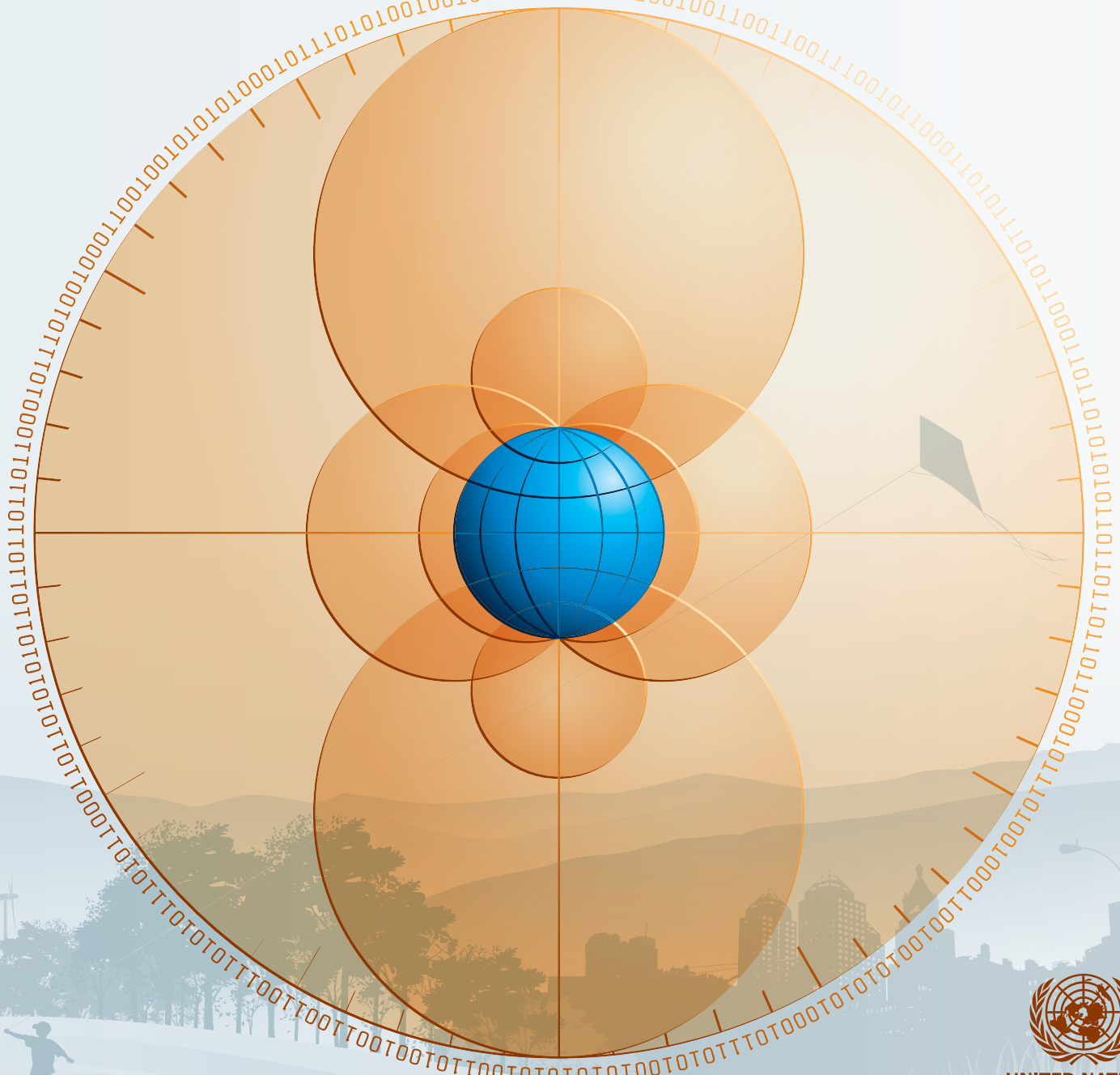
Economic & Social Affairs

United Nations E-Government Survey 2010

Leveraging e-government at a time of financial and economic crisis



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E-Government Survey 2010

Leveraging e-government at a time of financial and economic crisis

United Nations
New York, 2010

Foreword

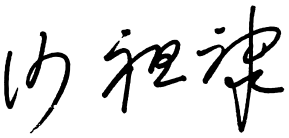
E-government – once a bold experiment and now an important tool for public sector transformation – has progressed to the point where it is now a force for effective governance and citizen participation, both at national and local levels. This is important. Until governments have the capacity to lead development efforts and deliver services that fully respond to the needs of citizens, the achievement of the internationally agreed development goals will continue to elude us. With the Millennium Development Goal time horizon of 2015 quickly approaching, it is no longer a question of whether we can afford information and communications technology in health, education, environmental protection and a multitude of other areas, but where to deploy them first and how rapidly gains can be realized.

The high demand for e-government knowledge and skills on the part of Member States has increased considerably in recent years. This upward trend in e-government development has accelerated despite, or maybe in part also due to, the current financial crisis and the pressing need for governments to be competent, transparent, accessible and efficient. The crisis makes a compelling case for e-government. The demand for social support has increased dramatically while revenues have declined precipitously. Public sector commitments to stimulus packages and financial sector support have yielded debt levels that may take a very long time to reduce.

Member States have had to coordinate, make hard choices and weigh spending options very carefully. But we must also consider in this moment that there is a reason why e-government matters beyond the need to maximize efficiency, or even beyond engaging citizens in urgent questions of public policy. The compelling factor and the bitter lesson learned from the crisis is that trust matters and lack of confidence in government, as in markets, can lead to calamity. The capacity to respond under difficult conditions and deliver expected results are cornerstones of effective government and a foundation of public trust.

The 2010 edition of the *United Nations E-Government Survey*, the fifth in a series begun in 2003, makes the case that e-government should play an ever-greater role in development. Many countries have made tremendous strides in the last two years, due in part to recent, exciting advances in the diffusion of technology. With its responsive, citizen-centric qualities, I firmly believe that e-government can make a decisive contribution to the achievement of the MDGs, particularly in developing regions.

This publication can become a useful reference to guide development efforts at international, regional and local levels. ■



Sha Zukang
Under-Secretary-General for
Economic and Social Affairs

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Part One on leveraging e-government at a time of financial and economic crisis was prepared by S. Ran Kim and Patrick Spearing with lead authors Tiago Peixoto (Chapter 1), Nick von Tunzelmann (Chapter 2) and S. Ran Kim (Chapter 3). Jeffrey Roy contributed an additional background paper for the study. Interns Aynur Sagin, Shuyi Wang, Jin Xin Liyuan Zhang and Huang Zhao provided research assistance.

Part Two on the state of e-government around the world was prepared by Richard Kerby, Deniz Susar, Carla Valle and Keping Yao with supplementary inputs from Michael Mimicopoulos, Jonas Rabinovitch and Patrick Spearing. The evaluation team for the methodology comprised Seema Hafeez, Richard Kerby, S. Ran Kim, Wai Min Kwok, Michael Mimicopoulos, Elida Reci, Silvia Schwarz and Deniz Susar.

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Acronyms

ARRA	American Recovery and Reinvestment Act
C2C	Citizen-to-citizen
C2G	Citizen-to-government
CEO	Chief executive officer
CEPA	Committee of Experts on Public Administration
CPSS	Committee on Payments and Settlements Systems
CSC	Common services centre
ESRI	Environmental Systems Research Institute
EU	European Union
FAQ	Frequently asked question
FATF	Financial Action Task Force
FSA	Financial Services Authority
FSAP	Financial Sector Assessment Program
G2B	Government-to-business
GCC	Gulf Cooperation Council
GDP	Gross domestic product
GIS	Geographic information system
HIV/AIDS	Human immunodeficiency virus/acquired immune deficiency syndrome
ICT	Information and communications technology
ILO	International Labour Organization
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
ITU	International Telecommunication Union
MDG	Millennium Development Goal
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental organization
OECD	Organization for Economic Cooperation and Development
OTC	Over-the-counter
REDD	Reducing emissions from deforestation and forest degradation
ROSC	Report on the observance of standards and codes
SMART	Skills matching and referral technology
SME	Small- and medium-sized enterprise
SMS	Short message service
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme

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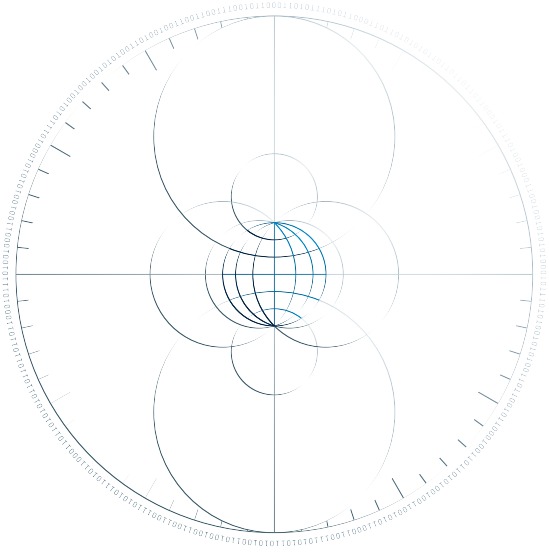


Introduction

E-government is a powerful tool for human development and essential to the achievement of the internationally agreed development goals including the Millennium Development Goals. Many countries are experiencing its transformative power in revitalizing public administration, overhauling public management, fostering inclusive leadership and moving civil service towards higher efficiency, transparency and accountability. They recognize e-government as a way of realizing the vision of a global information society. In contrast, countries slow to embrace e-government tend to remain mired in the typical institutional pathologies of supply-driven services and procedures, remoteness between government and citizen, and opaque decision-making processes.

Taking as its theme the most pressing challenge of recent times, the United Nations E-Government Survey 2010 focuses on the global financial and economic crisis. Part One of this report is dedicated to a discussion of the ways in which e-government can be leveraged to mitigate the effects of the financial and economic crisis on development. Its three chapters examine e-government in light of three stated priorities of United Nations Member States. Part Two is a report on the results of a global survey.

E-government at a time of financial and economic crisis

E-government is a means of enhancing the capacity of the public sector, together with citizens, to address particular development issues. It is never an end in itself. Can e-government help policy makers to respond to the global financial and economic crisis? Certainly, the effect of the crisis on the public sector has been profound. Although financial markets stabilized in 2009 due to massive and internationally coordinated government intervention, the real economy is still in a state of shock with high rates of unemployment and a tremendous squeeze on government revenues in many countries.

"Make the stimulus work for all"

In June 2009, government leaders and senior ministers converged at the United Nations to discuss the crisis and its impact on development. Member States called for action and encouraged governments to "make the stimulus work for all". By October 2009, more than 50 countries had committed $2.6 trillion to fiscal stimulus and pledged another $18 trillion in public funds to underwriting the financial sector and other industries. Next came the challenge of assessing whether or not the stimulus was indeed working for all, as Member States had hoped, and of assuaging public unease about the distribution of these huge sums.

In response to the crisis, governments have been exploiting online tools to enhance transparency and track stimulus spending – and they stand to gain much more if they tap the potential of open data. Chapter One describes the ways in which e-government tools are being used to monitor the crisis response funds, based on a study of 115 websites built on official government information. While there is a relatively high degree of transparency in stimulus initiatives, the real potential of e-government lies in the free sharing of government information based on common standards. otherwise known as open data services. Most governments are not yet taking advantage of the simple practice of sharing information in this way, yet it would enable independent actors to deepen their own analyses of government policy and action at very low cost to the public.

"Improved regulation and monitoring"

Deficiencies in financial supervision revealed by the crisis spurred Member States to express an interest in "improved regulation and monitoring". The experiences of the Great Depression and the Asian financial crisis show how alike the current crisis is in terms of financial causes as well as the behaviours that unfold as financial markets unravel. In each case, the systemic risks resulting from the neglect of analysts and regulators might have been mitigated if governments had promoted information and communication technology designed to reduce the opacity of the financial sector.

What is the role of e-government in financial regulation and monitoring? Chapter Two looks at these important historical analogies from the 1930s and 1990s, and then defines the potential of e-government to address structural problems in the financial system. Regulatory reform aims to promote transparency, integrity and efficiency in the financial sector. This is exactly what e-government is highly capable of doing. It can also add agility and provide real-time responsiveness to regulatory needs. While the capacity of e-government to handle speed and complexity is in the end no substitute for good policy, it may at least give citizens the power to question regulators and bring systemic issues forward.

"Contain the effects of the crisis and improve future global resilience"

Finally, Member States have signaled the need to "contain the effects of the crisis and improve future global resilience" by ensuring that governments take internationally-agreed development goals into account when they respond to it. Stronger social safety nets and measures to protect social expenditures are required if goals for poverty eradication, employment, environmental protection, gender equality, food security, health and education objectives are to be met alongside sustained economic growth. Stimulus funds can only go so far. To avert deep cuts in public spending (or even to avoid devaluing currencies and defaulting on public debt), governments may have no choice but to enhance efficiency and effectiveness if provision of public services is to be assured.

Just as ICT can introduce speed, agility and insight into regulatory functions, so too can e-services help governments to respond to an expanded set of demands even as revenues fall short. In Chapter Three, to help governments build on the practical experiences of others, recent e-government actions are described with possible solutions suggested for addressing employment, education, gender equality, health and environmental protection goals – five priorities of the Millennium Development Goals.

Global trends in e-government development

The United Nations E-Government Survey is recognized for providing a comprehensive assessment of national online services, telecommunication infrastructure and human capital. In Chapter Four, the results of the biennial global survey are presented together with insights into the "whats" and "whys" of e-government development in particular situations.

The watchword of e-government is 'citizen-centric practice'. For a country to be assessed favourably in relation to other countries, there needs to be solid evidence of an approach to e-government development that places citizens at the centre. The survey will show, for example, the availability of electronic and mobile services designed with citizens in mind. The explosive growth of broadband access in developed regions and mobile cellular subscriptions in developing countries are trends that governments are reflecting in their use of ICT, to varying degrees. Chapter Five provides an assessment of the use of e-government tools to promote citizen empowerment and inclusion, including women's equality. The focus is on the availability of e-services and the use of e-government techniques to enhance participation in decision-making.

Another word to watch is 'development', which in this edition replaces 'readiness'. The term 'e-government development' describes how far governments have actually advanced in this field instead of how ready or able they might be to do so, which was how 'e-government readiness' described national capacity. More countries than ever before are adopting national e-government strategies and multi-year action plans. From the most to the least developed, countries can be seen responding to expectations that governments both participate in and enable the information society by communicating and interacting more effectively with increasingly technology-savvy citizens. They are ready, and it is their level of development in this regard that must be assessed.

Key findings from the 2010 Survey

On-demand access to information, services and social networks on the Internet through a personal computer is no longer considered cutting-edge in developed regions but a norm that many people take for granted. The same may soon be true of the more advanced middle income countries. Cellular telephones and personal digital assistants have the potential to play the same role for developing countries if governments are able to come to terms with the changing face of technology and innovate with a citizen-centric mindset.

For example, alerts sent through short message services ('text messages') are being used to notify citizens that a request for assistance has been processed, that a permit needs to be renewed or that an emergency advisory notice has been issued. Cellular telephones are also being used in a more dynamic fashion to browse public services, authorize payments and engage in micro-volunteerism. Cell phones are used, for example, to provide government agencies with images or descriptions of local environmental conditions and to respond to social surveys.

The mobile revolution and growth of high-speed broadband and wireless access is beginning to have a measurable economic impact, reinforced by expansion of e-government capacity in the public sector, even in least developed countries with limited economies of scale. Mobile cellular subscriptions have grown exponentially in developing regions in the last 10 years but most governments are not exploiting this technology fully in public service delivery.

Returning to the question of online services, middle-income countries in particular have made significant advances,to the point where a number of them have usurped positions held in the past by high-income countries in the e-government development index. This has occurred despite the relative advantage enjoyed by developed regions

in telecommunications infrastructure, which accounts for a third of a country's index value. This may be explained by a combination of government leaders who understand the potential of ICT, a willingness to invest and comprehensive e-government policies designed with all segments of society in mind. Many of these countries have revamped their national and ministry websites as tightly integrated portals providing citizens with a single point of entry to all e-government services.

By contrast, e-government development remains a distant hope for many of the least developed countries due to the cost of technology, lack of infrastructure, limited human capital and a weak private sector. A paucity of public sector resources clearly imposes a drag on government innovation. Small ad-hoc and stand-alone projects are the norm in least developed countries, which often lack a well-thought e-strategy within their national development plans. Once initial funding for these projects ends, they are usually at high risk of simply shutting down. However, there are a few notable exceptions, such as e-education in Bangladesh and Ethiopia, and m-health in Rwanda. The experiences of these three countries demonstrate that significant gains can be realized in the least developed countries where there are enabling legal and regulatory frameworks in place, including specifically an e-government strategy with clearly identified sectoral priorities aligned with national development goals.

Consider Ethiopia – a landlocked country with limited access to international telecommunications lines, low adult literacy levels and a resource-poor public sector. On the surface it seems ill-equipped to profit from the information revolution, yet in 2005 the Government of Ethiopia adopted a national information and communications technology (ICT) policy and in 2006 launched a five-year ICT action plan to help diversify the country's economy, promote public sector reform and improve opportunities in education, health, small business development and agricultural modernization. The country has now connected nearly 600 local administrations to regional and federal offices, linked 450 secondary schools to a national education network, and provided some 16,000 villages with access to broadband services.

