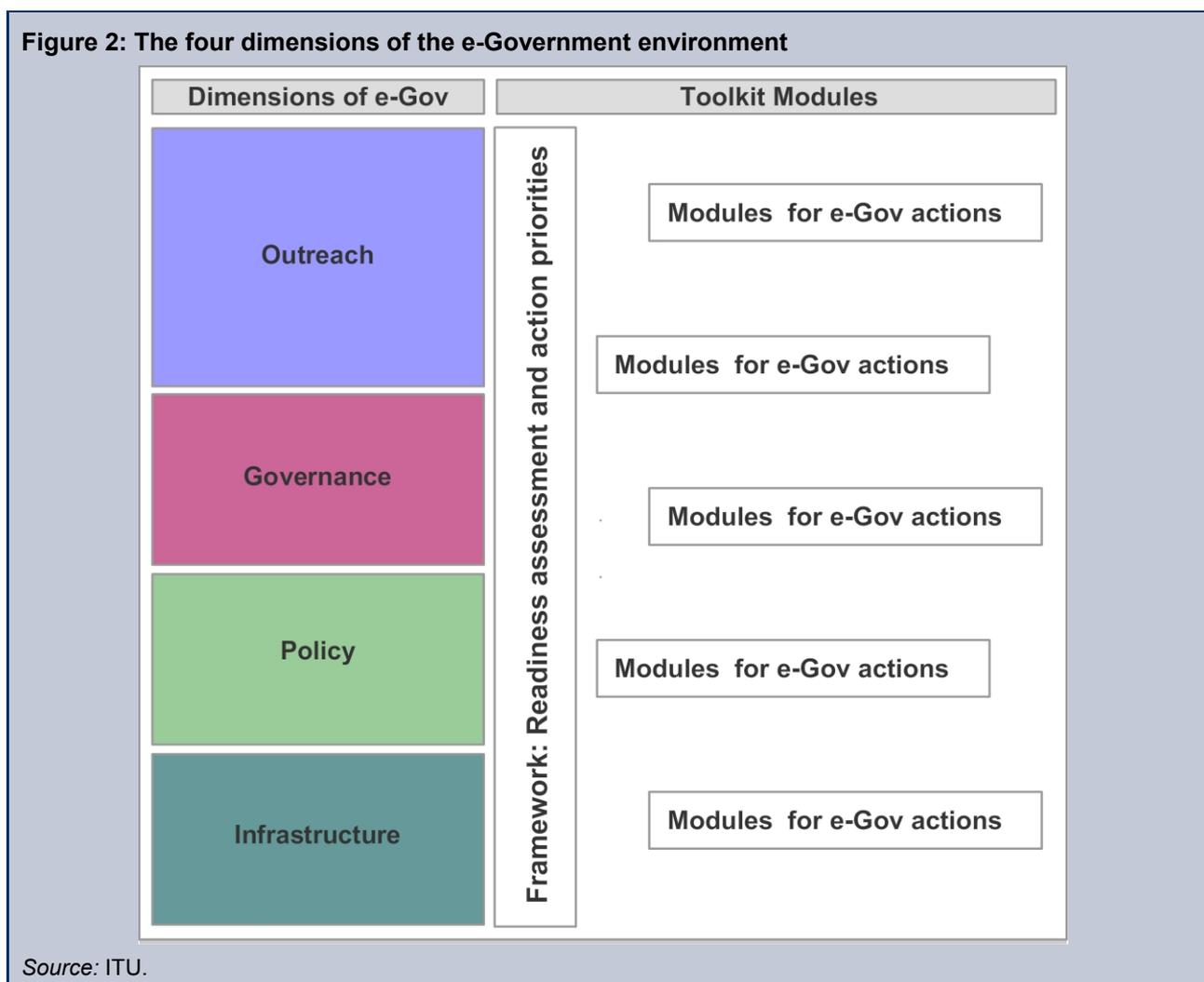
Even though the emergence of the Internet and developments in processing and storage of data are technological issues, e-government challenges are not primarily technical. e-Government activities are embedded in the environment of today's administration. This means that e-government activities can only be implemented successfully where administrations are able and willing to do so.⁵ Accordingly, the success of e-government initiatives depends in part on the ability for public administration, as well as the political will of key stakeholders. While the government

⁴ See infoDev, 2008.

⁵ See Edwin Lau, 2003.

and its administration play a fundamental role, the e-government environment is shaped also by other stakeholders, including citizens, businesses, civil servants, local, national and international institutions and civil society organisations.

Analytically, the e-government environment can be structured in several ways, according to different aspects.⁶ For the purpose of this Toolkit, we will concentrate on four basic dimensions of the e-government environment: (1) Infrastructure, (2) policy, (3) governance and (4) outreach. While this is not an exhaustive list of dimensions of e-government, these categories are considered to be wide enough to cover all the important aspects of e-government and can, at the same time, be narrowed down to provide useful recommendations on future policy prioritisation and activities. Therefore, this framework uses these four dimensions to describe and understand the realities that influence a country's level of e-government readiness.



3.1 Dimension one: Infrastructure

Infrastructure is probably the most obvious and tangible dimension of e-government. Since e-government is characterised by procedures and services taking place between administrations on the one side and citizens or businesses (or other administrative entities) on the other, technical infrastructure is needed to carry information and services. This characteristic distinguishes e-government from earlier forms of interaction with an administration. e-Government provision is not

⁶ See Tino Schuppan, 2009.

linked to a specific technology, but rather to any electronic means that citizens and businesses use to send and receive voice, data, and images via the Internet, such as personal computers, laptops, personal digital assistant devices (PDAs), as well as mobile and fixed line telephony,

The effectiveness of e-government services in reaching citizens and businesses depends greatly in the availability of ICT infrastructure. Therefore, it is very relevant for decision makers to evaluate the status and development of ICT infrastructure in their countries and plan e-government projects accordingly. To assess the level of access to ICT infrastructure, decision makers can use data collected from telecommunication incumbents and Internet providers via individual, business and household surveys. A well-informed analysis would profit also from knowledge of the affordability of access to ICTs, looking at tariffs for certain services in comparison to per capita income levels.

Finally, the infrastructure dimension also extends to the energy sector, as access to electricity is a precondition for a functioning ICT infrastructure.

3.2 Dimension two: Policy

A policy is a deliberate plan of action to guide decisions and achieve rational outcomes. Commonly, governments develop and implement policies to address basic socio-economic issues that are expressed in laws, budgetary actions, international agreements, declarations, contracts or campaigns.

Different types of policies shape the e-government environment. Trade regulations control the import and export of ICT goods, affecting the provision of services. Policies protecting local ICT industries, including tariff barriers, alter the movement and price of goods in a market. Similarly, antitrust regulations and market liberalisation strategies, enforced by telecommunication regulatory authorities, have created the conditions for greater competition in the sector, the introduction of new technologies and services, and better prices for consumers. Likewise, the inclusion of universal service obligations in the licences of telecommunication incumbents or Internet providers has promoted access to ICT infrastructure in least served areas, such as rural and low income communities.

Several countries have formulated comprehensive ICT strategies with the goal of accelerating their participation in the information society. The example of Egypt illustrates the close link that exists between general ICT policies and the e-government environment. Egypt's ICT strategy 2007-2010 brings e-government into the country's overall ICT strategy, proposing reforms in five key areas: state-of-the-art telecommunication and postal infrastructure, ICT access for all, ICT for education and Lifelong Learning, ICT for health, and innovation in the ICT industry.⁷ The same is true for Singapore, where the responsibility for general ICT policy, as well as for e-government policy, lays with the "Infocomm Development Authority of Singapore" (IDA). In the framework of its "iN2015" master plan and its "iGov 2010" sub-plan, IDA intends to encourage effective competition in the country's telecommunication market. Further, IDA functions as Chief Information Officer (CIO) and is responsible for the security of crucial ICT infrastructure, master-planning as well as project implementation of government-wide ICT plans. Box 2, below, provides more detail on the goals and strategies of both plans.

Policies protecting critical information infrastructure also shape the e-government environment. Cybersecurity policies—the protection of e-government infrastructure against failures and attacks from inside the system, as well as from outside—are essential once a country relies strongly on e-government services. Protective measures are particularly necessary for the provision of e-business or whenever sensitive financial or personal data are being transferred electronically. Protecting the privacy of individual users is also crucial to ensure citizen's trust in the new communication technologies. Accordingly, laws and regulations on digital identification, digital signatures, e-payment and data protection are highly relevant, and are shaping the environment of e-government.

⁷ Ministry of Communications and Information Technology (MCIT), http://www.mcit.gov.eg/ICT_Strategy.aspx

While e-government policies depend strongly on the vision of decision makers, success requires for such visions to be formulated, expressed, shared and discussed with all relevant stakeholders to improve ownership and ease implementation. When policies fail to be implemented, the gap between plans, actions and expected outcomes grows, resulting in citizen dissatisfaction.

Box 2: The master plan iN2015 and iGov2010, Singapore

A holistic strategy with strong customer orientation

In May 2006, IDA launched its 10-year master plan, called “Intelligent Nation 2015” (iN2015). A key component of the master plan is the establishment of a nation-wide “Next Generation Broadband Network”, comprised of both wired and wireless access. The wired network is expected to deliver ultra-high broadband symmetric speeds of 1Gbps and above to all households, business and education institutions; meanwhile, the wireless access should provide pervasive connectivity nationwide. This infrastructure will make possible to offer advanced services in seven key economic sectors: Media and entertainment, education, financial services, health care, manufacturing, tourism, infrastructure and ICT capacity building. Stakeholders from the private sector and civil society participated in the development of this plan, achieving a strong sense of ownership and support from all stakeholders for implementing the plan.

iN2015 includes a dedicated e-government plan, called “iGov2010”, which builds on the achievements of the previous e-Government Action Plan 1 and 2. The e-Government Action Plan 1, which ended in 2003, already made available 1,600 services online.

iGov2010 has a five-year budget of 2 billion USD and focuses on the following goals: (1) increase of reach and richness of e-services, (2) increase in customer orientation, (3) enhancement of capacity and synergy in government and (4) improvement of the competitiveness of Singapore’s economy. Figure 4 below provides an overview of the iGov2010 strategic framework.

Source: Infocomm Development Authority of Singapore (IDA). (2006a). *From Integrating Services to integration Governments*, Report by the iGov2010 Steering Committee, Singapore, http://www.ida.gov.sg/doc/About%20us/About_Us_Level2/20071005103551/07_iGov2010.pdf; Infocomm Development Authority of Singapore (IDA). (2006b), *Innovation. Integration. Internationalisation*. A Report by the iN2015 Steering Committee, Singapore, http://www.ida.gov.sg/doc/About%20us/About_Us_Level2/20071005103551/01_iN2015_Main_Report.pdf Accenture (2007). *Delivering on the Promise*.