Problems of resources are in no way limited to developing countries. The 2010 assessment of government websites has revealed that many national governments continue to focus on online and mobile dissemination of information rather than expansion of interactive services often because of the expense and complexity of rethinking systems, procedures and staffing behind the scenes. An antidote might be found in incremental expansion of e-services guided by sound institutional principles with a core objective of integration. Even simple solutions to discrete problems can result in substantial local efficiency gains and increased public satisfaction.

The survey found that some progress has been made in addressing the disconnection between e-government supply and demand although there is still a lot of room for improvement globally. In places where citizens may not be aware of the existence of e-government services, or prefer not to use them, governments would do well to ask them why. One reason may be ineffective marketing. Another may be that the majority of ICT initiatives are designed as efficiency measures (e.g. to automate complex functions such as income tax collection, school registration and processing of social benefits) with little input from the intended beneficiaries. Most surveys have shown that users prefer localized and personalized services, attributes that usually call for interdepartmental cooperation, back-office reorganization and reallocation of both human and financial resources. These requirements are not often taken into account.

E-participation remains in a nascent state in many countries, a finding that is related to the disconnection between government and citizens described above. Many governments include polls and feedback forms on their websites, but few sponsor discussion forums or blogs or post information to social networking sites. This is especially true for developing countries. Governments may need to be more creative about the ways in which they interact with the public, perhaps by creating integrated 'one-stop shop' portals or actively soliciting views that can be used to design public services or to shape public policy. Here, the Governments of Australia, Bahrain, Canada, Kazakhstan, the Republic of Korea, Singapore, the United Kingdom and the United States have been leading the charge.

Despite technological progress, the lack of ICT professionals (i.e. human capital) remains a major shortcoming in both middle- and low-income countries. Few civil services are able to compete with private sector salaries, with the inevitable result that top information technology personnel in developing countries tend to gravitate towards commercial firms. Even in cases where governments are able to recruit highly skilled information technology workers, these young men and women tend to stay only long enough in their government jobs to acquire enough experience to make them marketable in the more lucrative private sector. Similar capacity gaps exist at the management level. Developing country governments often find themselves in the position of having to hire expatriate management consultants and other information technology professionals to develop domestic e-government services.

Future prospects

The value of e-government will increasingly be defined by its contribution to development for all. Citizen-centricity, inclusiveness, connected government, universal access and use of new technologies such as mobile devices are the benchmarks against which electronic and other innovative forms of public service delivery will be assessed. A conceptual framework is presented in Chapter Six that grounds the future survey and sets the stage for further study by answering the question: What is e-government and how is it measured?

In the constantly evolving world of the Internet, research methods need to be updated regularly if the findings they underpin are to remain valid and relevant. More importantly, an international standard is needed in order to model, analyse and monitor the state of e-government across economic sectors and jurisdictions. Intergovernmental and expert bodies of the United Nations system could usefully examine the relationship between indicators of e-government and internationally agreed development goals. Such an exercise could deepen understanding of the impact of ICT in the public sector on development.

Indicators of e-government are the focus of efforts at the working level led by an international partnership of organizations. The group includes the United Nations Department of Economic and Social Affairs, the International Telecommunication Union, World Bank, Organisation for Economic Co-operation and Development, United Nations Conference on Trade and Development United Nations Educational, Scientific and Cultural Organization and others. While some progress has been made, a common set of e-government indicators would greatly facilitate international comparability and avoid unnecessary duplication in assessment of e-government development.

It is important to bear in mind the resistance that reformers might face when confronted with an entrenched public sector. Beyond changes of a technological nature, deeper transformations may be necessary behind the scenes. This is particularly so in contexts where esprit de corps is deeply rooted, where information-sharing is the exception rather than the rule, and where government ICT capacity is limited. In order for a country to excel at e-government, policy makers will usually need to join forces with public administrators to change mindsets and behaviours while offering civil servants the opportunity to acquire the skills needed in the modern organization.

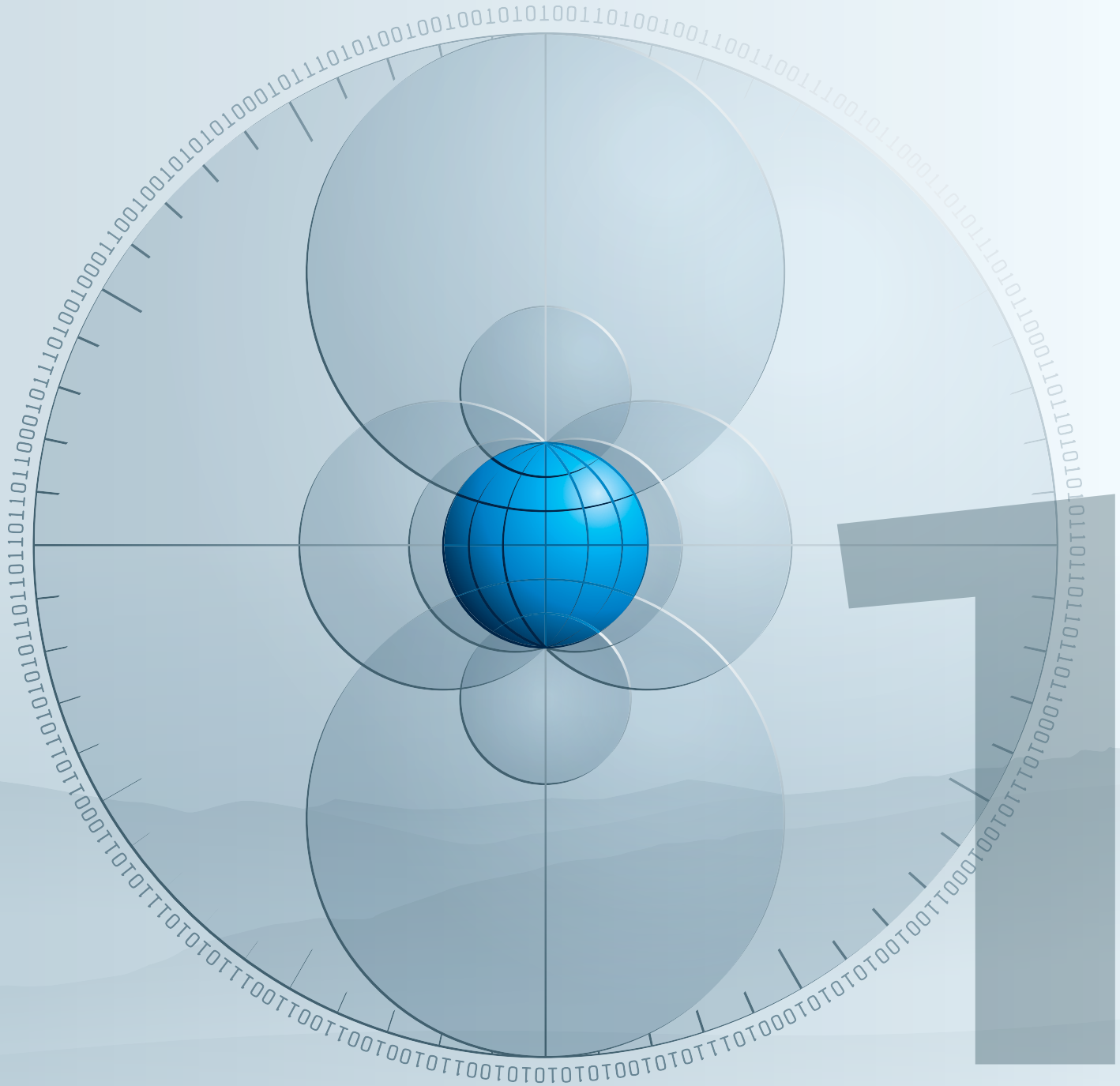
Looking ahead, international cooperation in e-government may be driven by economic integration policies, as experienced recently in the Caribbean, Europe and Western Asia. The Caribbean Centre for Development Administration, an agency of the Caribbean Community, prepared a draft regional e-government strategy for 2010 to 2014 to outline a common e-government vision, set of goals, strategic initiatives, immediate outcomes and implementation plan for English-speaking countries of the Caribbean. In the European Union, ministers responsible for e-government policy issued the "Ministerial Declaration on eGovernment" to articulate a common vision, objectives and priorities for 2011 to 2015. The Gulf Cooperation Council developed e-government standards and structures that are common among Arab States of the Persian Gulf, and holds a regional e-government conference with national awards.

Elsewhere, the African Union convened a high-level summit in February 2010 on challenges and prospects for information and communication technologies in Africa, while the International Telecommunication Union has plans to organize a series of summits over the course of 2010 to promote regional ICT strategies and products as part of its "Connect the World by 2015" initiative.

Such efforts at harmonizing e-government at the regional level would be strengthened by global cooperation, in the spirit of the World Summit on the Information Society. Fundamentally, e-government is not about "e", but about promotion of citizen-centric and participatory governance – helping people to improve their lives and have a voice in decisions affecting their future. Global collaboration is needed to succeed. With the leadership of United Nations Member States, e-government can become a global priority, creating opportunities for all. ■

Part 1

Leveraging e-government at a time of financial and economic crisis



Part 1

Leveraging e-government at a time of financial and economic crisis

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Chapter 1

Stimulus funds, transparency and public trust

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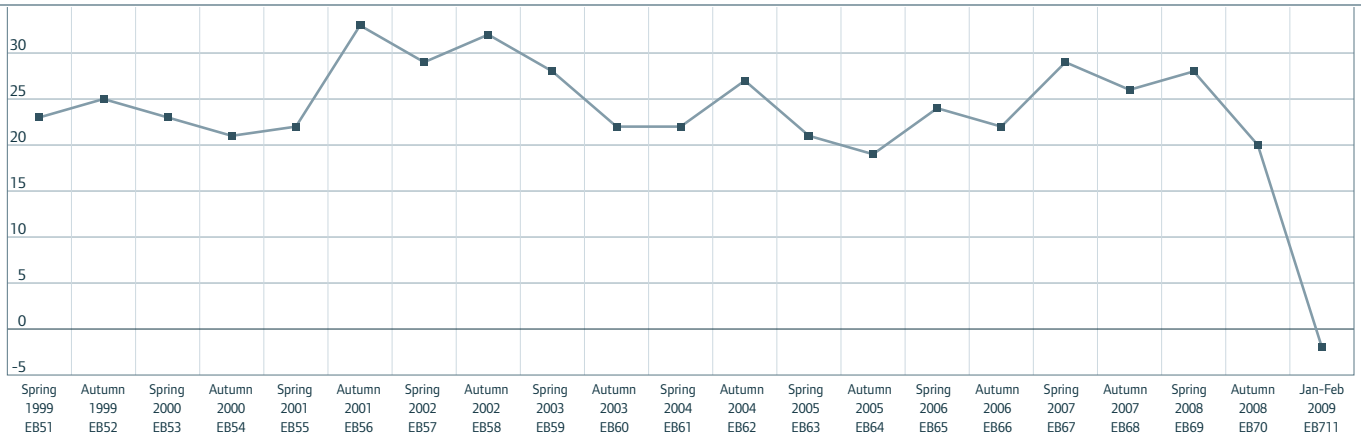
In the face of the rapidly unfolding global economic crisis, governments have acted swiftly to stabilize markets, restore economic growth and promote job creation. By October 2009, more than $20 trillion in public funds had been committed to addressing the crisis by some 50 countries – equivalent to more than one-third of world gross product. About 90 percent of this support went to underwriting the financial sector, with the remaining 10 percent allocated to the sort of government spending and tax breaks that constitute fiscal stimulus packages.[1]

Many observers agree that central banks, acting with the concurrence of national governments, can claim partial credit for the stabilization that has been achieved and the prospect of a recovery. But the general public seems to hold a completely different opinion. In the United Kingdom, United States and European Union, trust in central banks dramatically decreased in the six months following September 2008, just as they were rolling out substantial crisis-response initiatives.[2]

Figure 1.1 **Net trust in the European Central Bank (euro area 12), 1999-2009**



Source: Gros and Roth (2009).
Net trust is defined here as the percentage of respondents surveyed indicating that they trust the European Central Bank minus the percentage who indicate they do not trust it, based on twice-annual Eurobarometer surveys.

Part of the public's unease may be attributed to the vast sums involved and the shock of financial calamity. General anxiety over tax increases and future obligations has combined with uncertainty about the implications of the crisis to sour the public mood.

Another cause of unease may be the highly specialized nature of the field. The technicalities of governmental responses to the crisis are not easily understood by the general public. The intricacies of public finance provoke anxiety with discussion of such things as direct capital injections, purchase of assets and lending by treasuries, liquidity provision to financial institutions, market guarantees and preferential taxes – all on top of the 'simple' task of monitoring government spending. When citizens of the United Kingdom, United States and European Union were asked whether central banks had responded appropriately to the challenges of the economic downturn, 40 percent said they were not sure.[3]

E-government has much to contribute in addressing such a situation. Information services, knowledge-sharing, and tools for participation and collaboration may all serve to reduce uncertainty and assuage public unease. An increasing number of studies suggest a positive relationship between e-government and improvement in citizens' attitudes towards government.[4] Research in Canada and the United States, for example, suggests that using the Internet to transact with government has a positive impact on trust as well as public perceptions of government responsiveness.[5] Also, satisfaction levels may increase when government uses the Internet to solicit ideas from citizens and engage them in decision-making. Citizen participation, in turn, can make it easier to implement policy and is likely to lead to better outcomes as a result of increased public awareness and buy-in.

Table 1.1 **Number of websites studied by type of owner**

Group	Number of cases
National governments and European Union	31
Sub-national governments	63
International organizations	2
Non-governmental organizations	19
Total	**115**

1.1 Crisis response websites

Governments around the world have created websites that enable citizens to track stimulus packages and other public funds committed to addressing the financial and economic crisis. A total of 115 such sites were analysed to determine the extent to which ICT was being used to increase the overall effectiveness of government responses. Three issues were explored in depth:

- The degree of transparency in crisis-response programmes;
- Whether citizens are engaged in decisions about the types of response, how much money and to whom funds should be made available;
- Current policies on information disclosure and the extent to which civil society is able to use government information to raise awareness of particular issues.

The selection criteria for these cases were designed to maximize geographical coverage, include national and sub-national levels, and consider the work of both governmental and non-governmental actors. Finally, preference was given to cases that offered readily transferable policy lessons or that simply provided a greater amount of information for the study. It should be stressed, however, that the final ensemble of cases was the result of a stocktaking exercise and is neither a fully representative nor exhaustive listing of relevant e-government initiatives.

1.1.1 Tracking public funds

Citizens can recognize transparency – and the lack thereof – when they see it, and providing the public with more and better information on decisions taken and the reasons for them is a major need to be addressed by governments.[6] At least for the moment, many appear to be responding. Some 83 percent of crisis-response websites studied have as a common denominator the use of ICT to increase transparency.

Indeed, governments can easily provide general information on stimulus spending policies and amounts committed to various interventions. This is the case for Switzerland's State Secretariat of Economic Affairs website, which includes a section containing general information about the stabilization measures taken by the Government,

describing the three phases of the country's stabilization plan and domains of intervention such as infrastructure and employment.

Similarly, a section on the website of the Swedish Government provides general information on measures taken in different sectors, such as warranty programmes for financial institutions and support for Swedish municipalities. This is also the case for a section of the Korean Ministry of Strategy and Finance website, which outlines policies related to fiscal stimulus measures, employment and support to various industries. The website for the Philippines' Resiliency Action Plan provides useful information on the country's stimulus plan and fiscal measures as well as updated information on the latest measures taken by the Government and other news related to the crisis.

In contrast to the fairly simple initiatives described above, other governments have taken advantage of interactive tools to assist in the provision of information. German citizens are invited to ask questions concerning their government's recovery measures on the website of the German Ministry of Finance, which added this feature in an attempt to make its section on the economic crisis more attractive to its users by allowing for a more interactive experience. Prominently displayed in the main section dedicated to the crisis is a tool that allows citizens to enter an e-mail address and to ask questions that are later answered by the Ministry's staff, which posts the answers online. This simple application bears the potential of creating a direct link between concerned citizens who would like to have further information on the actions taken by the Government, and the Government itself. In addition, by publicizing the questions that are asked, the civil servants in charge of replying can avoid answering duplicate inquiries on an individual basis (i.e. recurrent questions), consequently reducing the workload when it comes to responding to the public.

Funds committed to addressing the crisis often can be linked to a geographic area, and citizens might well be interested in finding out how much money is directed to nearby places, and for what purposes. Governments are using geographic information systems to provide information in a more contextualized and attractive manner, while facilitating users' comprehension of the data conveyed. Forty percent of the websites identified present geo-referenced information.

Kazakhstan's crisis response website, for example, offers an interactive map and with just a few clicks the user is able to localize the areas where investments are made, along with detailed descriptions of projects (e.g. amount of resources allocated, name of contractor, how to contact the person in charge of the project, time for the realization of the project, number of jobs created by the project). All of this information is conveyed through an interactive map that enables the user to identify the regions where funds are being allocated as well as the agencies responsible for the projects. Similarly, on France's stimulus website the user can click on a map and find information on the allocation of recovery funds in the area selected and the total costs of individual projects taking place in the region. In a Brazilian example, the national government's Programme to Accelerate Growth is explained using an interactive map that provides information on investments by regions of the country and the public works taking place.

Other online tools also provide geographical information. The United States Recovery Act and Australian Economic Stimulus Plan websites both allow users to track funds by entering their postal codes. The State of Arkansas in the United States allows users to track recovery funds by county using their mobile phones

In addition to the generalist websites described above, some e-government initiatives serve very specific purposes. Innovative e-government solutions address specific needs raised by the crisis. A United

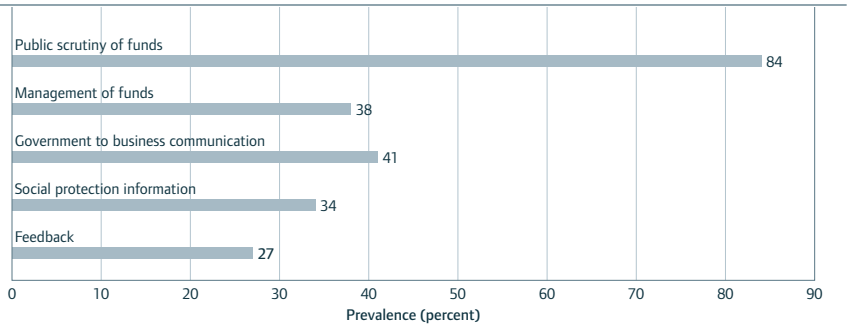
Figure 1.2 **Australia Economic Stimulus Plan website with geo-referencing tools**

Australia: Economic stimulus plan

Breakdown of stimulus plan and tracking stimulus projects at local level. Enables interactivity (ask a question). It could also be asking questions from citizens themselves. Links to sub-national websites of similar scope. Makes link to national jobs website, a pre-existing initiative that helps mitigate the effect of the crisis. Subscription to updates.

http://www.economicstimulusplan.gov.au/pages/default.aspx

Figure 1.3 **Crisis-response website objectives, October 2009**



States federal Government website assists recipients of recovery funds to meet quarterly reporting requirements by providing them with the means to submit project updates online. The system allows the recipients to view and comment on reports, as well as update and correct them whenever necessary. It illustrates the role that e-government tools might play in providing faster, more standardized and more effective transactions between the recipients of crisis funds and governments.

The benefits obtained through improved monitoring of public spending tend to outweigh the initial costs of setting up sites for communicating with citizens online.

1.1.2 The value of low-cost solutions

The websites studied represent varying levels of sophistication, as illustrated above, yet there appears to be no correlation between the resources invested in technology (e.g. in website costs) and the quality and quantity of transparency that is achieved. Moreover, there is widespread evidence that expressive results can be achieved at very low costs,[7] which in a context of constrained budgets is important for policy makers to know as they debate to what extent governments should prioritize e-government applications (e.g. websites) as a means to increase transparency.

Governments should not lose sight of the fact that the benefits obtained through improved monitoring and oversight of public spending are most likely to outweigh the initial costs of setting up sites for communicating with citizens online. This is supported by extensive evidence that transparency policies lead to non-negligible and desirable outcomes such as fiscal discipline and reduced misspending.[8] In California, for example, it cost $21,000 to implement the State's spending transparency website and its annual operational costs are estimated to be below $40,000. Visitors to the website report unnecessary spending to the government and, after only a few months of operation, the website had already saved the state over $20 million.[9] In a similar manner, the transparency website in Texas, just a few months after launching, had already helped achieve savings of over $5 million.[10]

The technological capability of a given government is another relatively insignificant factor affecting the actual level of transparency achieved. Consider the variance in transparency across the different countries, and their level of e-government development as measured, for example, by the quality and scope of their Web presence. There is no evidence that governments that perform better in terms of e-government development are necessarily those delivering the most efficient services for monitoring crisis-response funds. That is, evidence suggests that there is no correlation between the level of technological development of governments – as measured by its level of e-government development – and the factual provision of transparency with regards to crisis-response funds that are allocated by governments around the world.

When comparing cases at the international level, however, one is bound by serious limitations, given the disparity in aspects such as institutional frameworks (e.g. federal versus unitary) and crisis-response measures. An example from the state level will help to render this question of e-government and transparency more evident and less anecdotal. At this level, analysis can be carried out in a controlled environment where institutional traits are equal among all the sub-units (i.e. states) of the federation. In other words, cases are more comparable than at the international level. In the United States, where all of the states currently run stimulus websites, the use of public funds from the American Recovery and Reinvestment Act is subject to calls for transparency.

The scatterplot below illustrates the relationship between the transparency that is conveyed by those websites with regard to the allocation of recovery funds, in contrast to the e-government development of each State's government.

Clearly, in this instance, no correlation at all can be found between the two factors.[11] That is, a State's level of e-government development does not predict its efficient use of ICT to track public

stimulus funds. The extreme cases make the point. Delaware scores the highest on e-government development, yet its transparency website has one of the lowest scores. Conversely, Maryland's website is considered by far the best website for monitoring stimulus funds, yet the state ranks 48 out of 50 at the bottom of the index for State e-government development in the United States.

Evidence gathered at the international level, added to this analysis at the sub-national level, suggests a rather limited relationship between e-government development and the provision of transparency – as counter-intuitive as it might seem. Likewise, as mentioned above, little relation can be found between the cost of crisis-response websites designed to enhance transparency and their quality.

This bodes well for reformers at a moment when budgets for investing in technology are limited, particularly in countries in which e-government structures are less developed. Transparency policies, in the context of the global economic crisis, might produce better results when implemented incrementally and when taking advantage of existing ICT solutions that can be deployed without constituting an additional burden to governments' budgets.

In sum, rather than focusing on the expensive implementation of unnecessarily sophisticated technology, governments might provide better value for money by creatively utilizing pre-existing and low-cost ICT infrastructures to provide comprehensive and detailed information in a single point of access, and in an accessible and timely manner.[12]

1.1.3 Coordination across agencies

The global nature of the financial crisis, with the depression being highly connected as between regions and nations, requires more of government ICT initiatives. It requires that not just a few but all governments endeavour to build up networks to provide transparent information for the public, and to do so in a coordinated fashion.

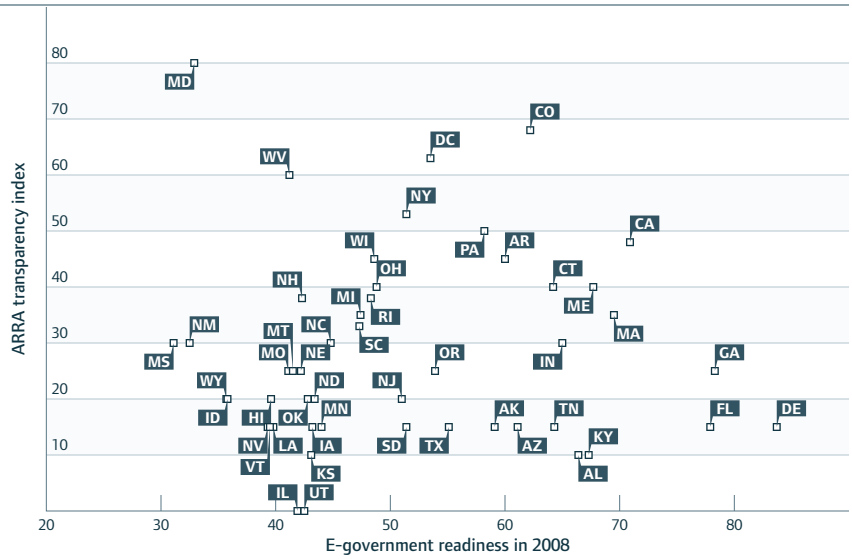
It is naturally the case that the progress achieved towards building e-government systems will be different in different localities. Generally, according to a study of Spanish regional governments,[13] regions with higher performance usually play an outstanding role, disclosing higher amounts of financial information on the Internet. To address this point, countries may need to foster regional e-government systems via programmes supported by the central government. In particular, central government can provide regional governments and agencies with basic website frameworks. These frameworks can be developed by special projects, or outsourced from coordinated developers to ensure their interconnection. From such support by central government, the construction of e-government systems in comparatively backward regions and departments can be promoted, and the overall cost can be reduced by copyright-trading or economies of scale in software development.

Following on from the above point, common software standards are needed to realize inter-connectivity, integration of data and convenience for users. Open standards are often good candidates because open software is fundamentally interoperable.

Web 2.0 is a popular term with advocates of e-government. Web 2.0 applications provide decentralized patterns for data submission and analysis, and provide a platform for the provider-user interaction, in contrast to non-interactive websites where users can only passively view information. Since the financial sector is a broad-wide connected industry, users in a variety of locations may find value in data and analysis of different locations and different investors. Therefore, the demands on data usage (e.g. downloading and

There appears to be no correlation between the resources invested in an established website and the quality and quantity of transparency that is achieved.

Figure 1.4 **Transparency and e-government development in the United States, 2009**



Sources: Transparency index of the ARRA, American Recovery and Reinvestment Act (http://projects.propublica.org/recovery/), Mattera, McIlvaine, Laicy, Lee and Cafcas (2009), West (2008).

applying) and interaction is correspondingly broad-wide. However, data integration and interaction can be achieved only by smooth data interconnection. In other words, there will be no true Web 2.0, no integration and application, if there is no broad interconnection across the relevant scope.

In fact, this lack of interconnection is at the heart of the current weakness of e-government systems being built. Taking the e-government projects that present economic recovery plans in the United States as an example, it becomes evident that most geographic information systems applied by state and local governments are not the same, frequently incompatible, and based on proprietary standards. Regarding this point, the International Monetary Fund issued a set of recommended standards and codes after the Asian financial crisis of the late 1990s.[14] Such principles ought to be taken up and advanced further as a partial solution to the ongoing financial crisis.

In many countries, information and services provided are not often presented in a centralized and coordinated manner, which requires business actors to navigate any number of different websites in order to gather the information they need. To address this problem, the Lithuanian economic stimulus plan website provides businesses with extensive information on crisis-response measures, policies and opportunities for different categories of businesses. In a similar vein, the French website for business development and employment provides useful information for small- and medium-sized enterprises in a format structured around thematic clusters (e.g. financing and investment support), functioning then as a single entry point to all information relevant to businesses in the context of the crisis.

Better delivery of services depends on the extent to which services offered take user-centricity as a guiding principle, and it does not refer to the size or level of sophistication of e-government structures. In many cases, the creation of a simple website that centralizes and organizes useful information that had been previously scattered across different government agency portals constitutes by itself a major step towards offering better support for citizens and businesses.

Information is a resource that individuals might not be willing to spontaneously share unless specific settings and motivations to do so are generated. It is important to bear in mind the resistance that reformers might face when confronted with the logics of the public sector. This is particularly so in contexts where *esprit de corps* is deep-rooted and where information-sharing is the exception, rather than the standard procedure. Beyond changes of a technological nature, deeper structural and organizational changes are necessary to bring about change in the way governments use and provide data and ICT services. Policies aimed at transparency can achieve their goals when governments create suitable institutional and organizational frameworks, incentives, and means such as e-government technologies that promote information-sharing at the collective and individual.

1.2 From transparency to participation

Most government websites with aims of transparency tend to be one-directional in their provision of information, enabling citizens to track and monitor government spending but not to take a more active role. More advanced websites, however, offer features and facilities enabling citizen participation and engagement. These websites are geared towards active interactions. In this regard, citizens are no longer passive consumers of government-provided information but active participants in the related content and information generation.

A range of opportunities for citizen participation are offered by Web 2.0, a term that refers to web applications that facilitate interactive information sharing, interoperability, user-centred design and collaboration. In the particular context of crisis-response funds and their usage, it is generally observed that governments lag behind non-governmental actors. The findings here seem to confirm this relationship when it comes to ICT in relation to crisis-response funds and policies aimed at mitigating the effects of the economic downturn. As shown by the figure below, only 23 percent of government crisis-response websites make any usage of Web 2.0 tools, compared to 57 percent of websites sponsored by non-governmental actors.

Few governments are taking advantage of the prospects offered by interactive technologies to foster participation with relation to economic crisis issues, although they could be reaping the benefits of inclusive policy-making while doing so at lowered implementation costs. No more than 27 percent of cases had explored the prospects of ICT for promoting some kind of citizen feedback or participation, as modest as these attempts might be, through traditional means such as e-mail or through the usage of Web 2.0 tools.

In other words, only a minority of cases explore the prospects of ICT tools for supporting a modality of engagement with external audiences. The budget consultation website of the Canadian province of British Columbia, for example, invites citizens to submit videos with their views on alternative ways of addressing the economic crisis and their indications of budgetary priorities. Another interesting deployment of ICT tools occurred in June 2009, when a message on the Twitter account of the Governor of California invited citizens to provide feedback on policies to address the State budget deficit. In August of the same year, a website was designed specifically to aggregate all the responses received from citizens via Twitter, with a user-based system also allowing users to rate each others' ideas in an attempt to identify the best submissions.

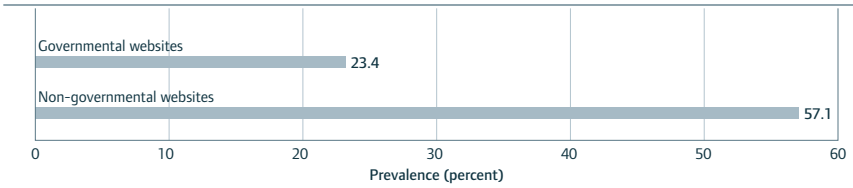
A misleading assumption frequently made with regard to public participation, be it ICT-enabled or not, is that the simple creation of channels for citizens to interact with governments necessarily engenders citizen participation. Evidence shows that most e-participation experiences have repeatedly shown disappointingly low levels of participation, despite the multiple and varied initiatives implemented by governments in recent years to engage citizens online, and apart from a few highly publicized examples.[15] Likewise, discussion groups, blogs and other forums on the topic of crisis-response funds report that, in most of the cases, participation has been extremely low.

By contrast, participatory budgeting has been reasonably successful. The practice, which can be broadly defined as the participation of citizens in decisions about budget allocation and in the monitoring of public spending, has been identified with a number of positive outcomes. These include increased transparency, innovative delivery of public services and reduction of tax delinquency. In Belo Horizonte, Brazil, and La Plata, Argentina, 10 percent of the population has voted on budget proposals online or via mobile telephones. Citizens in the municipality of Pune, India, have made suggestions for budget allocations online through the municipality's e-budgeting application. In Freiburg, Germany, the city has combined the use of an electronic budget planner with an online moderated deliberation and aggregation of results in wikis edited by the participants.[16]

More specifically related to the management of crisis-response funds is an example from the district of Heathcote, Australia, where citizens were invited to decide through the Internet on the allocation of stimulus funds from the State Government. Through a website, users prioritized the eligible proposals formulated by local community organizations, indicating which projects were the most deserving of existing funds. Citizens cast more than 20,000 votes in a short period of time, with groups actively engaged in canvassing campaigns both online and offline, some setting up stands and others launching online campaigns through social networks. The meaningful involvement of citizens in budgeting processes is one of the most efficient ways to generate an awareness of the existing tradeoffs when allocating limited resources. This opens up space for dialogue and cooperation, while allowing policy makers to identify citizens' preferences and demands. Participatory budgeting initiatives illustrate how meaningful e-participation can be achieved.

Interactive technologies offer governments a way to reap the benefits of inclusive policy-making on economic crisis issues at relatively low cost.

Figure 1.5 **Use of Web 2.0 tools by different actors, October 2009**



Open data enhances public sector efficiency by transferring some of the analytical demands of government to NGOs, research institutes and the media, which have been found to combine data from various sources in original and inventive ways.

1.3 Data access and civil society

Much of the innovation in the use of ICT to enhance management of crisis-response funds comes from the use of open data by non-governmental actors providing services of high public value without governments having to bear the costs. The aim of the open data movement is to make information freely available to everyone, without restrictions from copyright or patents and in standard machine-readable formats that can be exploited without the use of any given piece of software.

Open data enhances public sector efficiency by transferring some of the analytical demands of government to third parties such as non-governmental organizations, research institutes and the media, which have been found to combine data from various sources in original and inventive ways. The potential for actors outside of government to provide such services[17] when government data is made freely available[18] is suggested by Subsidyscope, an initiative of a non-profit foundation based in the United States. Its website draws on publicly available records to deliver high-quality information on the disposition of financial bailout funds by the government.

Through the global economic crisis, it has also become clear that an ability to perceive and understand the concept of risk is important for citizens to master and, indeed, is a competency of citizens that is important for the long-term health of the financial system. Such building of competencies (e.g. through formal education) and capabilities (e.g. through learning by doing and by using) among the citizens would require the use of data.

Figure 1.6 **United Kingdom crisis-response website with citizen feedback tools**

United Kingdom: Building Britain's future

Introduces Building Britains's Future, the government's plan for economic recovery. Outlines campaigns in consumer rights, crime, education, health, housing, low carbon and youth jobs and citizens can upload comments/ videos on these commitments. The government is soliciting citizen feedback on the BBF website. Use of Twitter and blogs.

http://www.hmg.gov.uk/buildingbritainsfuture.aspx

1.3.1 Government as a platform

The idea of 'government 2.0' is generally associated with the use of social media by the public sector. Recently, the notion has assumed greater definition through its association with government as a 'platform' or provider of data and services for others to exploit as they see fit.[19] Advocates for the concept of government as a platform privilege the role that governments should play as providers of web services, allowing third parties to innovate by building upon government data and applications. They believe that if governments provide data in a non-proprietary and predictable format, third parties are more likely to maximize the value of this information, hence providing services that better respond to users' expectations and needs.[20] Consequently, it is claimed that governments should use the Internet to provide free data in formats that are open, structured[21] and machine-readable, while the Web presence of governments is incrementally reduced as third parties start to provide information to the general public.[22]

The creation of the *data.gov* website by the United States Government is one of the most substantial steps taken so far to provide such a platform for third parties.[23] Launched in 2009, the website functions as a clearinghouse for datasets generated by the government in an accessible developer-friendly format. The United Kingdom and the State of Sao Paulo in Brazil are following a similar path towards the creation of websites that will serve as a single point of access to public data. With the intention of providing added value, both Governments have invited application developers to provide feedback on the conception of the sites.[24] Similar feedback was sought for the second version of United States Recovery Act website by the United States Recovery Accountability and Transparency Board, which asked the community of developers for their views on the most convenient format for disclosing data on crisis-response funds.[25]

For the moment, the provision of open government data via online and mobile channels is limited primarily to developed countries. Nevertheless, the prospect of third parties delivering services of high public value, which would otherwise have to be provided using taxpayer funds, is a path that should not be underestimated for both developed and developing countries.