Figure 3: Strategic framework of iGov2010

Vision	To be an Integrated Government that delights customers and connects citizens through infocomm			
Strategic Thrusts	Increasing Reach & Richness of e-Services	Increasing Citizens' Mindshare in e-Engagement	Enhancing Capacity & Synergy in Government	Enhancing National Competitive Advantage
Strategies	<ul style="list-style-type: none"> Develop insights to enhance e-services to customers Deliver proactive, user-friendly, responsive and integrated e-services Extend the reach of e-services 	<ul style="list-style-type: none"> Deliver clear and useful information online in a vibrant and interesting manner Attract participation in online public consultations and feedback 	<ul style="list-style-type: none"> Create synergy through shared data, processes & systems Enrich public officers' work experience through innovative use of infocomm Foster innovative exploitation of infocomm in public sector 	<ul style="list-style-type: none"> Enhance economic competitiveness through sectoral transformation Collaborate with infocomm industry in iGov solutions Showcase and promote iGov solutions
Key Enablers	Infocomm Management and Governance			
	Public Sector Infocomm Competency Development			
	Infocomm Security and Infrastructure			

Source: Infocomm Development Authority of Singapore (IDA), <http://www.ida.gov.sg/About%20us/20060406102431.aspx>.

3.3 Dimension three: Governance

Governance, that is, the performance of public administration, is an important factor for the success of e-government initiatives. The World Bank defines governance as the exercise of political authority and the use of institutional resources to manage society's problems and affairs.⁸ The optimum performance an administration can strive for is to produce a "worthwhile pattern of good results, while avoiding an undesirable pattern of bad circumstances".⁹ Therefore, to achieve good governance, different factors need to be balanced, including costs, freedom of the individual vs. the common good, local, national or global interests, as well as short and long term gains vs. losses. The negotiation of these factors may lead to different results and performances, as places and times change.

Despite these divergences, there is general consent on the minimum requirements for good performance of national administrations. Commonly, it is recognized that a government performs well if it, at least, does not abuse its power, is not corrupt, and follows the due processes of law, which includes a division between the executive, legislative and judicial powers, and freedom of the press. This paradigm is also often called "good governance" in the development literature.¹⁰

⁸ World Bank (2001), Managing Development - The Governance Dimension. http://www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2006/03/07/000090341_20060307104630/Rendered/PDF/34899.pdf

⁹ Wikipedia "Governance" <http://en.wikipedia.org/wiki/Governance>.

¹⁰ World Bank

<http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html>; OECD, <http://stats.oecd.org/glossary/detail.asp?ID=7237>;

Further, the success of e-government initiatives also depends on defining back-office workflows within the administration and on digitalizing and reengineering such workflows. Since citizens do not usually know the processes taking place within an administration, they judge its performance based on their personal experiences, drawing conclusions about the quality of governance according to the time it takes to complete standard procedures, like registering a car, and the reliability and consistency of such processes.

3.4 Dimension four: Outreach

“Outreach” is the dimension of e-government most prominently perceived and experienced by end-users, namely companies and citizens. Often referred to as the “horizontal integration” of public services, this dimension brings together various service offerings to the end-users.

One aspect of outreach is the supply of information and services by governments. Governments’ communication with and supply of information to businesses and citizens varies in intensity. Some administrations provide static information on web pages; others offer services online; and some others offer electronic consultation and participation. The European Union (EU), for example, practices online consultations of citizens. It applies e-government in order to overcome long distances, language barriers and the perceived democratic deficit of the institutions of the Union.

Service oriented e-government initiatives intend to bundle different services according to a combination that an end-user would perceive as a logical unit for one-stop-government. For instance, the government of Singapore is working on developing an even more user-friendly government portal.¹¹ To this end, provision of information in the front end should be improved; information should be presented in a better and more intuitive “look-and-feel” way, providing better search engines and including different types of media, such as video clips. Creating a one-stop government interface is a major challenge in national e-government efforts. The services that need to be integrated might represent numerous fragmented processes, requiring the involvement of a diverse number of stakeholders (see Box 2).

e-Government activities are also affected by demand forces emanating from the particular needs and characteristics of citizens and businesses, such as education, ICT literacy, and other life circumstances. Many e-government applications consist of texts and are Internet based, thus requiring users to have at least basic computer literacy and, if they do not rely on agencies in telecentres or other service providers, the ability to read and write. Therefore, it is crucial for the success of an e-government project to understand the capability of the citizens the initiative is targeting. The one stop shop “Jan Seva Kendra” in India, (see Box 1) is a good example of a low barrier e-government service provision project, where illiterate users have the option of receiving information through the telephone or talking to a civil servant in person.

Further, life circumstances, such as income, day-night rhythm, working hours, social structures, individual habits and culture, affect the demand for e-government services as well. For instance, in communities where the elder deal with the administration on behalf of the community, the demand for e-government services offered to individuals will probably be quite low; in contrast, individualised population in urban areas might prefer a seemingly anonymous way to communicate with authorities.

This dimension also covers outreach between national governments. Peer-to-peer learning, for instance, can be very helpful. Moreover, challenges like cybersecurity and cybercrimes are cross border issues that should be dealt with in a coordinated manner. Accordingly, engaging in global and regional fora on e-government can improve the e-government environment of a country.

UNESCAP <http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp>. transparency) is crucial for the success of e-government activities.

¹¹ See www.gov.sg.

4 MEASURING THE E-GOVERNMENT ENVIRONMENT

This framework takes into consideration quantitative and qualitative indicators for the analysis of the e-government environment. Three different types of indicators can be distinguished by their specification for e-government readiness. These are (1) indicators and indices on general aspects of a state, economy or society; (2) general e-readiness indicators, describing how different sectors of an economy or society are positioned to make use of ICT; and (3) core e-government readiness indicators, which target the thematic more narrow aspect of government using ICTs.¹²

The two latter types of indicators, general e-readiness and core e-government indicators, are combined and weighted in indices, such as the UN Department of Economic and Social Affairs' (UNDESA) "*United Nations e-Government Readiness Index*", its "*Web Measure Index*" and its "*E-participation Index*"¹³; the International Telecommunication Union's (ITU) former "*Digital Opportunity Index*" (DOI)¹⁴ and its new "*ICT Development Index*" (IDI)¹⁵; Accenture's annual benchmarking study on "*Leadership in Customer Service*"¹⁶; the Centre for Public Policy of the Brown University's "*Annual Global e-Government Study*"¹⁷; the Economist Intelligence Unit's annual "*E-readiness Report*"¹⁸; the "*Networked Readiness Index*" by INSEAD¹⁹; the "*Global Competitiveness Report*" of the World Economic Forum (WEF),²⁰ and several other regional or global benchmarking studies. These indices help identify national and global trends and allow cross-national comparisons.

Nevertheless, none of the broadly accepted indices stands completely without critique.²¹ All these well-regarded indices are highly aggregated. The indices help understand the status of e-government readiness and related issues but, so far, none of them could be used as the main source for the recommendations on e-government priorities and activities alone.

Additionally, as discussed in previous chapters, this toolkit is based on a multi-dimensional concept of e-government. Therefore, it would be unsuitable to rely on a single index to analyse the situation of a country and develop recommendations for priority setting and actions. Rather, to allow the user to see the larger picture,²² all three types of indicators and these well known indices are discussed in the following chapters, according to the dimension of e-government environment they inform about.

The following sections address the type of e-government related data currently available, and provide guidance on the relevance of existing indicators and the usefulness of those indices to assess e-government readiness. This chapter also provides a rationale for the selection of the five indices represented in the Quick-check Tool introduced below.

The indicators and indices mentioned in this framework do not represent a complete list. Implementation of e-government projects may require countries to collect more and different data to inform them of about the particular e-government environment present in the area where the project is to be implemented. That was the case of the German "D115" project, which illustrates the importance of learning from the experiences of other countries, as well as of researching the specific characteristics of an e-government environment before implementing a project. Project "D115" aimed to introduce a single non-emergency phone number and related services. To implement this project, the German government started by studying the experiences of other

¹² See Adegboyega Ojo, 2007.

¹³ See Department of Economic and Social Affairs (UNDESA), 2008.

¹⁴ See ITU, 2007.

¹⁵ See ITU, 2009.

¹⁶ See Accenture, 2007; Accenture, 2006.

¹⁷ See Darrell M. West, 2007.

¹⁸ See EIU, 2007.

¹⁹ See INSEAD and World Economic Forum, 2007.

²⁰ See World Economic Forum, 2008.

²¹ Robert J. Kauffman and Ajay Kumar, 2005.

²² Regarding the absence of a complete list of ICT indicators on e-government, see Sheridan Roberts, 2008, p.99. For particulars on the lack of e-government data on Africa, see Schuppan, 2009, p. 119.

countries in establishing single non-emergency numbers. This step was complemented with an analysis of existing call centres of authorities in Germany to better understand the status quo.²³ Based on the findings, a representative number of citizens were interviewed by phone. In these interviews citizens expressed their dissatisfaction with the opening hours of existing call centres, the lack of reachability of the official in charge, and the uncertainty about the jurisdiction. Box 3 below provides greater detail on the implementation and impact of this project.

Box 3: Project “D115”, Germany

Single non-emergency number

Project overview

Germany is a decentralized, federal state, composed of 16 “Länder” (countries), thousands of local authorities and municipalities, all of which have the right to self-administration. Following the examples of the United Kingdom, USA, France and Australia, the German government initiated project “D115” to establish a single non-emergency number. This effort helps Germany comply with the “European Service Directive” that prescribes the establishment of a one-stop shop for service providers. The project, however, goes further, by addressing not only service providers, but also all citizens and businesses.

The project is a revolutionary approach that breaks with common administrative practice, by promoting cooperation among different jurisdictions, competencies, territories, administrative levels and subject-based specialisations.

The project is expected to significantly improve access to services at all levels of government through interconnected service centres. The decentralized service centres will prepare and reference the necessary data and relevant services at all levels of government. They will answer basic questions and provide general information and direction to their constituents. More complicated enquiries will be forwarded to specialized officers, guaranteeing a response in a timely manner.

The single service number will be set up so that callers get connected with their closest service centre, which should be able to handle most concerns immediately. In the near future, the phone-number project plans to provide multi-channel means (email, SMS, etc.) to manage citizen and business contacts with the administration or provide further services.

By mid-2008, the German government had established the “D115” project team, prepared a detailed concept, as well as a strategy for implementation, and identified the pilot regions. The D115 project was launched in the pilot regions in March 2009. The pilot phase will last for about two years. Simultaneously, a 115-umbrella organisation is being established to standardise processes, improve services and extend them both geographically and thematically. Additional federal, state and local government agencies throughout Germany will be added to the D115 cooperation over the next few years.

Technology

The project uses different IT-applications to process data and voice, and types of networks to connect service centres. Each centre is furnished with telephone equipment and a knowledge management system with search functionalities and process management tools to help it document requests and forward calls.

Figure 4: Promises of services

²³ There are approximately 20.000 authorities throughout Germany, Their call centres and switch boards receive an average of 120 million calls per year from citizens and businesses.

	Mid term	Long term	Time →
Access through	- Telephone	- Email, Fax, SMS	- Integrated multi-channel approach
Width of service	<ul style="list-style-type: none"> - Basic information (opening hours, contact persons and responsables) - Development of a integrated translation service - Receipt of information, Complaints management 		
	- All public administration topics	- Regional integration	- Complete integration
	- German, English and regional languages	- Additional languages according to regional demand	- Multilingual
	- 06:00 - 22:00 6 days a week 24/7 during states of crises	- 24/7	- Special functions - 24/7
Depth of service	- Basic information	- Triggering of administrative processes	- Further integration
	- Putting through to the responsible	- Status enquires	
		- Appointments	
Service coverage	- Decentralized, preferably on communal level	- Bigger regional integration	- covering all federal states and all departments
	- partly regional	- Some services for all federal states	
Quality of service	<ul style="list-style-type: none"> - Sector typical service level (80% availability within 30 seconds) - Compliance with minimum quality levels) 		

Costs

Costs for the initial establishment of service centres have been estimated between 100 and 400 thousand Euros (EUR) per 100,000 citizens, based on national and international experiences and depending on the depth of services offered. Twenty percent of these costs cover conceptualisation and external services; 60 percent go to hardware and software; 10 percent to training and another 10 percent to housing. Annual costs of less than 705 thousand EUR per 100 thousand inhabitants are expected. The umbrella organisation has a budget of 2.7 to 4.8 million EUR. Aside the initial seed investment, the costs shall be carried by each authority in a system of mutuality.

Impact

Due to the right of self-administration, authorities cannot be ordered to participate in the initiative. It is a purely a voluntarily process and responsibility for the services provided stays with the authorities. Communities are participating because they realise the potential benefits, including improvement in services provided to citizens and businesses, increased transparency, and financial efficiency. So far, the initiative is being carried out with great political backing that crosses the boundaries of political parties. The staff members involved are enthusiastic about the project and citizens have high expectations for better services.

Source: Ministry of Interior, <http://www.d115.de>; Jobst Fiedler et. al. (2008). *Strategie 115, Studie zur Einführung einer behördenübergreifenden Servicrufnummer 115 in Deutschland, Ausführlichere Studienfassung* (Langfassung) http://www.isprat.net/html/downloads/strategie_115_langfassung.pdf, ISPRAT, Frankfurt a.M./Hamburg.

4.1 Indicators on the dimension of infrastructure

In order to assess the e-government readiness of a country, the ICT infrastructure situation needs to be examined. ICTs provide governments the means to communicate with and process transactions between the administration, citizens and businesses. Therefore, any administration needs to understand its situation regarding the type of ICT equipment available in its offices, including telephones, personal computers, servers, networks and software applications. These data is not publicly available in many countries for different reasons, such as security concerns, procurement strategies and even lack of knowledge within the administration itself. The level of ICT penetration within an administration cannot be estimated from that of the general population. Since no data collections exist for this aspect of the infrastructure dimension, each government needs to collect this information on its own to better understand the status (quality and quantity) of the existing equipment.

In contrast, data on citizen and business access to ICTs—the other side of e-government communication and transaction infrastructure—is better researched and published. Relevant indices on infrastructure include those published by ITU, the United Nations Conference on Trade and Development (UNCTAD), the Economist Intelligence Unit, Accenture and UNDESA.

For decades, the International Telecommunication Union has measured and collected core indicators on ICT infrastructure. ITU receives this information from its 191 Member states, from other international organisations and its own data collections. ITU data on telecommunication infrastructure²⁴ is included in the “*UN e-Readiness Index*” and many other publications. Data on a few basic indicators are freely available at the ITU website through the public tool called the “ITU ICT Eye”²⁵; the full database can be purchased in a CD-ROM or through the Annual Statistical Yearbooks and other global and regional reports.

Traditionally, ITU collects administrative data on ICT supply, including the number of fixed telephone lines, mobile subscribers, Internet subscribers by technology, and international bandwidth. These data usually are presented as absolute numbers per economy or per 100 inhabitants.

In early 2009, ITU launched the new “*ICT Development Index*” (IDI)²⁶, which combines, into a new annual publication, two existing ITU indices: the “*Digital Opportunity Index*” (DOI) and the “*ICT-Opportunity Index*” (ICT-OI) (ITU, 2009). The ITU e-Government Quick-check Tool, discussed in chapter 5, uses two sub-indices of the IDI: The *ICT access sub-index* and the *ICT use sub-index*.²⁷ As illustrated in Figure 6 below, the ICT access sub-index includes indicators on fixed telephone lines and mobile cellular subscribers per 100 inhabitants; international Internet bandwidth per Internet user; proportion of households with a computer and with Internet access. Meanwhile, the IDI’s ICT use sub-index is composed of indicators on Internet users, fixed broadband Internet subscribers and mobile broadband subscribers per 100 inhabitants.²⁸

These highly relevant indicators on infrastructure inform on the number of telecommunication services bought by customers and provided by incumbents and operators. Nevertheless, in order to understand the ICT market and design informed policies, it is important to know not only the absolute number of services paid for, but also who is actually using them. Current trends show disparities on ICT access among the population in developing countries, based on difference in income. While the high income elite in these countries might have two or more mobile cellular subscriptions, people in low income groups might lack access to any ICT services.

²⁴ See <http://www.itu.int/ITU-D/ict/index.html>.

²⁵ The ICT Eye Tool can be accessed at www.itu.int/ITU-D/icteye/Default.aspx.

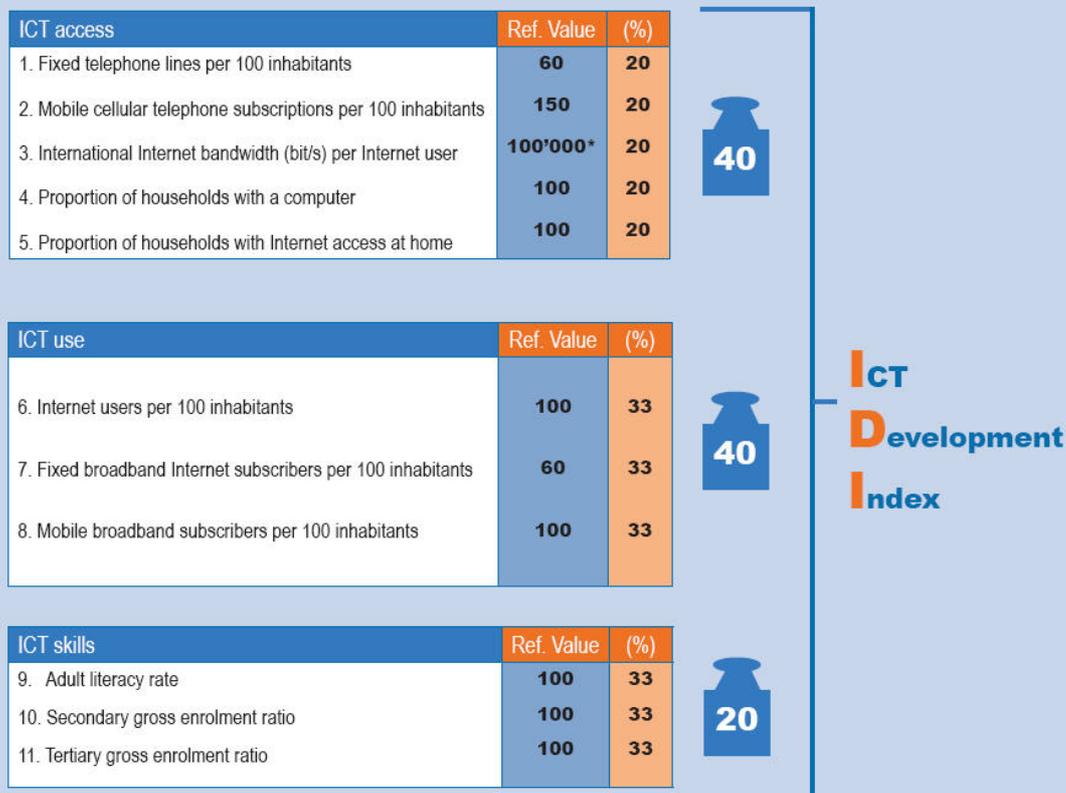
²⁶ See ITU, 2009.

²⁷ The indicators included in each of the sub-indices are equally weighted.

²⁸ The Quick-Check Tool uses these sub-indices separately. The tool also uses the IDI’s ICT skills sub-index, the remaining 20 percent of the IDI, which examines adult literacy rate and school enrolments. The ICT skills sub-index, however, is used as an indicator of the outreach dimension (see chapter 4.4).

Figure 5: The ICT Development Index of the ITU

Figure 3.2: ICT Development Index – Weighting of indicators



Note: * This corresponds to a log value of 5, which was used in the normalization step.
 Source: ITU.

Source: ITU, *Measuring the Information Society, The ICT Development Index*, 2009.

Subscription and penetration data, provided mostly by national administrations, represents a statistic on the average distribution of services among the population; but reality may look very different. The greater the disparities among citizens in terms of income, education, communication needs and location, the farther reality is to this statistical mean.