1.3.2 The economics of open data

In recent years, third parties have shown not only that they are able to deliver online services of great public value but also, in many cases, that they are able to provide such services even more efficiently than governments. To increase this kind of innovative work, the first step is to create a structure to ensure that governments provide data and web services in an appropriate manner. This will promote the co-production of public goods that foster transparency and deliver better services.

Most governments possess an extensive amount of data that could be reused and combined in groundbreaking ways by third party actors, but this data is dispersed across agencies of different levels and diverse branches of government. To put it bluntly, most governments may not be fully aware of how much and what data they create and dispose of, or from where it can be sourced. The majority of these highly dispersed datasets are unlikely to be available in structured and machine-readable formats.

In organizational terms, addressing the problem of data dispersion and the lack of common standards would require governments to implement and enforce policies for shared standards of data gathering and reporting across public agencies at different levels and branches. Finally, acquiring the structure necessary for the delivery of data to third parties entails the provision of a single point of access, conveying and updating all the data gathered in a developer-friendly manner. The steps involved in the appropriate provision of data, as briefly described above, produce better results when they occur simultaneously and in a gradual manner. For instance, governments might achieve their goals more efficiently if they release their data as it becomes available, rather than waiting to reach a hypothetical threshold or target before starting to release their data.

The deployment of human and financial resources to create the structure required for open data is a particularly sensitive matter for governments in the context of an economic downturn and tightening budgets, and it is a major issue at any given time for developing countries. Thus, the incentives to bear these costs rely on the expectation of concrete medium- and long-term results. The delivery of value-for-money when building a structure for the provision of open data is highly dependent on whether third parties will actually come into play or not. That is, for an existing offer of data there must be a corresponding demand, and vice-versa. The economics of open data is about releasing governments from the costly delivery of services online[26] while decreasing marginal costs for the provision of government-held data. The prospect of completing this virtuous cycle, which offsets governments' initial investments, is the compelling argument for governments to deploy efforts to incrementally reinforce their role as providers of data and Web services.

The economics of open data, with governments as data providers and third parties delivering the information to the public in more innovative and creative ways, has an inevitable resemblance to economic models that privilege market efficiency with the least governmental intervention. It is particularly interesting that such views are put forward precisely at a moment of increased government interventionism and scepticism towards unregulated markets. Will third parties increasingly co-produce online services if governments are to continuously withdraw from their previous roles as information providers? To what extent will non-governmental parties be able to address public demands and needs once governments start providing the necessary infrastructure in the form of datasets and Web services? If governments free the data, will third parties come?

Third parties have proven their ability to innovate and deliver, yet their range of action has been generally restricted to certain sectors of government activity and mainly concentrated in developed countries. It is still too early to paint a clear picture of the

Figure 1.7 **United States federal open data initiative**

United States: Data.gov

Federal datasets openly available for public use. Visitors are invited to suggest ideas for additional data and other site enhancements.

http://www.data.gov

The economics of open data, with governments as data providers and third parties delivering information to the public, has a resemblance to economic models that privilege market efficiency with the least governmental intervention.

capability of non-governmental actors in scaling up their existing efforts. Non-governmental actors have demonstrated their ability to go beyond simple resilience under difficult circumstances by actually mobilizing resources for the increased provision of online services of high public value. The majority of initiatives led by non-governmental studied in the United Nations e-Government Survey blossomed precisely during the worst moments of the economic downturn. In general, evidence suggests that the demand by third parties for data by far exceeds governments' offerings. Despite the possible existence of a limit on the extent to which third parties may come into play – in empirical and normative terms – there is clearly a potential to be explored, which may prove to be an exceptional model to be further explored.

As previously highlighted, there are sufficient incentives for governments to incrementally strengthen their role as providers of data and Web services, but the cycle is only completed with the intervention of third parties. The costs of innovation for non-governmental actors are, obviously, significantly reduced when governments provide data in a suitable format.[27] In addition, much of the technology that is developed by third parties in developed countries is conceived in open source formats that allow non-governmental actors from developing countries to use and adapt applications developed elsewhere. However, third parties still require technological capabilities in order to build upon government data – capabilities that might be scarce or under-mobilized for public purposes in developing countries.

Even in presumably adverse contexts, non-governmental actors are increasingly harnessing the potential of the convergence between ICT and government-held data for increased accountability and the provision of services of public value, according to anecdotal evidence. In Argentina, the website *Dinero y Politica* allows citizens to monitor expenses, budgets and campaign contributions to political parties. In a similar vein to the United States Open Congress website,[28] a group of developers in Brazil have joined forces in the development of *MeuParlamento* a website for monitoring legislative action at all levels and inviting citizens to provide feedback on the lawmaking process.[29] Similar initiatives led by non-governmental actors that build on government-held data can be found in countries such as Georgia, India, Jordan, Kenya, Lebanon and Lithuania. In Kenya, for example, the Budget Transparency Tool allows citizens to track the allocation of development funds and to report, via mobile SMS messages or e-mail, any irregularities identified by citizens.

Evidence, albeit anecdotal, implies the potential of third parties to provide online applications and services of public value by building upon government data. In developing countries, some governments might initially play a role in supporting the development and mobilization of the technological capability of third parties. In other words, under certain circumstances in the context of developing countries, some governmental intervention might be necessary, going beyond the simple provision of a structure for open data. The costs of such interventions would have to be offset by the services and applications subsequently provided by third parties. The initiative Apps for Democracy,[30] implemented in the United States by the District of Columbia, offers a pertinent example. Launched in 2008, Apps for Democracy featured a contest with awards for the best applications built upon data supplied by the district government. In thirty days, at a cost of $50,000 in awards, participants developed 47 applications that would have cost $2.6 million if developed internally by the District. Such a model provides high value for money while mobilizing and leveraging technological capabilities for public use, all factors important to the sustainability of the open data model.

International cooperation may also prove to be a valuable means for leveraging the capacity of non-governmental actors from developing countries to co-produce services of public value. A current project led by MySociety, a non-governmental organization in the United Kingdom, provides funding and technical support to individuals and organizations in Central and Eastern Europe to build ICT tools to enhance public transparency and accountability.[31] Governments and donor organizations might well consider following a similar path, encouraging partnership and cooperation among communities of technology actors from developed and developing countries. This approach carries the promise of fostering the sharing of technological knowledge among non-governmental actors at an international

level, ultimately strengthening the capabilities of third parties from both developed and developing countries in the co-production of services.

1.3.3 Who guards the e-guardians?

A paramount value of public service is the extent to which it is amenable to public accountability.[32] While third parties increasingly use ICT as a means to enhance transparency and empower citizens to hold governments accountable, the absence of mechanisms to hold third parties themselves accountable remains an issue to be addressed. This is even more pertinent if governments are to increasingly redefine their role as 'platforms', with third parties becoming gradually more significant in their emerging role as techno-political intermediaries between governments and the public.

If governments are to act mainly as providers of data and Web services, third parties come into play as the central actors in the definition of how data is presented and contextualized. The positive aspect of this is that third parties have shown a greater ability to represent data in innovative and accessible ways. This is useful if the consequent representation can reduce cognitive overload from access to so much information, improve its understanding and highlight patterns and associations that might otherwise go unnoticed. Yet, the manner in which data is represented, as well as the patterns and correlations highlighted, are the fruit of human judgement.[33] It remains to be seen how skilled third parties will be in helping the public to see the validity behind the information.

The techno-mediation deployed by third parties has proven valuable and their legitimacy has not been seriously challenged to date. However, if their role is expected to develop further, labels such as 'non-partisan' and 'non-profit' might not be sufficient to ensure public trust and accountability in the long term. Last but not least, the competition for audiences online should not be regarded as a mechanism capable by itself of rewarding the third parties that are committed to the values of transparency and public good. The emerging role of third parties in providing information to the public calls for creative and considered reflection on ways to ensure that public trust, both in governments and third parties, is not being taken for granted or undermined.

1.4 Conclusions

E-government tools have been used in an unprecedented manner as a means to support policies to alleviate and cope with the effects of the recent global economic crisis. They have played a major role in providing transparency of crisis-response measures, conveying relevant information and support to citizens and businesses, and encouraging feedback from citizens on alternatives for addressing the effects of the economic downturn.

The capacity to convey transparency is within the reach of, if not all, most national governments around the world. Moreover, there is growing evidence that the provision of transparency – and the use of e-government tools to support it – constitutes an approach wherein the initial investments required are quickly offset by the outcomes generated, such as increased savings and enhanced public trust.

Third parties can play an important role in the co-provision of services of high public value by deploying technologies in a manner that is creative and innovative. By enacting open data principles, governments lay down the foundations that reduce the entry barriers for non-governmental parties, thus allowing for the co-production of public services at minimal costs for governments and, consequently, for taxpayers.

The extent to which user-centricity is a component of each of the initiatives is a factor in its success. There exists a nearly systematic discrepancy between the offer of e-government facilities and the actual take-up of the services offered. This indicates that, less than a technological issue, users' take-up depends ultimately on the extent to which services are able to effectively address their needs and preferences.

Participatory practices, when appropriately designed and implemented, can address users' needs. Interactive ICT tools have proven to be an effective means for policy makers to identify the needs, demands and preferences of citizens. However, it is not sufficient to simply create of ICT-mediated channels of communication between governments and citizens. It is essential to identify users' needs, be it for the design of new e-government services or for the allocation of resources. This implies not

only creating channels to give a voice to citizens, but also creating the means to listen to the citizens and to provide them with meaningful responses.

The capacity of governments to address the issues that emerge as the economic crisis continues to unfold constitutes the core element through which trust can be renewed and reinforced, while transparency is also enhanced. As governments find themselves with constrained budgets and mounting demands, the need for providing better value for money has never been so pressing in the recent history of the public sector.

Although governments cannot easily afford to make mistakes, risk-aversion should not have the upper hand over innovation. The more prudent action is to move away from the comfort zone of standard procedures and logics anterior to the crisis, as paradoxical as this may seem. The current environment should be regarded as an opportunity for change in the way governments operate and interact with society. As experience with crisis-response websites shows, the Internet offers governments an opportunity to reinvent themselves even as they address a host of financial and economic challenges. ■

Table 1.2 **Features of selected crisis-response websites**

	Objectives					Tools		Draws on pre-existing site
	Public scrutiny of funds	Mgmt.	G2B	Social protect.	Feed-back	Geo-refencing	Social media	
Australia. Economic Stimulus Plan http://www.economicstimulusplan.gov.au/ BBreakdown of stimulus plan and tracking stimulus projects at local level. Enables interactivity (ask a question). Links to sub-national websites of similar scope. Makes link to national jobs website, a pre-existing initiative that helps mitigate the effect of the crisis. Subscription to updates.	✓		✓	✓		✓	✓	✓
Belgium. Restructuration d'entreprise http://www.herstructureringen.be/restructuration/fr/homepage/index.html Intergovernmental site explaining recovery measures for business.			✓	✓				
Belgium. Au travail – Mesures pour l'emploi http://www.autravail.be/ Aims to provide simple and centralized place to find information that is available on the Internet, regarding federal and regional measures that promote employment both for business and for the unemployed. By filling in a profile the business or the jobseeker can find which measures and opportunities are applicable.			✓	✓				
Brazil. Programa de Aceleraçaõ do Crescimento http://www.brasil.gov.br/pac/ Government's programme for accelerated growth. Information on the allocation of funds by region and sector. Link also to the pre-existing government budget consultation.	✓					✓		✓
Canada. Department of Finance http://www.fin.gc.ca/n08/data/08-103_1-eng.asp Fiscal stimulus budget consultation.					✓			
Canada. Canada's Economic Action Plan http://www.actionplan.gc.ca/ Outlines Canada's Economic Action Plan. Links to Facebook, Flickr, Twitter, Youtube and Myspace.	✓		✓	✓		✓	✓	
China. National Development and Reform Commission http://www.ndrc.gov.cn/ National Development and Reform Commission website with information on the Chinese stimulus plan.	✓				✓			
France. Les 1000 projets de la relance http ://ww.relance.gouv.fr/ Details projects being carried out under stimulus package. Link to relance TV. Specific section for incentives for companies willing to hire, given that one of the objectives of the initiative is protection of employment.	✓		✓	✓		✓		
France. Agir pour no entreprises, c'est agir pour l'emploi http://www.nosentreprisesnosemplois.gouv.fr/ G2B2G (government to business to government interaction) portal centralizing information relevant to businesses, e.g. information on where small and medium enterprises (SME) can find relevant information on how to access funds deployed by the government to address the crisis.			✓					✓
Germany. Bundesministerium der Finanzen http://www.fuer-alle-da.de/ Ministry of Finance. Details of financial crisis and bank bailouts. Page allows citizens to ask questions online and the answers are also displayed online. Functions as a FAQ (frequently asked questions) that relies on user-generated content.	✓		✓	✓				
Iceland. The Icelandic Government Information Centre http://www.iceland.org/info/iceland-crisis/ The Iceland government web-portal prominently features a link on the economic crisis on each page. Seriously affected by the crisis, Iceland provides a simple website with provision of general information in English concerning policies to address the crisis, which might indicate some effort to regain confidence from the external public and markets.	✓							

Mgmt. Management of funds
G2B Government to business communication
Social protect. Social protection information

Table 1.2 **Features of selected crisis-response websites** (cont.)

	Objectives					Tools		Draws on pre-existing site
	Public scrutiny of funds	Mgmt.	G2B	Social protect.	Feed-back	Geo-refencing	Social media	
Ireland. Losing your job http://www.losingyourjob.ie/ Public service information for those who are currently unemployed or are becoming unemployed. Aggregates information from pre-existing policies and websites.				✓				✓
Kazakhstan. Electronic Government http://www.e.gov.kz/ Portal for the country's e-government department. In-depth description of the country's plan for economic restabilization and individual stages of implementing action plans. Videos of meetings, speeches, government sessions. The website http://dorkarta.enbek.gov.kz/ focuses on crisis strategy ('dorkata' translates as 'roadmap'). It includes plans, projects, timelines and contact names for housing, schools, social projects, training, etc. by region. Also news, regulatory document downloads and an interactive map.	✓					✓		
Republic of Korea. Overcoming the Crisis http://www.mosf.go.kr/recover_eng/ Section of Ministry of Strategy and Finance website. Sections on general policies, fiscal policies, employment, industries and green growth actions to overcome the crisis. Information provision with some FAQ.	✓							
Lithuania. Ekonomikos skatinimo planas http://www.skatinimoplanas.lt/ Specific website by Ministry of Economy introduces the stimulus package.	✓		✓	✓				
Malaysia. Rangsangan Ekonomi Malaysia http://www.rangsanganekonomi.treasury.gov.my/ Details spending under the two stimulus plans: graphs, questions, downloads and RSS Web feed.	✓							
Philippines. Economic Resiliency Plan http://www.neda.gov.ph/erp/ ERP Watch is the Economic Resiliency Plan website. It is a section within the National Economic and Development Authority website.	✓							
Portugal. Governo de Portugal Programas e Planos http://www.portugal.gov.pt/pt/GC17/Governo/ProgramasEPlanos/Pages/Programas.aspx Some pages of the government website, with list of recovery programmes and links to more information.	✓							✓
Singapore. Budget 2010 http://www.singaporebudget.gov.sg/ Singapore Budget 2009 page with interactive tools including a benefits calculator for households and businesses, games, essay and video competitions, and coverage of mock parliamentary debates in schools. Recovery programme document download and summary of citizen feedback on budget issues. More specifically, the online game 'If I were the Finance Minister' gives users an idea of what it is like to steer fiscal policies and address the challenges and trade. The citizen feedback summarized on the website was solicited by the government via an online portal, budget dialogue sessions, e-townhall discussions, commentaries in media forums and SMS feedback channel. Link to page that explains what is available to citizens: http://www.mof.gov.sg/budget_2009/attachment/GovHelp2009.pdf.	✓			✓	✓			✓
Spain. Plan "E" http://www.plane.gob.es/ Plan "E" is the government website on economic stimulus and employment, in five languages to reflect the country's linguistic diversity. Pages provide information on courses of action, video interviews with public officials, and links to local-level project information. Periodic online chats serve as a platform for dialogue between public officials and citizens. News can be followed on Twitter. Interactive animation allows the user to see the results of the recovery plan, e.g. estimates of jobs that have been retained by the programme.	✓		✓	✓	✓		✓	
Sweden. Samtliga åtgärder – en översikt http://regeringen.se/sb/d/11577/a/120213/ Overview of stimulus measures. Extra page in the government's website.	✓							✓
Switzerland. Stabilisierungsmassnahmen http://www.seco.admin.ch/stabilisierungsmassnahmen/ Overview of restabilization measures.	✓							

Table 1.2 **Features of selected crisis-response websites** (cont.)

	Objectives					Tools		Draws on pre-existing site
	Public scrutiny of funds	Mgmt.	G2B	Social protect.	Feed-back	Geo-refencing	Social media	
United Kingdom. Building Britain's Future http://www.hmg.gov.uk/buildingbritainsfuture.aspx Introduces Building Britain's Future, the government's plan for economic recovery. Outlines campaigns in consumer rights, crime, education, health, housing, low carbon and youth jobs and citizens can upload comments/videos on these commitments. The government is soliciting citizen feedback on the plan. Use of Twitter and blogs.	✓				✓		✓	
United Kingdom. Real help now http://www.realhelpnow.gov.uk/ Advice for citizens on how to cope with the financial crisis (e.g. homeowners, business, jobs). Possible to search for initiatives at the local level concerning the recovery plan as a whole.			✓	✓		✓		
United States. Reovery.gov http://www.recovery.gov/ The government's official website to 'track the money' with data related to United States Recovery Act spending. For citizens to track the development of the recovery for greater transparency and accountability. Links to existing jobs websites. Use of Twitter, Facebook, MySpace and YouTube.	✓	✓	✓	✓		✓	✓	✓
United States. FinancialStability.gov http://www.financialstability.gov/ Website on the financial stability plan. News, reports and relevant information, for example on the local impact of the capital purchase programme.	✓					✓		✓
United States USAspending.gov http://www.usaspending.gov/ Details federal spending including that related to stimulus funds. Includes 'IT Dashboard' to follow investments in the information technology sector. The dashboard is considered to be one of the most innovative tools to enhance public scrutiny of government spending.	✓	✓				✓		
United States. FederalReporting.gov https://www.federalreporting.gov/ Business to government (B2G) website that serves as the central data collection system for Federal Agencies and Recipients of Federal awards under the United States Recovery Act. Registered users submit quarterly reports and review data. It provides support online through a live chat.		✓	✓					
United States. The President's SAVE Award http://www.whitehouse.gov/omb/save/SaveAwardHomePage/ Part of the Whitehouse website. Introduces the President's SAVE Award to enable Federal employees to submit their ideas for how government can save money and perform better, as part of annual budget process.		✓			✓			
United States. A National Dialogue http://www.thenationaldialogue.org/ Online dialogue on solutions to improve the design of the recovery.gov website. Hosted the Recovery Accountability and Transparency Board with the National Academy of Public Administration. Now closed.					✓		✓	✓

Mgmt. Management of funds
G2B Government to business communication
Social protect. Social protection information

Chapter 2

Roles for e-government in financial regulation and monitoring

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Governments are deploying new information and communications technology in response to the global financial crisis. These electronic government technologies have the potential to deliver imaginative options for policy-making processes as well as for the debates that surround them. For governments, the current most critical issue is how to rebuild trust in a system of financial weaknesses and governmental responses that has proved so highly untrustworthy to date. At this time, however, no one knows what these attempts at rebuilding trust might consist of, much less what they could possibly achieve in terms of refashioning the entire financial system – ideally, a system with more effective policies in place for financial regulation and monitoring.

In two historical analogies – the Great Depression and the Asian financial crisis – new technology embedded in capital formation alongside government efforts played some part in the subsequent stages of recovery. These historical comparisons demonstrate how alike the 'causes' of past and present financial crises may be, as well as the patterns of circumstances and behaviours that emerge. Moreover, these comparisons inform the discussion about the role of new technology and especially governmentally underpinned technology (such as rural electrification in the 1930s) in recovery. In the recent Asian experience, government actually made use of ICT, which provides the technological backbone of e-government, to advance recovery.

The leap forward in complexity both in breadth and in depth in the financial sector has created ideal conditions for the use of e-government in problem-solving efforts.

2.1 E-government risks and benefits

E-government has a great deal to offer in the reform of the financial regulatory system. Such reform should aim to promote the transparency, integrity and efficiency of the financial sector and sectors that are linked to it. This is what e-government does best, so long as its practitioners are well-versed in carrying out such objectives. E-government carries the additional advantage of being able to effect such outcomes in 'real time'.[1]

Most e-government is embedded in ICTs, which are connecting more and more people to a wider variety ('breadth') and profundity ('depth') of information. ICTs are connecting participants who had not previously been connected, which is enhancing the complexity in 'breadth' (the number of connections involved) of the market and the product.[2] Consider the number of participants in the home mortgage, for example: homeowners, commercial banks, savings and loan associations, investment banks and other issuers of mortgage-backed securities, purveyors of collateralized debt obligations and credit default swaps, mortgage lenders, brokers, servicers, trustees, credit-rating agencies, insurance companies, investors (including hedge funds, pension funds, sovereign wealth funds and mutual funds), regulators, government-sponsored enterprises, and politicians and their constituents. The number of financial institutions and investors entering this sector increased as a result of the in-depth securitization following the 1980s and the repeal of Glass-Steagall Act in 1999. At the same time, the increasing complexity of the product design attracted increasing numbers of consumers who had not been able to access the traditional mortgage.

As the number of connections has grown, so too has the sophistication of the financial sector. This increasing 'breadth' can be seen in the design of more and more sophisticated financial products, based on advanced mathematical models. The derivative products are designed as portfolios originating from different sources and including multi-layer securities. In this way, securitization has broken down the traditional relationship between borrowers and lenders.

This leap forward in terms of complexity both in breadth and in depth in the financial sector created ideal conditions for the use of e-government technology in problem-solving efforts. In the recent mortgage meltdown, however, as the regulators and major product providers worked to resolve the problems there proved to be a 'downside' associated with e-government. Regulators encountered problems linked to secrecy rather than transparency, problems associated with the skills and competences of those individuals entrusted with coping with e-government, and problems with the opacity of the new derivative financial products themselves. In terms of e-government, all of these factors lowered the performance of regulators.

Another potential downside is that once e-government begins to develop and become more sophisticated, citizens will be compelled to interact electronically with the government on a larger scale, which could potentially lead to a lack of privacy for civilians as their government obtains more and more information on them. Increased contact between government and its citizens can be a positive or negative experience. Other pitfalls of particular relevance to financial monitoring include the potential for high cost for little return on investment, lack of access for groups such as the poor, and a false impression of transparency given that governments control the information.

E-governance

E-government refers to a rather motley and eclectic variety of front-office and back-office operations that happen to be carried out by government and that has in places become properly systemic. There is a broader term than e-government. The notion of 'e-governance' refers to the wider process of bringing about the corresponding transformation in society.[3] Pippa Norris, McGuire Lecturer in Comparative Politics at the John F. Kennedy School of Government at Harvard University, describes the difference in views held by optimists and pessimists about e-government:

> *"Cyber-optimists are hopeful that the development of interactive services, new channels of communication, and efficiency gains from digital technologies will contribute towards the revitalisation of the role of government executives in representative democracies, facilitating communication between citizen and the state. In contrast, cyber-pessimists express doubts about the capacity*

of governments to adapt to the new environment, stressing that it is naïve to expect technology to transform government departments as organisations that are inherently conservative, hierarchical and bureaucratic."[4]

For practitioners of policy, neither of these extreme viewpoints might appear particularly useful, yet Norris offers the promise of effective ICT based on good governance:

> *"If practitioners bear in mind the factors of inclusiveness, equity, democratic accountability, transparency, civic engagement and other values embedded in the notion of 'good governance' to provide a substantial ethical grounding for e-government, it is possible to devise and implement a series of interventions involving ICTs that help address ... key challenges facing governments in developing nations today."*[5]

Thus good e-government can be said to be founded on good e-governance. However, the converse is also true: good e-government also contributes to realizing good e-governance.

An interim assessment

E-government is becoming a meaningful solution to providing better communication between the government (as policy maker and implementer) and citizens, and between the government (as regulator) and the financial sector. In fact, e-government has been put into practice since the early 1990s in industrialized countries such as the United States. However, in most of these countries, e-government has been used on a task-by-task basis rather than in a systemic manner. Certainly, the construction and implementation of e-government is a dynamic and ongoing process.[6] Many e-government websites, particularly those established and operated by governmental agencies, are still in their infancy stage and cannot as yet provide services that are satisfactory in either quantity or quality.[7]

To deal with the financial crisis in particular, the central issues promoted here are transparency, integrity and productivity (efficiency per unit of time), which are precisely the objectives that the introduction of e-government has the potential to improve. The most pertinent issue begins with how to implement e-government on a task-by-task basis, and the capabilities and competencies required, since these can permit the extension of operations. Eventually, this could result in the emergence of a new system of government and a new paradigm for governance.[8] The road from a task-by-task basis to a properly functioning system is, however, a long and rather tortuous one, involving cutting through or across many vested interests. Again there is much to gain from contemplating past historical evidence on how large systems came together, e.g. in electricity or railway networks.[9]

Regarding citizen participation, e-government issues remain somewhat controversial, and the impact seems to be evolving unevenly across populations. Some researchers argue that an increase in citizen participation in government decision-making could not be relied on to produce positive effects.[10] Moreover, the transparency of information disclosure may actually worsen the digital divide.[11] This may be the case if the policy makers are risk-averse, or if they are simply addressing the interactive comments they receive from certain vocal citizen participants rather than fulfilling their mandate or responding to the public interest.[12] A study of the central banks found that it was the independence of central banks that brought about their transparency, and not the reverse.[13]

In contrast to these pessimistic critics, proponents of citizens' participation via the Internet or other ICT methods are making their case. Michael R. Ward suggests that the spread of Internet usage would reduce the cost of political activities, as well as the possibility of 'circlet politics', though he emphasizes that the conclusion still needs to be tested through empirical studies.[14] Steven L. Clift suggests democracy can be deepened and become more participatory with the effective implementation of ICTs.[15] Many ICT industry observers, along with members of the current United States administration under President Barack Obama, also advocate the democratization of data.[16]

In any event, citizen participation via the Internet is not in the foreground of our discussion about e-government and the financial crisis. It is generally agreed that 'transparency of information' is good for democracy, the quality of regulation, international coordination and the competency of the general public in dealing with corresponding matters.

The central issues promoted here are transparency, integrity and productivity, which are precisely the objectives that the introduction of e-government has the potential to improve.

Beyond this point, the discussion is organized into four main sections. In each section, the largely defensive, reactive tone in the earlier parts is replaced later by scenarios in which a better society could be built by making more aggressive and proactive use of e-government, and by shifting focus from surviving in the short run, to faring better in the medium- to long-term.

2.2 Restoring trust after times of volatility

Beginning in mid-2007, a number of influential people issued warnings at various stages about the global financial situation. Most of the financial sector and the general public ignored these warnings, thereby propelling themselves and their societies into recession and then depression. Questions remain concerning the following:

- Would societies have listened to 'better' information and advice had it been offered, as the concept of 'social capabilities' suggests, or is this possibility refuted by propositions like 'irrational exuberance', 'herd instinct' and 'herd mentality'?[17]
- Did the e-technologies linking global financial centres actually make things worse than the absence of such technologies in the past?
- Could better and wiser governance of financial systems have averted recession, not to say depression, especially through more extensive adoption of e-government principles? And if so, did the basic shortcomings lie in the institutions associated with those financial systems, or can they be attributed to the failings of individuals and/or the particular organizations in which they were embedded?

Stated in this fashion, these questions cannot be adequately answered from the information currently available. The more enduring question to ask instead is: What are the opportunities for using e-government to ward off crises in the future? The pressing challenge then becomes one that has been skirted around several times already in this chapter, of how to go about restoring trust in what is widely regarded as a failed system. But to what extent can this be done without being in possession of a valid 'model' of the ways in which the present system may be malfunctioning?

The remainder of chapter two thus looks at financial regulation first in terms of models and then in terms of risk and other problems, before turning to what e-government might do better.

2.2.1 Starting from the right financial model

With the views of economists and policy makers subject to change and sometimes caprice, who is correct? For any solution to financial problems, including the use of e-government technology, the key is to start from a valid viewpoint or model. This can be seen, for example, in approaches to financial regulatory policy, whether we are discussing the Great Depression in the 1930s and its aftermath or the ongoing financial crisis of recent times.

By the 1980s the monetarist school of thought had eclipsed the rival Keynesian school and was putting forward as its base the theory of 'rational expectations', a modeling theory in which outcomes do not differ systematically from what people expect them to be. Rational expectations are based on probabilistic choices, as opposed to irrational expectations based on instinct. One of the direct implications of the rational expectations theory was an overt preference for government policies to follow certain rules. The reasoning behind the preference for governments following expressed rules was twofold: i) it reduced the risks and uncertainties involved in decision-making by the private sector; and ii) it would reduce and maybe even eliminate arbitrary decision-making by the 'untrustworthy' public sector.

Monetarist economists therefore for a time pursued the enforcement of 'rules', in particular rules about what could and could not be done in terms of expanding the country's money supply, in order to avoid inflation with all its costs. By way of a riposte to the asserted preference for rules, an opposing financial economist named Charles Goodhart formulated one rule (or 'law') that did always seem to work, namely that the imposition of any particular rule would ultimately subvert that rule. This would cause people to divert their efforts towards devising clever ways of circumventing the original 'rule', thereby negating the opportunity for the rule to work as it was designed to do.

When the limitations of the monetarist focus on rules became evident, this left the way clear in principle for exercising the obvious alternative of 'discretion' in policy-making, for instance in being more flexible about monetary expansion than the imposition of rules would allow. In an approach favouring discretion, e-government measures and techniques would seem to be ideal.

The most basic point to emphasize is that one cannot make any real progress through e-government or any other technological 'fix' if one begins from a specious set of assumptions about how the world really works, i.e. from the wrong model. The clear inference is that to implement a policy one must first make a serious effort to get the 'initial conditions' at least roughly correct or valid.

Systemic risk

The essence of the ongoing financial crisis is that the capability for control lags behind the pace of innovation in the financial sector. Therefore, the complexity of the activity has kept driving it onwards. For many years, the situation has been one in which the regulatory controls have failed to catch up with, for example, the proliferating markets for derivatives or the new methods for handling mortgages. The e-government solution could come into play through a call for greater transparency or greater speed, to allow the government to establish a much firmer and more responsive basis for a decision to intervene (or not) in the operations of a particular bank.

The transparency offered by e-government, however, often runs counter to practices in a highly competitive activity such as modern finance. Participants are in practice usually more inclined to maintain their own business secrets, rather than having them out in the open. Several elements have been widely blamed as being inaccurate or too opaque, including the risk evaluations of rating agencies, the creation of structured investment vehicles, and the design of other derivative financial products offered by hedge funds and banks. To the financial product providers, these non-transparent aspects contributed to their competitiveness, and were even encouraged by the government and regulators in the name of risk-sharing. The pursuit of high-profit investment opportunities was backed by massive foreign capital inflows, and long-term interest rates remained low over the course of nearly a decade – in turn, these factors encouraged financial practitioners to head for profit-taking in spite of risks they did not properly understand. So-called experts were not able to manage the risks effectively and often could not even define and measure the risks explicitly.[18]

The kinds of risks described above are rooted in financial systems; they are 'systemic' in that sense. 'Systemic risk' here refers to risks associated with enlarging operations at the level of macro 'systems', such as the financial system or the foreign trade system at the national level. 'Cross-systemic risk' refers to those linked to any conflict among those substantial components, such as barriers between the financial system and the technological or industrial system.

As regards the source of systemic risk in the global financial sector of recent times, there are a variety of viewpoints. Some insider experts insist that the crisis was caused by discontinuities in the financial market. These serious hiccups were based on "the innate human responses that result in swings between euphoria and fear" and were taken as "only a peripheral addendum to business-cycle and financial modeling".[19] This is to claim that low-probability events caused by the 'animal spirits' of human beings, i.e. contexts not portrayed in previous risk-related econometric models of 'rational expectations', destroyed these models in practical terms.[20] In other words, much like Milton Friedman said of the Great Depression, the systemic collapse was triggered by a chain of accidents.

Other insider experts argue that such systemic risk was essential to the relevant risk-related econometric models. However, the developers of these models were unable to inform the public about the risk, or maybe did not take on the ethical responsibility to do so.[21] Still others argue that the point is not whether the modeller ever informed the public about the systemic risks; rather, they say that the formal mathematical models essentially could not help to understand the complex relational structures and mechanisms involved, because of the inherent analytical biases in those models.[22] This position has much in common with the Keynesian views of Eichengreen and Temin regarding the 1930s, cited in section 2.1.1 above.

Yet another stance is taken by Peter Gowan,[23] who suggests that both modelers and regulators did perceive the systemic risk beforehand, but thought they could control the risk. The required financial technical innovations had been developed and were in place before 2001, before the rise of the housing bubble that led to the ongoing crisis. Therefore, the bubble inflated under the intentional gaze, and in some cases the actual participation, of these modelers and regulators – just as had happened with bubbles before.

The rapid decline in the housing and real estate services sectors, the financial services sector, then primary materials and finally secondary industry suggests that the individual sectors are not isolated from each other, nor from even broader, macro-level interactions. This raises the possibility of the dynamics of deflation in the style depicted by Kindleberger for the late 1920s and beyond, operating at the cross-systemic level. What this phrase suggests is the association – or sometimes collision – between already highly aggregated 'systems'.

Cross-systemic risk

Handling such a situation might sound like a classic application of risk management and containment, but success depends on first knowing how the policies for financial regulation are to be chosen. Rather than (insurable) 'risk', this would raise issues of genuine 'uncertainty' or worse: a lack of knowledge (or true 'ignorance') about what the present problems actually are.[24] Without going into great detail about either the causes or the course of the ongoing financial crisis,[25] it does not seem difficult to aver that the problems rapidly became systemic, and indeed in our sense cross-systemic.

Thus, as in the United States or Europe in the 1930s or South-East Asia in the late 1990s, the difficulties quickly began to pervade the real as well as monetary facets of globally oriented economies. The loss of faith in first one and then the other recalls Kindleberger's notion of the (interacting) 'dynamics of deflation', and worked like a pair of pincers by greatly exacerbating systemic risk and uncertainty.