Acknowledging the gap between statistics and reality, international organisations and their Member States have started collecting data on ICT usage. ITU is a member of the “Partnership on Measuring ICT for Development”, an initiative that responds to the World Summit on the Information Society’s (WSIS) appeal to promote more and better ICT data collection. The Partnership is encouraging the collection of data on ICT usage in national household surveys; meanwhile the United Nations Conference on Trade and Development (UNCTAD) collects data on business usage data. Both surveys help inform decision-makers on the level of uptake of different ICTs and the demand of both citizens and businesses. Unfortunately, these usage data is available so far only for a selected number of countries. Starting in 2009, the Economist Intelligence Unit (EIU) is adding three new usage indicators to its annual “*E-readiness Rankings*” report, as part of its “Consumer and Business Adoption” category: Use of Internet by consumers, use of online

public services by citizens and use of online public services by businesses. EIU acknowledges in its report, however, the difficulty of finding objective and comparable data on usage across countries.²⁹

The EIU report, which assesses e-readiness in 70 of the world's largest economies, also includes a category on "Connectivity and Technology Infrastructure", where it presents data on mobile-phone subscriptions, overall Internet users and broadband Internet accounts, as a percentage of the total population. EIU infrastructure category also looks at broadband affordability, the penetration of secure Internet servers in the population and international Internet bandwidth. Like ITU, the EIU infrastructure index reports penetration data. It should be pointed out, however, that data on Internet usage in developing countries and countries in transition might be underreported. In these countries, a higher percentage of the population access the Internet at public access points, such as libraries, schools or cyber cafes, where a single computer provides access to multiple users rather than a single owner.

EIU's 2009 report stopped reporting penetration of personal computers and Wi-Fi hotspots due to concerns with relevance to e-readiness and data comparability, respectively.³⁰ In fact, this indicator was less relevant to least developed countries because access to hotspots require a person to carry a portable ICT device, such as a PDA or a laptop, which is not the case for a large number of people in developing countries.

Accenture also publishes a report on ICT infrastructure for 22 countries, but it does not include any low income economies. Accordingly, this source is not considered useful for the purpose of this toolkit.³¹

UNDESA's "*United Nations e-Government Readiness Index*" includes a sub-index on infrastructure. The "*Telecommunication Infrastructure Index*" is a composite of five indicators of penetration that uses ITU primary data: (1) Internet users/100 inhabitants, (2) PCs/100 inhabitants, (3) main (fixed) telephone lines/100 inhabitants, (4) cellular telephones/100 inhabitants and (5) broad banding/100 inhabitants.³² Each indicator weights 20 per cent in the overall Index score.³³ This index focuses on Internet users rather than on Internet subscribers. This is an advantage, particularly for developing economies, because potential users of e-government services in these countries might not be able to subscribe to an Internet connection but might use the Internet at public Internet access points. Further, the index includes data on broadband and cellular mobile subscriptions, the two technologies that are becoming increasingly relevant for the provision of e-government services. This index is well balanced, but it uses primary ITU data and its composition differs little from ITU's IDI "ICT access" sub-index. For these reasons, the ITU e-Government Quick-Check Tool uses the IDI sub-indices instead.

Finally, as mentioned above, ICT usage is strongly influenced by the affordability of services, particularly in countries with low GDP per capita. To monitor the evolution of ICT service and access rates, ITU publishes rate data on different regional and global reports. In 2009, the Union published a new ICT price basket comprising fixed telephone, mobile cellular and fixed broadband tariffs.³⁴ This basket provides a good overview on the tariffs and affordability of ICT services in a country in comparison to others. In contrast, EIU calculates the affordability of digital services based only on the lowest-priced DSL broadband subscription as a percentage of an average household's median monthly income.³⁵ While the cost of DSL broadband subscription might be a very relevant indicator for the 70 countries EIU monitors, it may not be as useful for low income

²⁹ See EIU, 2009.

³⁰ See EIU, 2009, p. 4.

³¹ See Accenture, 2006; Accenture, 2007.

³² Although the indicator is named "cellular telephones" it refers to ITU's primary data on "cellular mobile subscribers", not to the sum of mobile devices within a country, as it might be inferred. Similarly, "broad banding" refers to the ITU indicator for "(fixed) broadband subscribers" and does not reflect bandwidth or the number of mobile broadband subscribers.

³³ See Department of Economic and Social Affairs (UNDESA), 2008.

³⁴ See ITU, 2009.

³⁵ See EIU, 2007 and 2009.

economies. In sub-Saharan Africa, for instance, where the price of Internet connectivity remains high and mobile telephony has become drastically more affordable within the last decade, the price of a DSL connection would not be representative enough to judge the affordability of digital communications.

4.2 Indicators on the policy dimension

The priorities of a nation are reflected in its laws and policies. These policies can be rather broad and general strategies to manage the functionality of diverse sectors of the economy. The e-government environment is particularly affected by (1) rules on competition and antitrust strategies; (2) ICT policies and regulations, including standardisation rules, and (3) government ICT strategies and e-government plans (see Box 2).

INSEAD's sub-index on "*Political and Regulatory Environment*"³⁶ monitors indicators on market regulation in general for 105 economies. Unfortunately, this Index is not published annually, making it difficult to compare data over time. Many other organisations dealing with macroeconomic issues collect data on general market regulation. Among them, the Organisation for Economic Co-operation and Development (OECD) and the World Bank look into issues of regulatory quality and rule of law; the World Economic Forum, on its part, evaluates the effectiveness of antitrust policy. Another source for policy indicators is the "*Bertelsmann Transformation Index*" (BTI), published by the Bertelsmann Foundation. The BTI collects perceptions, expert opinions and key figures on the socio-economic performance of 125 economies, assessing aspects of market and competition, stability of currency and prices, the protection of private property, as well as social and economic sustainability. One weakness of the BTI is its rather biased combination of indicators. It follows a normative approach, based on an economic model ("*soziale Marktwirtschaft*") that is considered to exist in Germany. Therefore, its findings refer mainly to deviations from this "ideal" economic archetype and should be applied with caution when analysing the situation of other countries.

Administrative data on the regulation of the telecommunication environment (level of competition, licensing, etc.) can be obtained online from ITU, as described in the section on infrastructure indicators. The Economist Intelligence Unit includes in its "*E-Readiness Report*" data for 70 countries on laws concerning the Internet, including Internet security and electronic IDs. Unfortunately, the information on the indicators for the effectiveness of traditional legal frameworks, the level of censorship, and the ease of registering a new business, also monitored in the EIU report, is presented only as aggregated data. EIU's data on government spending on ICTs as a proportion of the GDP face a similar problem. EIU aggregates the data collected for this indicator with data on digital development strategies, e-government strategies and online procurement.³⁷ Consequently, the Index does not provide policymakers sufficient data to support their assessments of the policy environment.

Since the Economist Intelligence Unit publishes data for only 70 countries, this toolkit relies instead on WEF's "*Global Competitiveness Report*", which provides data on ICT related laws for 134 economies. In this report, WEF monitors three highly relevant laws for the conduction of e-government activities: electronic commerce, digital signature and consumer protection. These areas provide the legal basis for conducting financial transactions or legal interactions between government, citizens and businesses, and are thus, essential for e-government. A key advantage of WEF's analysis is that it examines not only whether ICT related laws have been formulated, but also if they are being enforced.³⁸ The usefulness of this information for assessing e-government readiness more than surpasses one of the disadvantages of the WEF index, which is that it does not display objective data, but it is based on opinions of the selected persons surveyed each year.

³⁶ See INSEAD and World Economic Forum, 2007.

³⁷ See EIU, 2007 and 2009.

³⁸ See World Economic Forum, 2008.

4.3 Indicators on the governance dimension

Governance is probably the most difficult dimension of the e-government environment to measure. It describes the functionality of a large number of public institutions that often follow formal, constitutional and legal rules, as well as informal rules or unwritten codes of conduct. These formal and informal rules support the expectation that a government and its administration will do what they can to serve their citizens. Based on this assumption, assessing the soundness of government performance, both in qualitative and quantitative terms, when implementing e-government, can be done through the analysis of the government performance itself and of the perception of different actors.

As mentioned above, the ability of a government to implement the e-government environment can be described either in general terms, taking into account its institutional, legislative and judicial performance, or in a narrower sense, by focusing on its performance on back-office workflow and process reengineering. The focus of all these efforts should be on good governance, which means that decision-making and implementation occur without abuse of power, corruption and within the rule of law. Indicators that help understand the capacity of a government and its administration for good governance include those describing the functionality of the political and legal system; freedom of press as balancing power; the absence of corruption, and the reliability of decisions and decision makers.

Data on the level of corruption and, respectively, the level of corruption control, are published by Transparency International (TI) in the “*TI Corruption Perceptions Index*” and by the World Bank in its “*World Development Index*”.³⁹ Beyond the absence of corruption, the presence of freedom is usually considered an indicator of good government performance. Freedom is per se hard to measure. Since the presence of freedom is usually considered to be more in the interest of citizens than governments, freedom indices tend to be published by the civil society, and the data collected is based on perceptions, rather than on administrative quantitative data. Information on freedom is published in the annual report of Reporters without Borders, in the “*Worldwide Press Freedom Index*”⁴⁰ of Freedom House⁴¹, which pays particular attention to freedom of press, as well as in the EIU “*E-Readiness Report*”⁴² which monitors the level of censorship. Further, the EIU also presents benchmarking on the effectiveness of the traditional legal framework.

The “*Bertelsmann Transformation Index*”⁴³ monitors the perception of governance for 125 middle and low income countries, which it disaggregates into relevant aspects, such as steering capability, resource efficiency, consensus building and international cooperation.

The World Economic Forum also considers governance a highly relevant topic. It collects and disseminates data on aspects such as judicial independence, public trust of politicians and transparency of policymaking through its “*Global Competitiveness Report*”.

So far, there is not a fully adequate index available that covers the challenging topic of e-government environment. For this reason, the Quick-check Tool, included in this framework, uses data from the “*World Governance Indicators*” (WGI), collected by the World Bank since 1996 and published on an annual basis since 2002. The WGI reports data for 212 economies on government performance in the areas of voice and accountability; political stability and lack of violence; government effectiveness; regulatory ability, as well as on the rule of law and corruption control. To collect the data, the World Bank surveys “a large number of enterprise, citizen and expert survey respondents in industrial and developing countries, as reported by a number of survey institutes, think tanks, non-governmental organizations, and international organizations”⁴⁴ on the quality of governance. Over time, the World Bank has been able to reduce standard errors

³⁹ See World Bank, 2008b; Transparency International, 2008.

⁴⁰ See Reporters without Borders, 2009

⁴¹ See Freedom House, 2008

⁴² See EIU, 2007

⁴³ See Bertelsmann Foundation, 2008, for example.

⁴⁴ See Daniel Kaufmann, 2008.

by increasing the number of sources employed. All these reasons justify the use of the “*World Governance Indicators*” as a source for the Quick-check Tool.