So what could e-government improvements have done about 'systemic risk'? Or what might they do in any future re-run of this scenario? The answer depends a lot on how much emphasis one places on social psychology, and on such beliefs in the vagaries of human nature as 'herd mentality'. Using the Internet allows incorrect information as well as correct information to be circulated more rapidly; so how is any recipient in a position to arbitrate between seeing a particular item of information as correct or incorrect, especially when in reality the alternatives are likely to be much greater in number and much grayer in contrasting tones (i.e. offering less stark situations than choosing between black and white)?

Raising awareness that there is a problem can be half the struggle, though unfortunately not many governments are brave enough to do this when it matters most, namely at the outset. Clearly much will depend on the citizens' faith in the governmental office or officers concerned.

The 'shadow banking system'

The scale of the non-bank financial system (the 'shadow banking system') had been growing very rapidly before the crisis set in. According to Timothy F. Geithner,[26] the aggregate size of shadow banking, including the structured investment vehicles, auction-rate preferred securities, tender option bonds and variable-rate demand notes, along with assets financed overnight in tri-party repos (repurchasing agreements) and hedge funds, was approaching the asset levels of the traditional deposit banking system by early 2007.[27]

The neglect of regulation of the shadow banking system was a key factor underlying the financial crisis, as noted by Geithner and Krugman. The shadow banking system had not been regulated nearly as strictly as the depository banking system, especially in terms of capital reserves and liquidity. This allowed the shadow system a remarkable degree of leverage on its capital, mainly via borrowing from the short-term, highly liquid money market, to speculate in long-term, less liquid markets.

From the mid-1980s on, few efforts were made to extend regulation to the growing shadow banking system. On the contrary, moves were made in the opposite direction. Before the crisis, even regulators had no idea as to approximately how much capital had been engaged in such a system, and also had no clear mastery of the practical process

of transactions. In the words of the director of regulation at Spain's central bank, structured investment vehicles and conduits were "like banks but without capital or supervision".[28] Without effective regulation, the increasingly complex structures of derivatives as financial products promoted resource allocation (for speculation), while becoming, in Warren Buffett's words, "financial weapons of mass destruction".[29]

In the continuing absence of the kinds of fundamental reforms that must be carried out, it can be predicted with a high degree of confidence that introducing or developing e-government practices will remain largely irrelevant. As it is, too large a proportion of financial speculation activity nowadays still takes place below the radar of regulation. On the other hand, this lacuna offers great prospects for e-government once the gap in regulation is successfully overcome. At that stage, e-government can fully come into play, both to aid in the implementation of the regulatory code itself, and to monitor its consequences.

2.2.2 Roles for e-government in financial monitoring

Effective communication should be regarded as the foundation of measures to allow the financial services sector to recover, especially in light of the complexity in breadth and depth of the issues involved. The transparency of the financial engineering is important for regulators trying to build up a robust supervision system. Information disclosure is also critical to restore the confidence of the entire market, and to maintain long-term rationality in customer attitudes towards the market after the crisis has abated.

E-government can add agility and flexibility in real-time responsiveness to events that will inevitably arise, and this is important in light of calls for more dynamic regulation. As the CEO of Goldman Sachs said in a recent speech:

> *"Capital, credit and underwriting standards should be subject to more 'dynamic regulation'. Regulators should consider the regulatory inputs and outputs needed to ensure a regime that is nimble and strong enough to identify and appropriately constrain market excesses, particularly in a sustained period of economic growth."*[30]

Financial activities will be reformed in a number of countries, as is currently being emphasized by global leaders. The focus for reform is stricter regulation of shadow banking systems, and correspondingly the securitized derivative financial products. In July 2009, for example, the incoming Obama administration proposed legislation to require hedge-fund managers, as well as managers of private equity funds and venture capital funds, to register with the Securities and Exchange Commission.[31] However, in an ever-changing and for the most part advancing world, it would seem unlikely that the regulation of the financial sector would be pulled back to the situation that existed before the mid-1980s, which would imply sharp declines in, say, speculation via securitization and/or hedge funds. Rather, governments and regulators will try to promote the effectiveness and efficiency of monitoring. This means that the targets of reform should be at least twofold, involving promoting the safety of derivative financial activity, and minimizing the depressive effects brought about by the reform of financial innovations.

The critical point of reform is not to discourage financial innovation, but to require information transparency, and enhanced supervisory capabilities on the part of regulators. Currently, a series of reforms is likely to be carried out, as has been observed by regulators around the world over the past few months. E-government can provide effective tools for these reforms as a platform to buttress communication among different actors from the government, industries and the public.

In addition, to promote regulation, some responsibilities attributed to particular regulatory agents would be strengthened. Some government entities, including the United States Department of the Treasury, propose that this kind of regulation could be carried out partly through representation by professional departments and agencies. However, this has to be balanced against the likely augmentation of relevant regulatory bodies. In a context of 'lean regulation' or in Obama's terminology 'smart regulation', accelerating the ICT foundation of regulation to promote information transparency

E-government can add agility and flexibility in real-time responsiveness to events that will inevitably arise, and this is important in light of calls for more dynamic regulation.

and process supervision would appear to be a good way forward. In constructing an e-government system, it is also helpful to build up the capacity for systematic analysis by the unit responsible for supervision in the country concerned, so that it can respond to the ebbs and flows and general processes of the crisis. A case in point is the Capital Markets Safety Board recently proposed by Andrew Lo,[32] which would appear to be a more flexible and comprehensive way of coping with the rapid and progressive dynamic evolution of the financial sector.

To collect information

E-government can provide information tools for regulators to develop and then implement regulations related to the shadow banking system. Reform of the shadow banking system should aim to put the system back on the radar screen of regulators. Most requirements to the deposit banks would be transplanted to the shadow banking system, such as the requirement of adequate capital reserves, liquidity, and so on.

Regulators need to uncover more information compared with what has to be supplied under the existing regulations. The activities of banking are highly connected, and their transactions, as previously emphasized, do not happen in traditional ways, i.e. in regulated venues and via transparent counterparties. Therefore, new categories of information should be explored and collected to support the analysis of the regulators, as is broadly recognized by industrial practitioners and regulators. For example, Verena Ross of the United Kingdom's Financial Services Authority, says that more resources should be devoted to the supervision of high-impact firms, and more focus ought to fall on the details of bank accounting.[33] Generally speaking, data may need to be revealed to the regulators regarding the shadow banking system's leverage, liquidity, correlation, concentration, sensitivities and connectedness.

Mass information should be explored and analyzed by regulators, as it is rapidly increasing in terms of both depth and breadth. E-government is a suitable method for regulators to carry out the data collection.

To undertake process supervision

Considering the complexity of the financial sector at present, static data at a particular point of time are not sufficient to master the dynamics of the transactions. To avoid another credit crisis, regulators should address the financial engineering process of derivative product designs. In other words, the requirement of transparency should cover credit rating, product package modeling, pricing among counterparties, and so on. If regulators can obtain such data, this would enhance the competency levels of the regulators.

In fact, the proposed reforms aim to build a capillary network of information to cover the financial sector both in depth and in breadth. Only an ICT-based network can achieve such a target. It requires not only the construction of ICT infrastructure, but also the building of new institutional arrangements. New compulsory regulation procedures could be closely connected to an ICT network.

To improve the timeliness of regulation

E-government is important if regulators are to effect timely supervision. In comparison with traditional bank activities, those needed to regulate derivative activities have special characteristics, especially those developed for over-the-counter markets (OTC derivatives). These transactions could occur without standard contracts, and without transparent and regulated venues and counterparties.[34] These features allow the current shadow banking system greater flexibility to adjust to the dynamics of targeted industries and price fluctuations. The transactions can be carried out flexibly with respect to both time and place (of course, before the crisis, many activities were even held offshore). This flexibility is an important source of the competitiveness of the shadow banking system led by United States and United Kingdom. For the regulators, however, it becomes very difficult to master the complexity of the financial engineering process.

Timely monitoring is critical. Only a digital regulatory network can work compatibly with the automated data feeds of regulation. Through a Web 2.0 framework and the Internet accounts of these financial institutions, data on the transactions

could be collected automatically by the timely input of financial practitioners, for analysis and supervision by the regulators.

To prevent periodic bubbles

The ultimate solution is to prevent economic bubbles from forming in the first place – a conclusion drawn by reconsidering the economic bubbles and bursts in recent decades, when the leading countries were implementing aggressive monetarist policies. An economic wave is usually the outcome of an interaction between technological and industrial changes and financial investment.[35] It reflects the natural reaction of human beings, with their capital and limited rationality, to pursue potentially highly profitable opportunities. However, according to events witnessed in the past few decades, some of the bubbles came about in the context of overheated 'exuberance', with the blind following the blind, and neglect on the part of analysts and regulators. Therefore, as a counterpart institutional arrangement, governmental intervention should have the capability to influence the formation of such bubbles more directly and effectively if need be. In fact, the existing e-government methods do have the potential to influence the financial markets, as is demonstrated in a case study in Russia by Melvin et al.[36]

The intervention of government should be associated with a coherent structure of regulation towards all components of the financial system, as well as an effective communication system with the public, namely the common investors. A potential system needs to be explored via e-government. The question is how to express the information supplied to and from the regulators clearly and directly in the market, and how to build a bridge for such information and the market feedback to reach the public, while also stressing minimum disturbance to the operation of the market.

Common standards are required to realize effective information communication via e-government. Common standards of data collecting and processing are needed for the different agencies, namely those in different places and those in charge of different professional tasks. Only with such cohesive cooperation can regulators build up an integrated capability to cope with the systemic risks of the increasingly more complex financial sector.

2.3 Confidence, capabilities and competencies

2.3.1 Panics and restoring confidence

Panics among common investors and even among financial managers and institutional investors are not difficult to understand as being a natural human response to the downturn of the bubble economy, as happened during 1930-1933, 1997-1998 and 2000-2001. Unlike in the past, however, the recent panics also arose from people's inability to handle the complexity of financial products and markets. As already seen, the securitized derivative products of recent times had actually broken down any effective information channel between borrowers and lenders. People felt fearful in the face of downhill potentials they did not know well and evidently were not able to measure. Through these means, the panics were more likely to be the consequence than the cause of the industrial structure and the absence of effective regulation.

The crowded nature of the financial markets also contributed to the panics because when a downturn signal was identified, people knew that it was impossible for everyone to get out at once.[37] The panic among financial practitioners and investors resulted in a herd-like crowding into a flight-to-quality in asset holdings. For the highly connected financial sector, the fear quickly spread to other parts of the industry. Finally, the highly leveraged derivative products became a 'death spiral' confronting their investors, and the whole financial system collapsed. The supposedly super-safe, super-senior derivative products, such as collateralized debt obligations, rapidly tumbled to the level of becoming junk securities.

There are lessons here for the operation of markets. Thus the head of Goldman Sachs has implicitly argued for what are frequently referred to as 'organized markets':

> *"To increase overall transparency and help ensure that book value really means book value, regulators should require that all assets across financial institutions be similarly valued. Fair value accounting gives investors more clarity with respect to balance sheet risk. How can one justify that the same instruments or risks are priced differently because they reside in different parts of the balance sheet within the same institution?*

E-government offers financial transparency and the improvement of citizens' capabilities in risk assessment and risk control – these are the twin keys to promoting market confidence and public trust.

"But, if we abandon, as opposed to regulate, market mechanisms created decades ago, like securitization and credit default swaps, we may end up constraining access to capital and the efficient hedging and distribution of risk, when we ultimately do come through this crisis."[38]

This authority draws the conclusion that markets cannot thrive without confidence:

"We have to safeguard the value of risk capital ... while enhancing investor confidence through meaningful transparency, effective oversight and strong governance. But, there should be no doubt: markets simply cannot thrive without confidence."[39]

E-government offers information transparency of the financial system and the improvement of citizens' capabilities in risk assessment and risk control – these are the twin keys to promoting market confidence and public trust, which are regarded as critical for restoring a robust financial sector.

2.3.2 Shortcomings in skills and abilities

The more irrational social desires cannot be eliminated by the effective communication or information transparency brought about by e-government, yet the goal of pursuing better lives is a worthy one. Indeed, this goal is the basic motivation for continuing economic development. To what extent do social desires for improvement conflict with social capabilities[40] to bring about a self-sustaining development process? To resolve this and similar issues in regard to implementing e-government, we need to dig deeper into the nature of 'capabilities' – a subject that existing studies normally take for granted.

To exchange knowledge and change in real time

No amount of purely technical inputs into e-government will work in the absence of the skills (competencies and capabilities) needed to supply, produce and use equipment and technological inputs. In contrast with much of the management literature, which tends to use these terms interchangeably, we are here sharply differentiating – at least in theory – the nature of 'capabilities' from that of 'competences' or 'competencies'.[41] If the problem is one of incompetence, the individuals who might be blamed for the financial crisis fell short of the minimum actions required by the circumstances, notwithstanding their apparent qualifications to do the job at hand, as reflected in résumés and other standard measures of 'human capital'. If, on the other hand, the problem is one of incapability, then other factors, including many that would lie outside the individuals' power to do much about, could be held to account for much of the current crisis.

Seminal studies by Wesley Cohen and Daniel Levinthal have explored the development of 'absorptive capacity', i.e. the ability of a firm or other organization to master and utilize technologies taken from others. They argue that it rests to a considerable degree on trying to replicate the findings of earlier research and development efforts by those others,[42] partly because of the gamut of difficulties that are likely to arise by simply copying ideas previously developed elsewhere. In a later paper, these authors argued that "such a capability ['absorptive capacity'] not only enables a firm to exploit new extramural knowledge, but to predict more accurately the nature of future technological advances."[43]

Two kinds of capabilities are of special concern to the development of e-government specifically and indeed to production practices in all walks of life. One type refers to 'interactive capabilities', and involves knowledge exchange with other entities. This knowledge exchange may take place along a supply chain (a company is likely to be involved in many of these[44]); with corporate or non-corporate organizations in research, finance and marketing, etc.; and with transnational organizations and corporations in other countries ('international technology transfer' or interchange). A second type of capability concerns the now-popular phrase 'dynamic capabilities', implying the ability to change one's capability base in 'real time', i.e. within a time period that is appropriate for dealing with pressing competition (explicit or implicit) that may be arising on a number of fronts at roughly the same time. Dealing successfully with such 'dynamic competition'[45] will normally involve having adaptable, flexible and communicable resources in the system.[46] It is worth bearing in mind that all that has just been said about the capabilities and competencies of firms applies equally to non-profit organizations such as state universities or governments.[47]

This is where e-government comes back to center stage. It is the mixture of flexibility and agility with transparency, integrity and efficiency that is

the key to 'success' in this arena, but all of these elements involve good people capable of working on good equipment. While in the financial industry certain actors are being blamed for the financial crisis, it is predicted that e-government and associated e-technologies might curtail such negative outcomes in the future.

Specific failings in the broader system

As it stands, the specific problems can be summarized as follows:

1) The rating agents and their inaccurate credit ratings on mortgages created the bubble in the housing market. This whole area of more or less collective blunder has been blamed on many factors. Some question the agents' underlying business model and argue that the implicit conflicts with practice inclined them to give unduly high ratings. Lo[48] discloses the continual 'brain-drain' from the rating agencies to their clients, namely the banks and shadow banks, which usually benefited the rating agencies in the short run but over the medium term deprived them of sufficient talent to deal with the complex situation that they were now confronting.

2) Regarding the oversights in relation to the shadow banking system (see section 2.2.1 above), one of the key questions relates to enhancing the competencies and capabilities of the regulators. In terms of their capabilities, regulators must have sufficient methods and means to identify and supervise the growing number and coverage of innovative financial activities, in terms of competencies, and display better understanding of the world they are facing, including the realm of shadow banking. Otherwise Goodhart's Law will prevail, such that the imposition of any rule will ultimately undermine the effectiveness of that rule.

3) The financial sector, given its scale and scope, lacks qualified human resources. For example, in 2007 the Massachusetts Institute of Technology produced only four PhD graduates in finance, compared with 337 in various fields of engineering. To make up for the shortages of expertise in advanced mathematics and modelling, many financial institutions recruited employees from technically sophisticated disciplines, such as physics, mathematics, computer sciences and astronomy to work as technical supporting forces. However, these employees were not essentially financially educated, and had only limited ability to respond to the sophisticated dynamic market evolution. This led to weaknesses in risk assessment, risk management and control.

4) Financial model developers did not inform the public about the systemic risks. Colander et al.[49] argue that systemic risk did exist, and the financial model developers, namely the financial economists and financial engineers, did not inform the financial sector in general, much less the public at large. Lawson and recently Hodgson[50] insist that the fundamental problem is not whether the modelers had ever been informed; it was that the pre-selected mathematical models could not interpret the complex, highly interconnected and dynamically evolving economic practices. The former interpretation relates to cases involving 'asymmetries of information' and thus competencies, while Lawson's position has much more in common with what we refer to as 'asymmetries of knowledge', and therefore with (inadequate) capabilities.[51]

5) The integrity of managers in the financial sector was called into question, for example over their compensation and 'bonuses', which struck many of the more moderate public observers (including the Governor of the Bank of England[52]) as immodest in scale and positively harmful in terms of the incentives on offer. The incentives actually appeared to negate the clear need to enhance risk accounting, as well as the need to reform the regulatory requirements on corporate governance to make sure that risk management was effectively deployed in the financial sector. Meanwhile, transparency of information is also needed for regulators to identify their transactions properly.