Customer orientation is crucial for the design and implementation of any e-government project. The administration’s customers are the citizens and businesses using e-government services. Consequently, Accenture dedicated its 2007 e-government survey on “*Leadership in customer service: Delivering on the promise*” to evaluate the level of citizen and business satisfaction with e-government services. Unfortunately, this report only analyses the cases of 22 countries, limiting its usefulness for assessing the situation in developing countries.⁴⁵

Similarly, the Economist Intelligence Unit’s “*E-Readiness Report*” includes an indicator on consumer perception of the ease of registering a new business. Although obtaining a business licence represents only one service that can be provided electronically, this indicator is important because it gives an idea on the level of bureaucracy and service-orientation of an administration.⁴⁶

4.4 Indicators on the outreach dimension

In the field of e-government, outreach refers to the status of the services offered by a government and its administration. The success of any e-government effort requires assessing both the administration’s supply of outreach activities and the potential demand and uptake of services by citizens and businesses. Accordingly, the indicators used in the analysis of the outreach dimension of the e-government environment should include both supply and demand indicators.

The status of e-government supply is measured periodically in several surveys that focus mainly on the analysis of government web pages and their functionalities. The best known surveys are those conducted by Darrell M. West and the Centre for Public Policy at Brown University⁴⁷, which includes data on 198 countries; the Economist Intelligence Unit’s “*E-Readiness Report*”, which monitors online procurement and the availability of online public services for citizens and businesses in 60 countries; and the European Union (EU) and Capgemini survey on online services in EU countries. The satisfaction of citizens with e-government services is probably the best indicator to understand how well governments respond to the needs of their clients. Accenture monitors this indicator in its annual benchmarking study on “*Leadership in Customer Service*”⁴⁸; however, as mentioned earlier, it only provides data for 22 selected countries.⁴⁹

Another well known report on supply indicators of outreach is UNDESA’s “*UN E-Government Survey*”⁵⁰, which contains two relevant indices: The “*Web Measure Index*” and the “*E-Participation Index*”. The “*Web Measure Index*” presents data collected from the assessment of online government services offered on the sites of the Ministries/Departments of Health, Education, Social Welfare, Labour and Finance. These pages are chosen because they are considered to be the most relevant and demanded by citizens. UNDESA collects this information on an annual basis for 192 countries. Accordingly, this is the index the Quick-check Tool uses to describe the outreach dimension from the supply perspective. The “*E-Participation Index*” provides data on a government’s information system, its consultation methods, as well as on the way citizen contributions are taken into consideration. Despite the usefulness of this information, it was considered more appropriate to include the “*Web Measure Index*” in the Quick-check Tool instead, to avoid having to deal with the different aspects of political culture considered in the “*E-Participation Index*”.

Three crucial indicators on the demand side of e-government services are the education level of the citizens, their access to ICT and their patterns of usage. For instance, in a country where the mobile phones are pervasive, it would be more appropriate to focus the e-government efforts on

⁴⁵ See Accenture, 2007.

⁴⁶ See EIU, 2007.

⁴⁷ See Darrell M. West, 2008.

⁴⁸ See Accenture, 2007; Accenture, 2006.

⁴⁹ See Accenture, 2007; Accenture, 2006.

⁵⁰ See Department of Economic and Social Affairs (UNDESA), 2008.

the provision of mobile e-services instead of on bandwidth intensive Internet based services. The lack of usage data has already been discussed in the section on infrastructure indicators. Data on the level of education (literacy rate, primary, secondary and tertiary enrolment), relevant for all functions requiring users to read and write, are available from the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Institute for Statistics (UIS).⁵¹ These primary data are also presented in the "*Human Development Index*" (HDI) of the United Nations Development Program (UNDP), as well as in different indices produced by the World Economic Forum⁵² and the World Bank.⁵³ UNDESA's "*E-government survey*" uses data from UNESCO and UNDP's HDI to compose its "*Human Capital Index*". This index is composed of indicators on adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio, giving two thirds of the weight to the adult literacy rate and one third to the gross enrolment ratio.

In its newly developed "*ICT Development Index*" (IDI), ITU includes also an "*ICT skills*" sub-index, composed of indicators on adult literacy rate, as well as secondary and tertiary enrolment rates, weighted equally.⁵⁴ Both UNDESA's "*Human Capital Index*" and the ITU "*ICT skills*" index use data collected and disseminated by UNESCO. The only difference is that ITU does not include data on primary gross enrolment rates, like UNDESA. This could result on paying less attention on the next generation of e-government users who are now in primary school; but, at the same time, ITU gives more weight to secondary and tertiary school enrolment than UNDESA. While primary education provides the population basic reading and writing skills, it might not be sufficient to enable citizens to make the best use of ICT for e-government services. This requires not only ICT skills, but also the sound decision-making of a sovereign citizen. Taking these factors into account, it was considered more appropriate to use ITU's ICT skills index in the Quick-check Tool.

A thorough assessment of the demand for e-government services should take into consideration differences in the needs of particular groups. Language differences and disabilities may create barriers for the participation of certain social groups in e-government interactions. Darrell M. West and the Centre for Public Policy at Brown University pay particular attention to this fact. They also elaborate on the kind of technologies that can be used to get in contact with governments using government Internet portals.⁵⁵ This data collection could be very useful in a second step of e-government assessment once the skill level of the general public has been evaluated.

A third category of outreach indicators would measure the level of governmental engagement in international and regional cooperation. This form of transnational outreach offers a government the possibility of exchanging information on trends with other countries, sharing experiences and allowing peer learning. Only in the "*Bertelsmann Transformation Index*" includes indicators of international cooperation.⁵⁶ Although the BTI indicator does not refer exclusively to cooperation on e-government issues, it reflects the general openness of a government to engage in international dialogue. Since ICT policies are transnational by nature, the involvement of a government in relevant international agreements always results advantageous.

4.5 Grouping of countries

The e-government literature⁵⁷ classifies countries into groups based on typical e-government actions administrations engage in and on challenges countries face as a result of their level of e-government development. These groups could then be described as stereotypical stages in the development of e-government.

⁵¹ See <http://stats.uis.unesco.org/>.

⁵² See World Economic Forum, 2008

⁵³ See World Bank, 2008b.

⁵⁴ See ITU, 2009; Susan Teltscher, 2009.

⁵⁵ See Darrell M. West, 2007.

⁵⁶ See Bertelsmann Foundation, 2008.

⁵⁷ See INSEAD and World Economic Forum, 2004.

e-Government is considered to go through different evolutionary stages. Gartner, for instance, classifies these stages as (1) informational, (2) interactional, (3) transactional, and (4) integrated.⁵⁸ The initial informational stage refers to the focus of an administration in establishing a simple web presence. By the interactional stage, an administration has already given the citizen the capability to research documents in a database, download forms, and engage with the administration via email. When e-government reaches the transactional stage, users can access confidential databases with different levels of access rights; they conduct financial transactions with the administration, and perform other administrative tasks, such as renewing a driver's licence, in a secure manner. According to Gartner, in the final stage of e-government evolution, administrations engage in back-office re-engineering and organisational changes to further enhance service delivery via ICTs. At this stage it is typical for different organisations and units to be collaborating closely through an integrated IT-system.

Similarly, Layne and Lee identify four evolutionary phases of e-government: (1) cataloguing, (2) transaction, (3) vertical integration and (4) horizontal integration.⁵⁹ Layne and Lee's first stage resembles Gartner's. They call it "cataloguing" because of the administration's focus on collecting government information and presenting it online. By the end of this stage, governments are establishing index pages and portal sites to organize electronic documents. While Gartner considers the capability of downloading electronic forms as characteristic of the interactional stage (stage 2), Layne and Lee still consider it part of the initial stage. For them, the transactional stage (stage 2) is reached only when a government focuses on allowing citizens to interact electronically with the administration. The second stage is characterised by government efforts on adding live database links to online interfaces, thus enabling the provision of online services, such as renewing identification cards and paying fines. These initial stages are followed by vertical and horizontal integration of government levels and thematic areas.⁶⁰

Vertical integration of services tends to occur before horizontal integration, facilitated by existing similarities among organisations in charge of related topics at different levels of the administration, such as between municipal, state and national agencies within a specific sector of the economy. The integration between a local schooling authority and the Ministry of Education would represent an example of vertical integration.

Horizontal integration, in contrast, requires establishing connections between organisations that deal with different sectors of the economy, such as the ministries of telecommunication and health. Vertical integration refers to national and local governments connecting electronically for different functions or services. This level of integration facilitates the provision of more complex electronic services that require the intervention of different agencies. During this stage of e-government development, for instance, a citizen in a small village would be able to file for a business license and have his request being transferred electronically to the state's business licensing system and to the federal government to obtain an employer identification number (FEIN). According to Layne and Lee, the last stage of e-government is reached when functions and services across different parts of government are finally integrated. For instance, a business should be able to simultaneously pay unemployment insurance to one state agency and business taxes to another because the systems in both agencies are interconnected.

Using a slightly different focus, UNDESA, together with Siau and Long, argue for a classification of e-government development into five stages.⁶¹ According to UNDESA, the development of government web services goes through five different stages: (1) Emerging, (2) enhanced, (3) interactive, (4) transactional and (5) connected.⁶² These stages are very similar to Gartner's; the main difference between them is that UNDESA divides Gartner's first stage into two separate ones. UNDESA identifies the emerging stage with the provision of really basic web presence, while the ability to present documents or forms would be more advanced and therefore be part of the

⁵⁸ See Mamadou T. Koné, 2006.

⁵⁹ See K. Layne & J. Lee, 2001.

⁶⁰ See Box 3, for an example of these stages in Germany.

⁶¹ See UNDESA 2008 and Keng Siau & Yuan Long, 2005

⁶² See Department of Economic and Social Affairs (UNDESA), 2008.

enhanced stage. During this second stage, users are not yet able to interact electronically with the administration. This kind of “transactional” relation would be part of UNDESA’s fourth stage, while the establishment of interactive portals or websites would be representative of the third, “interactive” stage. The final stage of e-government, as defined by UNDESA, combines Layne and Lee’s vertical and horizontal integration with other capabilities, such as interoperability issues and the establishment of connections among several stakeholders (government, businesses, academic institutions, NGOs and civil society). According to UNDESA’s definition, e-participation, that is, the involvement of different individuals and groups into opinion forming and decision-making processes through electronic means, is representative of the final “connected” stage.