6) The securitized derivative financial products were so sophisticated that they disrupted effective information connections between borrowers and lenders. The derivatives products were in theory designed to disperse risk. Regulators such as the United States Department of the Treasury admit[53] that the very process of securitization created conflicts of interest; it did so by breaking down the traditional relationships between borrowers and lenders, which market discipline failed to correct. As previously mentioned, even many financial managers did not fully understand the products they transacted, to say nothing of the common investors, who

were at the mercy of rating agencies that often failed to describe the risks of relevant products accurately. Originally, the motive behind bundling derivative financial products was to disperse risks. However, over the past 20 years these products gradually became extremely risky, especially after 1999, when they became more or less totally opaque to buyers. In fact, they became a major source of contagion.

2.3.3 A platform to reconsider public expectations

E-government can aid in providing a platform for the public to reconsider their expectations. In the financial system as it was, the 'animal spirits' of people at large were also included among the factors involved in the making of the bubble. This came to be associated in the public mind with the political desires and vanities of politicians, in spite of the increasingly huge trade deficit that underlay a comparatively slow or stagnant growth of productivity. The rapid expansion of the housing sector was achieved by the massive participation of citizens, while the governmental solution to advocate and support such desires was also to create structured investment vehicles such as Fannie Mae and Freddie Mac (which provided "creative accounting"[54] for the domestic housing industry in the United States). The inappropriately fast and continuous expansion of desires finally contributed to the primary determinant of this crisis, even though it is technically termed systemic risk.

The ongoing crisis provides its citizens and opinion leaders with a chance to re-think the essential problems of social, political and economic life. E-government, with the transparent data, analysis and interaction it can exhibit, can provide a valid instrument for individuals to connect themselves with practical macro analysis, which might help to promote an understanding of the internal conflicts in society.

2.4 International cooperation and e-government

2.4.1 Problems from a global perspective

With financial markets integrated worldwide, the crisis inevitably went global, as the United Kingdom's Verena Ross asserts:

> *"The current crisis has been truly global in its nature and has highlighted significant shortcomings in the international regulatory framework. Growing risks were not properly identified and monitored, standard-setting bodies varied in their effectiveness and cross-border crisis management arrangements did not work well."*[55]

Global architecture

A paper from the International Monetary Fund acknowledges that the present financial crisis "has revealed important flaws in the current global architecture" and specifically identifies four areas where the "existing architecture failed to respond adequately as growing vulnerabilities eventually produced a crisis."[56] Of these areas, two are related to systemic risk, namely across-the-board financial regulation and the international coordination of macro-prudential responses to such risk. The other two areas noted by the IMF are the need for cross-border coordination and arrangements for financial regulation "to avoid a repetition of the 'go-it-alone' strategies seen in this crisis", and the need for additional IMF-style funding.

In the ongoing crisis, a global perspective is crucial for understanding the transmission, overall dimensions and causes of the crisis, which had deep roots in imbalances in international trade and capital flows and the disparity of regulation across countries. There is an element of chaos theory operating across international frontiers, in which something as small as the flutter of a butterfly's wing in China might affect the weather in New York City. The part of the butterfly was played by an Austrian bank in 1931 (the Creditanstalt), by property-price inflation in Bangkok in 1997, and by Icelandic banks in 2007/8. The lessons learned so slowly and painfully in the mid-1930s about the necessity for international cooperation at the highest levels ("hang together lest we hang separately") were then forgotten until recently, when economic crises again became painfully evident.

The international level of the crisis can be seen in the flows of credits from one part of the world to another. This flood of credit was supported by low long-term interest rates, which were in turn supported by enormous growth in the amount of foreign capital flows. These massive foreign capital

inflows were linked to imbalances in international trade, significant global macroeconomic misalignments over the last decade, and in particular the build-up of large current account surpluses in Asian and oil exporting countries. Meanwhile, there were growing current account deficits in the United States as well as in the United Kingdom and other European countries. Thus foreign exchange surpluses were accumulated by China, other East Asian countries and countries exporting oil in large volumes.[57] Much of this money went back to the major countries such as the United States and the United Kingdom through investing in a large capital pool, or buying up substantial portions of the national debts. This provided support for their levels of 'over-consumption' based on credit and for the prosperity of asset-backed trading and other securities, both directly as well as indirectly (via the domestic credit-fueled booms).

In principle, the international situation has e-government in its solution – yet e-government is usually national in nature. Most e-government schemes up to the present day, other than those launched by supranational or international bodies, start from a national and sometimes rather nationalistic perspective, with corresponding sets of political and policy assumptions. These assumptions may not square with the need for international tact and discretion, much less training programmes. Lloyd Blankfein of Goldman Sachs notes the need for supervision at the global level and what it would require to be effective:

> *"As recognized at the recent G20 Summit, the level of global supervisory coordination and communication should reflect the global interconnectedness of markets. Regulators should implement more robust information sharing and harmonized disclosure, coupled with a more systemic, effective reporting regime for institutions and major market participants. Without these, regulators will lack essential tools to help them understand levels of systemic vulnerability in the banking sector and in financial markets more broadly."*[58]

Regulating offshore funds

Regulators are presented with a critical difficulty in the case of offshore transactions, and especially those linked with the shadow banking system. Most activities of this kind do not have transparent, regulated venues and counterparties for their transactions.

About half of all hedge funds in existence in 2008 were registered offshore, according to estimates. Tax havens were the most popular location for the offshore hedge funds. Offshore havens were located in places such as Bahrain, Bermuda, British Virgin Islands, Cayman Islands, Ireland, Luxembourg and the Netherlands Antilles. Onshore havens were located in the United Kingdom and United States. Registering in tax havens freed the hedge funds from paying tax on the increase in the value of their portfolios. More importantly, the host countries of the offshore hedge funds built up accommodating jurisdictions, which on the one hand attracted the relocation and residency of relevant pools of capital, and on the other hand freed the hedge funds from 'annoying' regulatory interference. Policing such offshore operations was not impossible, but was considerably more difficult. Moreover, for a long time the general consensus, at least in the United States, was that there was no need for such policing.[59] This exacerbated disparities in regulation, and added to the difficulties of regulators trying to identify the prices, values and processes of the shadow banking system.

International coordination or greater national powers?

Potential room for misalignment between national and global regulatory policy was paralleled by potential room for misalignment in e-government principles and practices. Take, for example, the Icelandic banks operating in the United Kingdom. As Ross points out in relation to the gap in regulatory power:

> *"Landsbanki was free to operate in the UK as a branch over which the FSA [Financial Services Authority] only had limited powers, as responsibility for its prudential supervision rested with the Icelandic regulator. UK depositors were also later dependent on the Icelandic deposit insurance scheme, with resources that proved inadequate and requiring the intervention of the UK authorities."*[60]

The complex international situation has e-government in its solution – yet e-government is usually national in nature with a corresponding potential for misalignment of e-government principles and practices.

The 'options' seemed to consist of strengthening internal controls on the national front vs. greater external coordination on the supranational (European) front. The Financial Services Authority could see the benefits of pursuing both at the same time, without dwelling too much on the costs side of that particular ledger. This is what political scientists tend to refer to as 'multi-level governance',[61] in which spatial hierarchies dominate political decision-making, and from time to time find their 'solutions' in setting up top-heavy bureaucratic nightmares.

To manage such contexts satisfactorily, and to avoid their worst excesses, e-government becomes essential. It is not merely an elegant accessory but an indispensable tool when one is even considering such a complex system (or 'system of systems'). Whether the ground-rules for effective e-government can hold is open to debate. Desiderata such as transparency and integrity may prevail to greater or lesser extents. But any derogation of decision-making duties to ICT networks must at the same time be sustained by the very diversity of the e-government structures which they would already have helped to create.

It seems unlikely that powerful new international agents will be set up to establish international e-government that is transparent and satisfies international needs. Citizens and nations ought to enhance the potential for information-sharing and harmonized disclosure offered by e-government, based on existing international platforms such as The Group of Twenty Finance Ministers and Central Bank Governors, IMF, Organisation for Economic Co-operation and Development, and United Nations.

Box 2.1 **Reports on the Observance of Standards and Codes agreed by the IMF and World Bank, November 2002**

Transparency standards

The standards in these areas were developed and are assessed by the International Monetary Fund to cover issues of data and policy transparency:

- Data transparency: IMF's Special Data Dissemination Standard/General Data Dissemination System
- Fiscal transparency: IMF's Code of Good Practices on Fiscal Transparency
- Monetary and financial policy transparency: IMF's Code of Good Practices on Transparency in Monetary and Financial Policies, which is usually assessed by the Fund and the Worl

Financial sector standards

The standards in these areas were developed by other institutions and are generally assessed under the FSAP:

- Banking supervision: Basel Committee's Core Principles for Effective Banking Supervision
- Securities: International Organization of Securities Commissions' (IOSCO) Objectives and Principles for Securities Regulation
- Insurance: International Association of Insurance Supervisors' Insurance Supervisory Principles
- Payments and securities settlement systems: Committee on Payments and Settlements Systems (CPSS) Core Principles for Systemically Important Payments Systems and CPSS-IOSCO Joint Task Force's Recommendations for Securities Settlement Systems
- Anti-money laundering and combating the financing of terrorism: Financial Action Task Force 40+8 Recommendations

Standards concerned with market integrity

Standards in these areas have been developed by relevant institutions and the World Bank is in the lead in undertaking assessments. Some of these areas may be assessed under the FSAP.

- Corporate governance: OECD's Principles of Corporate Governance
- Accounting: International Accounting Standards Board's International Accounting Standards
- Auditing: International Federation of Accountants' International Standards on Auditing
- Insolvency and creditor rights

2.4.2 Common standards for better regulation

Regulators have come to realize that common accounting principles and regulation standards should be implemented in countries where financial activities, such as those based on securitized derivative products, have developed Internet-based connectivity far beyond the country's borders. There is, however, the additional need for these electronic networks to be inter-connectable, which is what makes information-sharing practical. For this purpose, cross-national coordination is needed during the process of building or reforming e-government in such countries. Effective international cooperation depends on common standards for data collecting and processing, common or interoperable software platforms and high-speed communications. These elements are crucial. The most critical need is for mutual understanding, which would permit the countries to share data and analysis in real time, and to achieve coordinated action. Perhaps this could be implemented firstly in international alliances, such as the European Union, OECD, North American Free Trade Agreement, and United Nations Conference on Trade and Development.

In fact, in the economic stimulus packages of different countries, large amounts have been invested in the infrastructure category, which

includes the investment in ICT infrastructure.[62] This could provide an opportunity to appeal to member countries of these international entities to build up harmonized software platforms and coordinated institutions. But at more or less the same time as the East Asian economies – inspired by China in this respect – have begun to embrace the concept of harmony,[63] western nations have rejected harmonization, in the EU's case in favour of 'open methods of coordination', i.e. the primacy of national over supranational systems.

Standards and codes

After the Asian financial crisis of the 1990s, the IMF prepared a set of recommended Standards and Codes that remain relevant to e-government. Countries subject to reporting to the IMF and World Bank would be required to prepare Reports on the Observance of Standards and Codes, as explained in a statement made when the recommendations were published:

> *"The IMF and World Bank have endorsed internationally recognized standards and codes in 12 areas as important for their work and for which Reports on the Observance of Standards and Codes (ROSCs) are prepared. Standards in the areas of data, fiscal transparency, and monetary and financial policy transparency have been developed by the Fund while others have been developed by other standard setting bodies including the World Bank, the Basel Committee on Banking Supervision, and the Financial Action Task Force (FATF).*
>
> *"ROSCs are prepared and published at the request of the member country by the IMF and/or World Bank in each of the 12 areas. ROSCs covering financial sector standards are usually prepared in the context of the Financial Sector Assessment Program. In some cases, detailed assessments of countries' observance of standards are also published."*[64]

The IMF and World Bank published their list of ROSCs in November 2002. The areas addressed in this list could also serve as set of principles to guide countries as they seek to use e-government.

2.4.3 The financial crisis and developing countries

Developing countries face the challenge of 'catching-up' to developed countries when it comes to investing in e-government. On the one side are the cyber-optimists (to re-use Norris's helpful phrase), who speak in terms of 'leapfrogging' and even overtaking the more advanced industrial countries. Being unencumbered with the 'penalty of an early start',[65] in the form here of large fixed landline communication systems and networks, developing nations are supposedly free to invest in cheaper and much more flexible mobile systems. On the other side again lie the cyber-pessimists, who envisage these high-tech activities as almost inevitably being dominated by the advanced industrial countries.

To be sure, a number of the larger developing countries, led by the so-called BRIC countries (Brazil, Russia, India and China), have public sectors that are large enough to keep some of the alleged depredations of multinational companies at bay, but most of them do not fall into this category. In the meantime, the countries best equipped in terms of e-skills (both competencies and capabilities as in section 2.3.2 above) are likely to wrest away most of the gains which, in their view, would belong to the knowledge-rich, earlier-industrializing countries. In the end, the predictions of the pessimists may turn out to fit reality better. But at the same time, e-government opportunities are within the grasp of each developing country itself – not simply in the hands of over-powerful foreigners.

One reason for this positive conclusion is that a fairly small country or region may have a comparative advantage if it has relatively stable existing social networks lodged within a communicative social structure. This may explain the good overall position of e-government development of countries such as Estonia and New Zealand.[66] The growing accentuation of a positive role for public procurement in policy-making is another point that can favour a small- to medium-sized developing country, so long as it maintains a clear vision of what it stands for, as in the Republic of Korea's approach to high-speed broadband.[67]

The concerns of developing countries in respect to e-government lie less in any natural barriers to the diffusion of e-government and more on the side of human resources and their disposition, i.e. their 'capabilities' in policy-making, technology and consumption, as per a study by Guida and Crow. Their main points are quoted in the following page:

If e-government technology is correctly deployed and suitable governance systems are in place, one may end up with the happy situation of both more government capacity to intervene when needed and more freedom for markets to function as they ought to in due course.

- From a practitioner's perspective, the most challenging issues in the implementation of technology-dependent government services derive from the governance aspects of the initiatives;
- For governments in the developing world, the most important benefits of adopting a standards-based architecture lie in the area of procurement of applications and application-based services;
- Mobile phones, in providing affordable broadband network access, can offer a valuable means of delivering e-government services;
- There is high risk associated with e-government investments, and though the rewards are potentially substantial they may be hard to quantify;
- Capacity-building and formal change management strategies are essential if e-government programmes are to be effective.[68]

The above factors range quite broadly over the terrain covered in this chapter, including references to governance, standards, risk and capabilities, as well as to technology. It is time to draw some conclusions from our study.

2.5 Conclusions

E-government clearly has a potential role in alleviating the worst symptoms of the ongoing financial crisis. The benefits in comparison with the costs are likely to rise over time, as a consequence of two mutually reinforcing trends: the improvement in e-government systems themselves, including more widespread access, faster operating and transmission speeds, and the increasing capabilities – and willingness – of the public to make use of the technologies involved.

At the same time, it is all too easy to fall into the trap of advocating little more than a technological 'fix' for the problems that have arisen. Certainly, such 'fixes' by themselves will not work. Potential roadblocks include inadequate competencies (e.g. hemorrhaging of talent, poor models) and limited capabilities (e.g. lack of exercise of good judgment). Technology alone will not cure these deficiencies, even if it becomes more user-friendly, and fault-tolerant. It remains a challenge for e-government to attempt to make processes more transparent as well as more accurate. An example of this would be in formulating credit ratings.

The main point to emerge from recent history is much the same as for the Great Depression: no amount of good practice by e-government or other means can withstand the consequences of beginning with a false set of assumptions.[69] Included among these faulty assumptions must be the notion that freedom from regulation is the solution. Another misleading assumption is that the solution lies in only allowing self-regulation, which has its limits:

> *"For policymakers and regulators, it should be clear that self-regulation has its limits. At the very least, fixing a system-wide problem, elevating standards or driving the industry to a collective response requires effective central regulation and the convening power of regulators."*[70]

That is, in the words of the CEO of Goldman Sachs, allowing the financial world to monitor and regulate itself would be a measure based on the erroneous idea that the effects of systemic and especially cross-systemic risks can be safely overlooked.

Coping with financial panics requires immediately addressing the first signals of the crisis. This calls for what we can describe in this summary as 'dynamic interactive capabilities', so as to achieve a robust financial system and effective regulation. It may be recalled that 'dynamic' refers to real-time responses, which probably require a set of relevant and effective system-oriented competencies to be already present and at hand. The term 'interactive' refers to functioning two-way interchanges already in place in the financial system and around its edges. Both the dynamism and the interactivity could in theory be augmented by new approaches based on high-speed technologies, such as e-government. These possibilities can be drawn on for solving some of the longer-term negative fallouts from the crisis, especially through using e-technologies.

All stakeholders admit that there were considerations beyond the previous economic models and regulatory systems that destroyed the stable pattern of development preceding the global financial crisis. In the past 20 years, human response in periods of fear ought to be included in these models and mind-sets, as they are at least equally important as those of the "euphoria" noted by Alan Greenspan, former Chairman of the United States Federal Reserve. But this view is not widely welcomed by

the public which, on the contrary, is more inclined towards the comment from Krugman[71] that systemic risks come from neglect on the part of regulators. Therefore, it would seem reasonable that critics and the general public question the ethical responsibilities of the model developers, and possibly the regulators as well.

E-government provides the public with an opportunity to have their views expressed. Whether governments take notice may be another matter, but they will have their 'wriggle-room' drastically reduced, as a result of the associated increase in transparency and democratization. If the technology is correctly deployed and suitable governance systems are in place, it still may be possible end up with the happy situation of both more government intervention for a while but more freedom for markets – admittedly 'organized markets' – to function as they ought to in due course. Thus paradoxically, in this scenario, more government discretion in the short run may lead to less arbitrary forms of government discretionary power over the longer haul. There are any number of precedents for such an optimistic outcome to be realized, yet innate pessimists will match this story of an upward-pointing virtuous circle or spiral by citing possibilities of downward vicious circles.