Siau and Long also propose a five-stage model, comprising some of the stages described above: (1) web presence, (2) interaction, (3) transaction, (4) transformation, and (5) e-democracy.⁶³ Based on these stages, Gil-Garcia and Martinez-Moyano have developed a four-stage model that reflects progression in the level of technological and organisational sophistication and the transfer of capabilities from national to local governments.⁶⁴

Interestingly, the e-government literature has identified a connection between the level of progress in e-government evolution and the economic development of a country. INSEAD’s “*Networked Readiness Index*” and UNDESA’s “*E-Government Readiness Index*” show correlations between GDP per capita and countries’ readiness rankings, based on their respective benchmarking. Similarly, ITU’s “*ICT Development Index*” found a correlation between GNI per capita and the IDI rankings. Taking into account the strong correlation between economic and e-government development, this toolkit classifies countries into four income groups (low, lower middle, upper middle and high income economies), based on the distribution of gross domestic product (GDP) per capita, expressed in US dollars (USD). This type of country classification is commonly used by UN agencies and the World Bank, and facilitates identifying trends and significant divergences in the implementation of e-government among countries in the same income group, as well as between countries in different income groups.

This toolkit applies a broad definition of e-government that takes into consideration the influence of historical, cultural and social factors, characteristic of a country or region, on the actualization of government and governance concepts. For this purpose, it was considered useful for the Quick-check Tool to allow comparisons of e-government performance at the regional level, using the ITU regional classification.⁶⁵

As discussed in this section, e-government is considered a multi-stage process. Therefore, it is expected for future versions of the Quick-check Tool to comparisons of performance over time. The tool will be regularly updated to incorporate the latest indicator values, but it will still give access to the values of previous versions to allow for comparison.

5 HOW TO USE THE E-GOVERNMENT QUICK-CHECK TOOL

This framework provides the e-Government Toolkit user an interactive tool—called the “e-Government Quick-check Tool”—that represents the status of the e-government environment in single countries and country groups using as a proxy data on five relevant indicators and indices: (1) ICT skills and (2) ICT access and use indicators, collected in ITU’s “*ICT Development Index*”; (3) indicators on ICT related laws published by the World Economic Forum; (4) “*Worldwide Governance Indicators*”, gathered by the World Bank; (5) web-based public services indicators, published by UNDESA as a sub-index of its “*Web Measure Index*”. The methodology used by the selected indices, as well as the justification for selecting those indices, was already described in chapter 4 above. While the data used in the Quick-check Tool is not new, the originality of this tool

⁶³ See Keng Siau & Yuan Long, 2005.

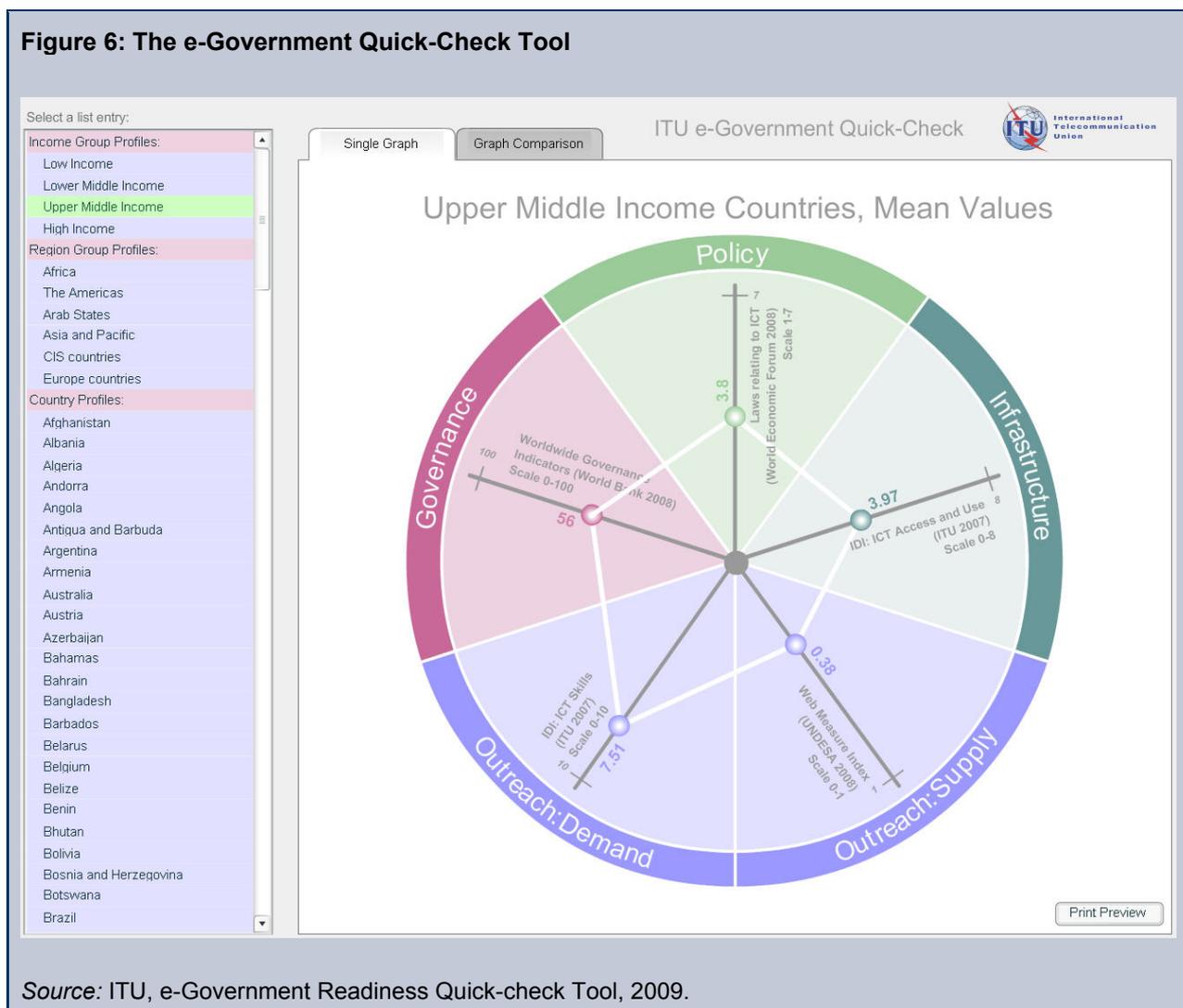
⁶⁴ See J. R. Gil-García & I. J. Martínez-Moyano, 2005.

⁶⁵ ITU classifies countries into six regions: Africa, the Americas, Arab States, Asia & Pacific, Europe and CIS countries.

stems from bringing together, in a single interface, data on the most relevant e-government indicators collected by multiple organizations.

5.1 Analysing a country's e-government readiness with the Quick-check Tool

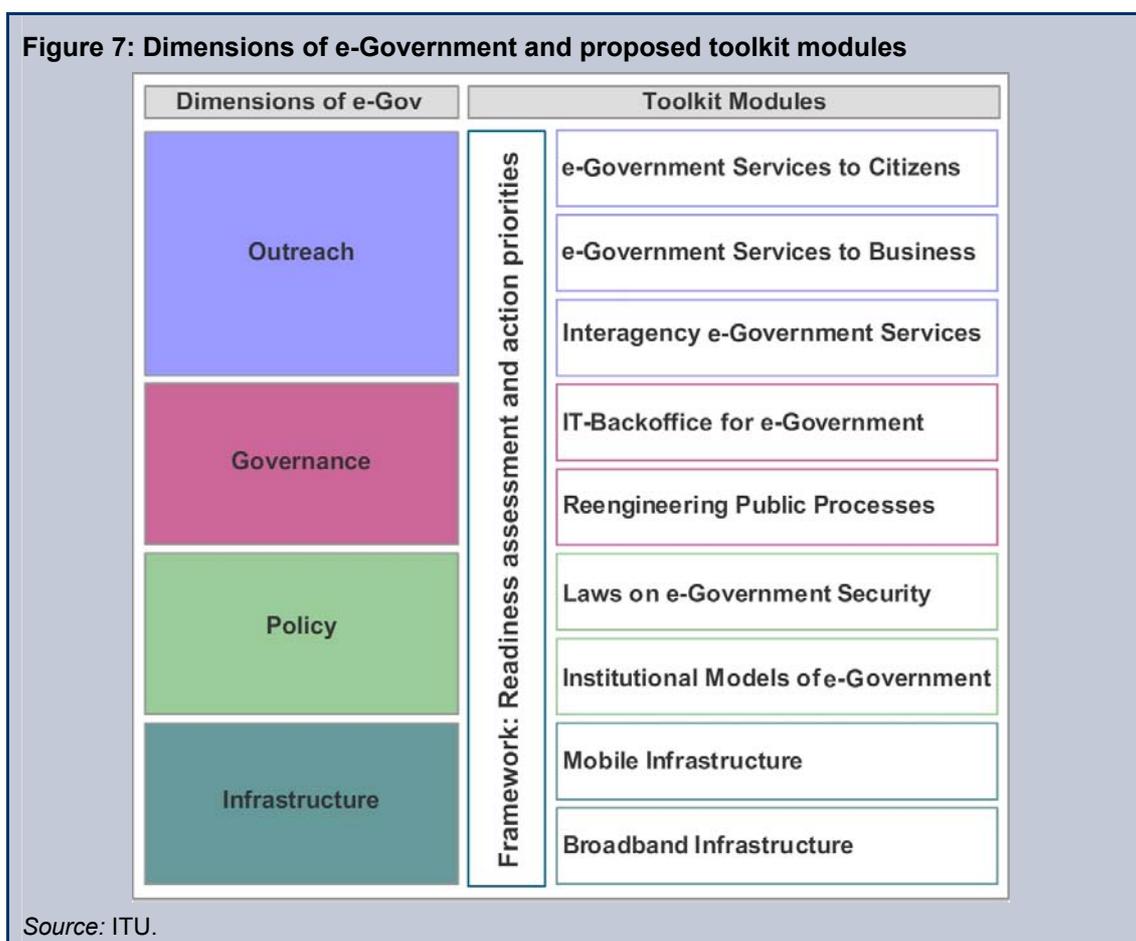
One of the primary objectives of this framework is to understand the factors that contribute to the level of e-government readiness of a country. The interactive e-Government Quick-check Tool provides a quick and simple graphical overview of five different e-government indicators. The tool, available to end-users in a CD-ROM and as a web-based tool accessible at: <http://www.itu.int/ITU-D/cyb/app/e-gov.html>, allows users to visualize the level of e-government readiness of a single country, income group or ITU region, comparing up to four different graphs at once. Figure 7 below displays a screenshot of the tool's user interface, illustrating a profile based on income group. The scores for the five indicators are displayed on a single radar chart.



Decision makers can use the Quick-check Tool to help them assess the state of readiness of a country, based on the indicators selected for the four dimensions of the e-government environment. The Tool's comparison capability may also prove useful in helping decision makers identify countries or country groups with whom to exchange experiences and strategies for implementing e-government, promoting peer learning.

6 RECOMMENDATIONS: FUTURE E-GOVERNMENT TOOLKIT MODULES AND PRIORITIES

While it is not possible for the ITU e-Government Implementation Toolkit to provide detailed advice on e-government actions and priorities for specific countries, it aims to enable users, through its different thematic modules and hand-on tools, make an informed decision for the specific situation they face. Based on a comprehensive literature review and observations, the authors recommend for the toolkit modules to examine ten core aspects of e-government implementation, covering the four dimensions discussed in previous chapters. The proposed thematic modules, presented in Figure 8 below, should be considered as separate units. It is therefore not necessary to work through the toolkit in any specific order. The selection and order of modules would depend on the specific needs of the user.⁶⁶



The following sections discuss the rationale for the topics proposed under the each of the four dimensions, pointing out the group of countries that would find the particular thematic most critical, based on their current stage of e-government development.

⁶⁶ To ease access to the different modules and their respective tools, they will be made available online, in a paper version and in CD-Rom, for those regions where Internet access is difficult.

6.1 Recommendations on the dimension of infrastructure

Currently, mobile telephony and broadband technologies are probably the ICTs with the greatest relevance for e-government service provision.

6.1.1 Mobile infrastructure for e-government (m-Government)

In 2008, the number of mobile cellular subscribers had reached 4.1 billion subscribers worldwide, almost four times more than main fixed line subscribers. This means that, statistically, while in developed countries each person has a mobile cellular subscription⁶⁷, in developing countries, the penetration of mobile cellular subscriptions per 100 inhabitants had reached a rate of only 49.8 percent.⁶⁸ Despite the disparity in penetration between world regions and countries, mobile cellular phones are the most commonly used ICT in most countries. Their relatively low hardware and infrastructure deployment costs, as well as their affordable usage rates, make mobile phones a powerful tool for the provision of e-government services, particularly to citizens in developing countries and regions without sufficient infrastructure.⁶⁹

“m-Government” is the extension of e-government to mobile platforms, such as laptops, PDAs and other mobile devices. The main advantage of the mobile platform is its ubiquity, that is, the potential availability of services anytime, anywhere. Due to its mobile characteristic, m-government can be particularly useful for emergency situations, such as in the provision of tsunami warnings.

Citizen demand for e-government services emerged as a response to increased use of e-commerce. Users expect their interactions with administrations to follow the same pattern as other commercial transactions. If it is possible for them to order goods online, they wonder why it would not also be possible to apply for certain district or government services online. It is likely that the adoption of m-government services will follow a similar pattern. The demand and adoption of m-government services will likely be the greatest in countries like the Philippines, where mobile phones are commonly used to pay for daily goods.

Increased adoption of m-government services will depend largely on the development of encryption and authentication technologies, such as electronic IDs, to facilitate safe and reliable data transmission. Other issues that should be addressed include payment infrastructures, privacy and security concerns and data protection.⁷⁰ Further, the provision of m-government will have an effect not only on telecommunication regulation, but also in other economic sectors, such as banking. Accordingly, one module of this toolkit should outline the challenges regarding the implementation of m-government applications in developing economies.

6.1.2 Broadband infrastructure for e-government

Another module of this toolkit could examine the provision of mobile broadband services in upper middle and high income countries. Because e-government services are becoming more sophisticated over time, they increasingly require more bandwidth. Therefore, broadband access is crucial in order to be able to make best use of the Internet, whether it is through cable modems, digital subscriber lines (DSL), fibre optics or wireless technologies. A sound regulatory and policy framework stimulates infrastructure supply. Yet, availability of infrastructure is a necessary, but not sufficient condition for access; the pricing of services provided by such infrastructure is also crucial. The goal is to make broadband access affordable to the average citizen.⁷¹ Accordingly, it is recommended for one module to address possible ways to make best use of broadband infrastructure for e-government.

⁶⁷ According to ITU data, at the end of 2007, developed countries had 100.3 mobile cellular subscriptions per 100 inhabitants.

⁶⁸ See ITU, 2009.

⁶⁹ See Ibrahim Kushchu & M. Halid Kuscu, 2004; ITU, 2009; Jon P. Gant, 2008.

⁷⁰ See Jennie Carroll, 2006.

⁷¹ See EIU, 2007.

6.2 Recommendations on the policy dimension

The policy dimension refers to laws, as well as to the institutional setting of administrative entities. Governments can give priority to certain issues over others, such as the decision of establishing an independent telecommunication regulation authority, for instance. Both policy aspects could be reflected in toolkit modules.

6.2.1 Laws on e-government security

An enabling policy environment for e-government usually requires laws and regulations on the authentication of actors to ensure the protection of citizens' rights and guarantee security and privacy.⁷² One relevant legal matter is amending rules that state that some kind of documents, which originally needed to be presented in paper, can also be presented electronically. Further, the topics of electronic signatures and the authentication of a citizen's or officer's identity need to be technically and legally validated.⁷³ Since the World Bank's Information for Development Program (infoDev) has not explored these questions in depth, dedicating a module of the ITU toolkit to these topics could be a significant contribution to this area.

6.2.2 Institutional models of e-government

Multiple government agencies are involved in the implementation of policies and standards relevant to e-government, such as those referring to cyber security, the transferability of data and interoperability standards. Interagency coordination is thus necessary to ensure that policies protecting citizens' rights and standards that support the functionality of the system as a whole are duly enforced. To facilitate coordination and monitor e-government activities conducted by different entities, some governments have either established new agencies or assigned the task to existing ministries or regulatory authorities. Examples of coordinating agencies include the REACH Agency⁷⁴ in Ireland, the Egyptian Ministry of State for Administrative Development, the German Federal Office of Information Security (BSI) and the Indian Department for Information Technology at the Ministry of Communication and Information Technology. Commonly, these agencies are in charge of developing and implementing technical standards to ease the exchange of information among public agencies.⁷⁵

As countries reach more advanced stages of e-government, they need to pay attention to the development of coordination processes and the allocation of responsibilities. According to the five stages of e-government evolution defined by UNDESA, coordination is not yet urgent during the initial ("emerging") stage because the online presence of single governments or ministries is just being established. But as soon as information archives are developed, during the "enhanced" stage, cooperation and coordination among the different agencies becomes essential. Otherwise, the transaction costs and disturbances involved in ensuring technical interoperability and institutional stability would be higher at a later stage. From stage three ("interactive") onwards, the activities of agencies at all levels of the administration need to be considered to better serve the needs of the citizens, take advantage of all the cost savings, and increase transparency through electronic government. Therefore, it would be valuable to dedicate one module of this toolkit to the requirements and possible solutions for the institutional setting of e-government.

6.3 Recommendations on the governance dimension

Public institutions are in constant change. This can be due to changes in management paradigms, such as the emergence of the "New Public Management", which places a strong focus on serving citizens' needs and administrative efficiency, or to the move from cash-based accounting to

⁷² See S. Holden & L. Millett, 2005.

⁷³ See infoDev, 2008.

⁷⁴ See www.reach.ie.

⁷⁵ One example for such a set of rules is the Singapore Government Enterprise Architecture (SGEA).

accrual accounting in public financial management. Transformation can also be initiated, however, by changes in political power or by government initiatives to reform the administration. These efforts usually are accompanied by appeals for greater transparency, higher efficiency or job cuts in public institutions.

The changing nature of public institutions has several consequences for e-government projects. On the one hand, e-government systems have to allow for a high degree of integration and flexibility. On the other hand, they need to adhere to various policy requirements, which might, in some instances, even forbid a strong integration of processes and data. To examine both of these issues, it would be recommended for the toolkit to dedicate two of its modules to the pillars of e-government: Process re-engineering and back-office implementation.

6.3.1 Process re-engineering

The experience of different countries shows that the implementation of back-office software in the public sector often triggers reforms in internal processes, also known as “process re-engineering”. Back-office software typically provides functionalities for human resources, project management, finance and supply chain management. In many cases, the need for business blue prints, a required input for implementing this software, results in a situation where previously informal processes are documented for the first time.

It is therefore evident, that the implementation of back-office software is almost never a mere automation of existing processes. Typically, new workflows have to be designed; new responsibilities need to be assigned, and internal resistances have to be managed and overcome. It can be stated, that such change management issues are, in many cases, the true reason behind the partial or total failure of the implementation of back-office systems.

6.3.2 Back-office implementation

The implementation of back-office e-government systems is a risky and significant process. The systems exhibit an enormous degree of complexity and are highly customizable. The cost of implementation is typically very high, with a large portion of the budget being dedicated to implementation rather than to the actual software. Training public servants on the new system is also resource intensive and is often neglected. In addition, the vast number of transactions needed in some areas, such as in revenue collection for public services, requires a careful transition from manual systems to automated ones. In short: back-office implementation needs to be carefully planned and managed. Consequently, the toolkit dedicates a separate module to this important e-government topic.

6.4 Recommendations on the outreach dimension

Similar to developments in e-commerce, most of the current state-of-the-art e-government applications offer an interface accessible anytime, anywhere, through a multitude of devices, using both fixed-line and mobile connections. Some of these applications are web-based or SMS-based. In fact, the term e-government only made its appearance during the emergence of the “new economy”, supported by technological advances that resulted in the development of what is commonly called “new media”. It should be emphasised, however, that these applications constitute only the top layer of typical e-government architecture, and would offer little value without the foundation of back-office processes and systems (vertical integration) to support them.

Commonly, e-government services are categorized according to their target audience. The usual categories are: e-government services to citizens (G2C), e-government services to business (G2B) and interagency e-government services (G2G). Each of these categories varies on the type of needs they respond to and the e-government services used to satisfy them. It would be recommendable for the toolkit to address the e-government requirements of these target-groups separately.

6.4.1 E-government services to citizens (G2C)

G2C services usually offer bundled services to provide value to specific groups of citizens who find themselves in prototypical “life situations”. Examples include persons who have just moved to a new city, newly married couples or unemployed people receiving government compensation. Each member of such a group has similar service requirements. Since the entire population of a country is regarded as a potential target group, these services require the most extensive national infrastructure and their implementation will provide the biggest challenges to less developed countries. However, services offered via cellular phones have shown very promising results over the last few years in regions with low fixed line teledensity. Mobile technology requires less investment in infrastructure and its cost models, including cheap prepaid cards, have made telephony and data transfer via SMS affordable for people with lower income.⁷⁶ Accordingly, mobile-based e-government interaction (m-government) would be a very relevant topic to discuss in a section of this module.

6.4.2 E-government services to business (G2B)

G2B services cover all service interactions between an administration and the private sector. Typical areas include customs, tax and revenues, procurement and company registration. For lower income countries, these services might be easier to implement than G2C services because the private sector tends to have access to a wider range of advanced technological infrastructure than the average citizen.

6.4.3 Interagency e-government services (G2G)

G2G services are those that a public institution offers to other public institutions. A good example is the General Auditor’s office, which has regular process interactions with other departments. Some of these processes, such as the compilation of financial reports on spending or revenues collected, could be supported by or executed through online systems. Similarly, information on contact details for staff in other agencies, human resource matters concerning civil servants, union activities or other topics of common interest, could be shared through G2G services. These services also include less interactive processes, such as the provision of information to other public entities or public servants.

6.5 Recommendations on the priorities for different income groups

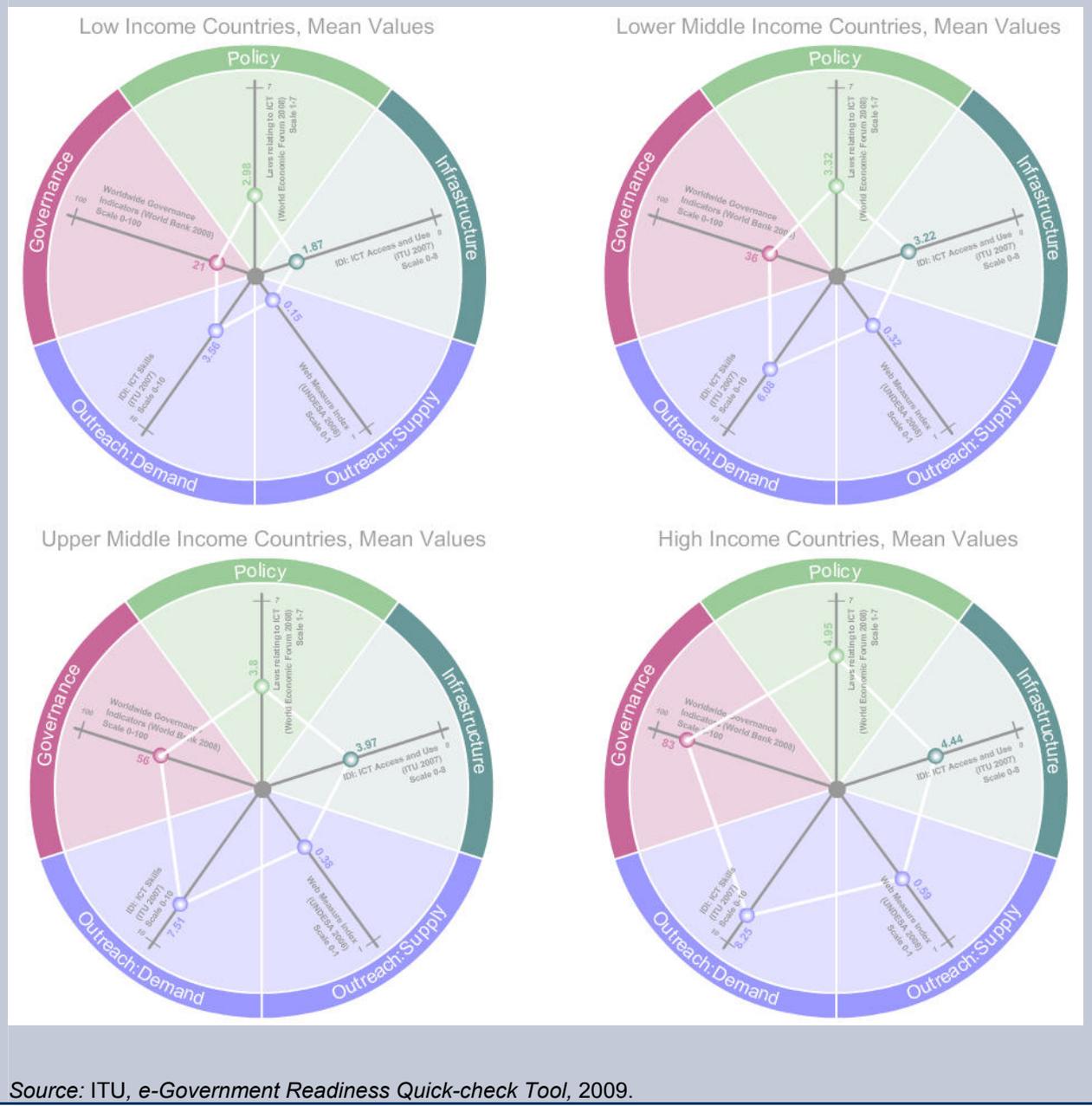
As discussed in chapter 5, there is a correlation between e-government readiness and GDP per capita. Figure 9 below, illustrates the performance of countries in the four income groups based on the five indices and indicators included in the Quick-check Tool. The graphs show clear differences in the mean values of the four income groups, with mean scores in all indicators increasing (moving outwards in the radar graphs) as the level of income raises. Accordingly, countries in different income groups will need to give priority to different dimensions and actions of the e-government environment, based on their current level of readiness and economic development.

Based on the needs and challenges identified in this framework for each of the four income groups, the topics addressed in the proposed modules of the e-Government Implementation Toolkit have been ranked according to their level of priority (high, medium and optional). This prioritisation, illustrated in Figure 10 below, aims to direct the attention of decision makers from a particular income group to the modules that might be most relevant to their current level of readiness. So, for instance, the module on mobile infrastructure would be highly relevant to countries in low, lower middle and upper middle income groups, where mobile technologies could provide a feasible and cost effective platform for e-government provision. This mobile infrastructure module, however, would be of medium importance to high income economies, where the deployment of broadband infrastructure is more advanced. The prioritization of module topics also intends to define target groups (decision-makers in certain income group countries) that would be

⁷⁶ See Romeo Bertolini, Olaf Nielinger, and Monika Muylkens, 2006.

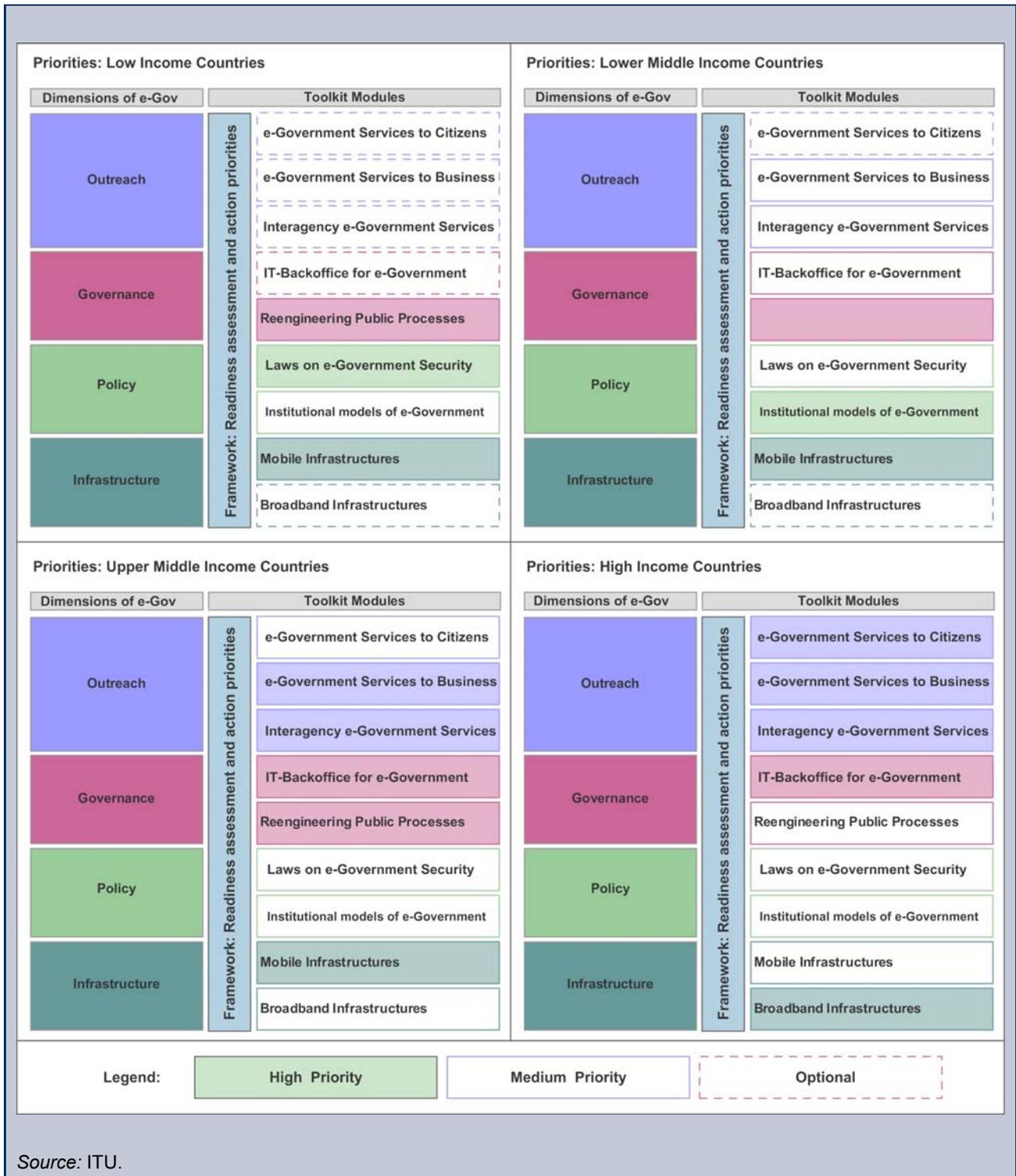
most interested in contributing to future Toolkit modules. Last, but not least, this prioritisation suggests areas where training efforts for certain country groups could focus on.

Figure 8: Country group findings



The goal of this toolkit is to support decision makers from low, lower middle and upper middle income countries in the implementation of e-government. The Toolkit, however, also proposes topics that respond to the needs of high income countries because these modules are expected to become relevant to countries in other income groups as their e-government environment evolves over time.

Figure 9: Action priorities by country group



6.6 Recommending regional and international exchange of experience

A final recommendation of this framework is to organize global and regional workshops to create opportunities for the exchange of e-government experiences, raising awareness about key regional topics and promoting peer-learning opportunities. A possible model for peer learning could be the Cyber Security “High Level Panel” at the International Telecommunication Union; its organisational structure could be replicated for such purpose.

This framework and the “Quick-check Tool” indicate some common issues for discussion, based on regional and income groupings. The Quick-check Tool could eventually be updated to allow analysis at the sub-regional level. This capability would permit narrowing down specific target groups even further.

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