What then of the balance between cyber-optimism and cyber-pessimism? For the last words on this, consider the conclusion of the Economist Intelligence Unit, which had this to say in 2009 on the subject of e-government development:

> *In rich and poor countries alike, however, thorny policy issues arising from the very success of digital development remain largely unresolved... The delicate social contract between digital consumers and the operators of digital channels will be tested in the coming years, as intensified revenue pressure increases service providers' need to utilise the Internet for intrusions that are both annoying (for example, inbound advertising) and potentially privacy-infringing ('deep-packet' inspection systems).*
>
> *The environmental impact of ICT usage is also likely to remain a concern for governments as long as climate change and carbon reduction remain high on the global agenda... The expansion of one of the global economy's most essential resources – information – is having an unintended knock-on effect on other precious resources... [E]-readiness is not fostered in a digital vacuum, but rather in a complex web of social, cultural, economic and political factors, ultimately driven by the usage imperative.*[72]

In other words, the cross-systemic risk factor is evident at the national and global levels, and not just within the ICT sector itself.

Can e-government then be recommended on balance for financial regulation? Yes, but if government policies enable financial players to escape scrutiny, then e-government will not improve regulation although it can still enhance efficiency. Overall, e-government is built for speed and for managing complexity, qualities that make it well-suited to financial monitoring and regulation. At the same time, it should not be regarded as a technological 'fix'. E-government especially, of all the e-buzzwords, can only be as good as the 'dynamic interactive capabilities' of the policy makers who apply their principles and models to its design, together with those of the people who construct and operate its systems. ■

Chapter 3

E-service delivery and the MDGs

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The world economic crisis has savaged government finances. Policy makers are facing the harsh reality of substantially diminished revenues at a time when social protection services and business support schemes are in great demand. Given mounting public debt as well as budget deficits ranging from 6 to 12 percent of Gross Domestic Product (GDP) in developed regions and 5 to 6 percent of GDP in many developing countries, 2010 looks to be a difficult year for politicians and administrators trying to assure the delivery of essential public services.[1] Even governments currently using stimulus spending to compensate for financial shortfalls are discussing so-called exit strategies, in the knowledge that such large-scale borrowing cannot continue indefinitely.

The effects of the deterioration in public finances are likely to extend to official development assistance budgets on which many low-income countries rely, depending on the funds to supplement their volatile commodity and trade-related revenues.[2] Sub-national governments are in an even tighter bind, with limited authority to raise revenues on their own and no possibility of tailoring monetary policy to local economic conditions.

E-government can inject much needed flexibility and quickly expand the reach of public services at a time of economic and financial stress.

3.1 Why e-services?

Short of devaluing currencies or defaulting on public debt, governments are finding themselves with few options as they try to balance diminished revenues and increased expenditures. The most immediate response would be to reduce public services. Indeed, policy makers in both high- and middle-income countries are considering austerity measures of the sort once reserved for low-income recipients of multilateral financial aid. In so doing, social protection, health and education budgets will inevitably come under pressure. Another approach, less reactive and more strategic, is to mitigate the effects of the crisis on public finances by enhancing public sector capacity – providing services more efficiently as well as more effectively and aligning them with the results people expect. But how?

Here e-government can play a very important role. Just as technology has always been an important determinant of productivity in the broader economy, so too is the application of information technology in the rate and quality of public service delivery. In a time of economic stress, improved communications and faster response times can make a critical difference to those most at risk.

The overall trend of e-government development is conducive to such efforts. The number of initiatives related to e-government has continued to grow. In Australia, the Internet has replaced contact in person and by telephone as the most common way citizens make contact with their government.[3] Since the United Nations E-Government Survey was launched in 2003,[4] there has been steady progress in the implementation of the electronic delivery of government services (e-service delivery) in both developed and developing countries, and by now the benefits are well known.

Chief among the benefits of e-service delivery are efficiency gains. Efficiency is especially important given the current financial crisis, which has drastically increased demand for public services, including unemployment benefits, food vouchers, health services and the provision of information on debt relief. The British Financial Services Authority is a case in point. Overwhelmed by the demand for face-to-face debt advice, the Authority launched a new website to facilitate the provision of debt-related information.

In addition to new initiatives, some countries may also benefit from existing e-government infrastructure. Singapore has provided rapid cash transfers to those most in need, including older persons and members of other vulnerable groups, by linking the databases of different government departments with the direct deposit systems of the nation's banks. These e-government efforts can make a difference to citizens, especially in a country such as Singapore, which has allocated some 52 percent of its stimulus funds to social protection measures, and which has a high level of e-government development and a corresponding agility in the delivery of public services under a variety of conditions.[5]

In other countries, reports about the slow distribution of stimulus funds to citizens and businesses are reflections of the limited administrative capacity of government agencies. This situation has prompted some countries to initiate accelerated service delivery through online channels. The United States has created a website for processing stimulus grants that guides prospective recipients to benefits for which they may be eligible. The United Kingdom's website Real Help Now provides detailed information on stimulus opportunities for homeowners, pensioners and employers, as well as those looking for a job or needing assistance with personal finances. Initiatives are broken down by region and accessed through an interactive map. What these and other initiatives have in common is a relatively high degree of e-government development as a result of prior, related investments.

Public feedback and collaboration will not guarantee better service delivery but, at very little cost to the taxpayer, participatory methods can help policy makers set priorities, encourage more citizens to 'buy in' to programmes, increase satisfaction levels and thus augment the chances of successful policy outcomes. For example, social networking sites such as Facebook, YouTube and Twitter, as well as blogging software and mobile technology, allow governments to tap into the collective knowledge of society quickly and directly. In this way, citizens move from being passive consumers of government services

to advisers and innovators contributing ideas that are in better accord with their individual and group needs.[6]

Despite speed, efficiency, citizen participation and other benefits of e-service delivery, the usual caveats apply. E-services cannot substitute for traditional methods if citizens do not have ready access to the requisite infrastructure (including a reliable supply of electricity), or if they lack basic education or the means to pay for access to the Internet. Measured in purchasing power parity dollars, broadband Internet subscriptions are 10 times more expensive in developing countries than in developed regions.[7] Policy makers should also bear in mind problems related to time lags and the delayed impact of new e-government applications; the high failure rate of information technology projects; and the inevitability of rapid technological change, with the corresponding obsolescence of e-government systems.[8] Moreover, the proportion of the Internet population providing original content to social networking sites is still very small, even in developed regions, which limits the scope of participatory public service delivery.[9]

These are and other constraints are also discussed in some detail in chapter two of this report.

3.2 Delivering e-services with a view towards achieving the MDGs

Fewer resources and greater demand – at heart this is a public sector delivery and capacity issue. The situation calls for greater agility, efficiency and reach of public services, especially in the sectors of health, education, gender, environment and employment, which are important in their own right and central to achievement of the MDGs. E-government can be of great use in this regard. The purpose of this section is to present the reader with some potential e-government solutions, based on the experiences of others, which may help public authorities to continue on the path towards internationally agreed development goals, despite the current economic situation. For each of five priority areas drawn from the United Nations Millennium Declaration, specific development problems and issues arising from the current crisis are briefly recalled, followed by possible e-government solutions and an account of recent actions.

3.2.1 Employment services for poverty eradication

The issue

Poverty eradication is one of the most urgent and compelling development goals. There is serious concern that the 'near poor' are becoming the new poor. The World Bank estimates that an additional 53 million people in developing countries will fall into poverty on top of the 130 million to 155 million who became poor due to the impact of the food and oil crisis in 2008. This crisis caused a drop in GDP rates in many developing countries, including in African countries, which registered a 2.9 percent fall, as seen in table 3.1.

Productive employment is the key element for poverty reduction. The current financial and economic crisis exacerbates large-scale structural unemployment, under-employment and poverty for many developing countries, especially those considered least-developed. The global economy has been relying on demand fuelled by credit rather than earnings from productive activity, greatly contributing to the 'jobless growth'. Therefore, enhancing employment opportunities is an important and urgent issue for the international community.

Faced with the prospect of a prolonged global increase in unemployment, poverty and inequality, and the continuing collapse of enterprises, the International Labour Organization adopted a Global Jobs Pact on 19 June 2009. It is designed to guide national and international policies aimed at stimulating economic recovery, generating jobs and providing protection to working people and their families. Although the Pact was designed with all regions in mind, it may be difficult for developing countries with limited fiscal and policy space to promote job creation in the absence of innovative and cost-effective means of implementing the Pact. Against this background, e-government tools are increasingly considered as a potential solution.

Table 3.1 **Real GDP growth (percent) before and after the economic crisis of 2008-2009**

			Real GDP growth		GDP change
		Before crisis		After crisis	After crisis
	2008 estimate	2009 projection	2008 estimate	2009 projection	2008-2009
Africa	5.9	5.9	5.7	2.8	-2.9

Source: African Development Bank (2009)

Possible solutions

Most of the policy options enumerated in the Global Jobs Pact appear to lend themselves to a variety of e-government responses. E-service delivery can contribute to efforts to address poverty, employment and the impacts of the financial and economic crisis.

In many countries, crisis-response measures aim to attenuate the effects of the economic crisis on employment, and e-government tools can play a significant role in ensuring that pro-employment policies reach their targets. Governments can provide online public information services to job seekers and online vocational and technical training and entrepreneurial skills development for those who have lost or are at risk of losing their job as well as to vulnerable groups.[10] In addition, they can provide ICT-based assessment, tracking and monitoring of the activities of the unemployed through the various parts of the employment services system, which is useful in the current situation.

These potential solutions need to be innovative and geared towards pro-poor services for poverty eradication and employment, especially in rural areas, where the majority of populations in developing countries live. Such e-government orientation is deemed particularly essential in rural areas, as most national e-government programmes have tended to focus on internal efficiency rather than public service delivery, and are mostly focused on urban areas.[11]

Recent actions

An innovative e-government response to rural poverty and unemployment is India's e-payment system for the National Rural Employment Guarantee Scheme, which makes use of biometric smart cards. The card uniquely identifies every citizen, with a finger print scanner to the benefit of illiterate citizens. This card initiative was motivated by the need to ensure that the poor and marginalized receive wages and social welfare benefits intended for them.[12] It enhances transparency and accountability. Pension and wages underwritten by the scheme are paid through these smart cards in many Indian villages.

Another example of an e-government initiative in employment is the multimedia project 'Oman Royal Court Affairs – Mobile Recruitment', which won the World Summit Award in 2009 with an electronic evaluation system that receives job applications via short messaging system (SMS).[13] It was one of eight winners in a contest following on the United Nations' World Summit on the Information Society, and is not identified as a direct response to the crisis. Every job application is processed in a few seconds and the recruitment process is completed in about two weeks. The system simplifies filtering of candidates by integrating the National Manpower Register with a mobile-based job application, screening and short-listing of jobseekers. Results of automated screening process are forwarded via SMS. The automated mobile recruitment system saves time, cost and effort.[14]

The current financial and economic crisis has led governments in different parts of the world have taken explicit steps to reduce unemployment including the creation of websites as part of their response.

- Employment is among the discussion topics in My Better Estonia, a civil initiative that invites citizens to brainstorm for a better Estonia and to propose solutions for various problems, including those related to the country's financial crisis. Public opinions are then published on a website and good ideas yielded by online brainstorming events nationwide are used in making policy decisions. As regards employment, the Ministry of Social Affairs is currently implementing a project that will create new jobs, based on citizen feedback collected online.[15]
- Ireland's website *Losing Your Job*, provides public service information to the newly unemployed and potential job-seekers with a user-tailored design that make it easy to access relevant information.[16]
- In Belgium, the website *Au Travail* (Off to work)[17] contains an application that allows jobseekers to find the specific employment measures and opportunities that concern them. Users can complete an online form describing their work history before being directed to stimulus measures about work and employment that are relevant to their profile. This presentation of measures allows citizens to assess whether they are eligible for some form of assistance under the country's stimulus plan. If so, they are told how to apply; if not, they are advised on alternative measures.

The most recent initiative, in direct response to the crisis, comes from the United States. The newly developed SMART 2010 (short for Skills Matching and Referral Technology) is an e-government tool connecting unemployed New Yorkers with available jobs. A completed résumé in electronic format is fed into the State Department of Labor's SMART 2010 system at a career centre. The computer program analyses résumés for skills and work experience and then electronically contacts unemployed New Yorkers via e-mail, recommending job openings in their areas based on their experience and skills. Within 24 hours of submitting a résumé, the individual will receive an e-mail message containing job matches from a database of employment opportunities.[18]

3.2.2 Weathering difficult times in education

The issue

There has been real progress towards universal primary education in many developing countries since 2000. But the current financial and economic crisis threatens the significant gains that these countries have made in improving education outcomes. Governments in developing countries have thus far managed to protect their education budgets from the crisis, yet it remains to be seen how long they can continue to do so. There are concerns over ability of governments to sustain educational expansion and maintain the quality of educational service.[19] The crisis is reducing the ability of both households and governments to invest in education.

At the same time, there are new, beneficial developments such as allocation of stimulus funding to education. Not only developed countries (e.g. Finland, the Netherlands) but also some developing countries (e.g. Kenya, Mexico, Namibia, Thailand) have been using their stimulus packages for investment in education. The focus differs, however. Developed countries such as the Netherlands and Switzerland have focused on supporting professional schools for the unemployed. In contrast, developing countries (including China) tend to focus on primary education and access to education. The Thai stimulus package to respond to the current financial and economic crisis includes a 15-year free education policy that aims to reduce the financial burdens on parents and enable Thai children to have equal access to high-quality education.[20]

The overall impact is too early to assess, yet there is a sense of real danger that some developing countries, which have made progress towards the Millennium Development Goal of universal primary education, will suffer setbacks as result of the financial and economic crisis. Countries such as Bangladesh, Ethiopia, Mali, Rwanda and Senegal are at particular risk.[21] Aid to education had already begun to fall prior to the crisis and may further drop by $1.1 billion in 2010, according to the 2009 Education for All Global Monitoring Report. Nearly 75 million children are out of school, the report says.[22] Case studies of countries such as Mongolia show that the financial and economic crisis has had a major impact on school attendance and school quality, increasing school dropout rates at every level of schooling.[23] This finding is in contrast to the past Asian financial crisis of the 1990s, when school enrolment rates did not decline as much as feared, partly due to household and school-level adjustment.[24]

Possible solutions

E-government delivery of educational service can help countries to weather difficult times in education. It is a powerful medium for education, with 24-hour Internet accessibility over distance. The reach of schools can dramatically be expanded. The ever-increasing possibility for remote education is particularly exciting and important for developing countries. Generally speaking, potential e-government solutions include provision of information on topics such as finding a school, identifying the right colleges for students, finding teaching opportunities for teachers, and receiving test results. Solutions may also be found in the use of ICTs to enhance student education and teacher training.

If these potentials are to materialize, e-government services for education need to be underpinned by affordable and reliable Internet connectivity and other vital infrastructure such as school computers and universal access facilities where ICT can be effectively used in educational and training tools.

Box 3.1 **Online alerts about schools and H1N1 flu**

Schools already face the challenges of financial and economic crisis. Add to this the threat of H1N1 flu, which is leading to increasing efforts on the part of United States government and school districts to put information online. Through such learning measures people can be alerted to possible closures or teacher and student absences because of a H1N1 flu outbreak. In particular, the United States Department of Education has asked Curriki – an open-source online repository of free curricular materials from commercial vendors, government and professional organizations and educators – to establish a 'continuity of learning plan' as part of a nationwide readiness initiative.

Source: Ash (2009)

The use of ICT in education is too often constrained by a lack of computer stations and other infrastructure. Ensuring the basic infrastructural backbone has been and continues to be a major concern for developing countries.

Recent actions

In developed countries, stimulus packages are prompting substantial new initiatives in the educational sector. The United States' stimulus package set aside $650 million to invest in school technology and broadband, cover expenses for schools to install or improve Internet connections to broadband, and to help teachers learn how technology can be used to improve their lessons. In the same country, several states initiated recent actions to monitor and analyze the effectiveness of their programmes, such as the use of Economic Recovery Fund Tracking technology by the Arkansas Department of Education. Through funding from the American Recovery and Reinvestment Act, states are now being encouraged to create statewide longitudinal data systems to help track student achievement. Also, on a different topic, it is interesting to observe how e-technology has been applied to deal with the outbreak of H1N1 flu (see box 3.1).

The current situation of financial hardship has motivated countries to place financial information online, including information about scholarships and financial aid. The Irish Government's website called *Student Finance*[25] is particularly useful in this regard.

In many developing countries, the focus has been primarily on ensuring that students and teachers have ICT skills ('Education for ICT') rather than using ICTs for better learning and teaching process ('ICT for Education').[26] An example is the e-Schools Initiative of the New Partnership for Africa's Development (NEPAD). Despite the current financial and economic crisis, the initiative has achieved some progress.[27] Initiated in 2003, it aims to impart ICT skills to African schoolchildren, equip them with ICT apparatus, and provide teachers with ICT skills. It is a good example of integrated approaches with its teacher development framework for teacher training and professional development.

ICT applications are becoming more important for remote education and virtual classrooms. Long before the current economic crisis, several developing countries had initiated steps to provide education to students in remote areas. These include Mauritius' Cyber Caravan Project, Egypt's video-conference distance learning linking 27 sites across the country to provide learning facilities in remote areas, Guinea's adult literacy programmes conducted via the Internet, and Burkina Faso's Classe Rurale En Langue Nationales project, a distance-learning programme in local languages targeting rural people, including those who are illiterate. E-education services in Australia are successfully applied to overcome geographical distance and enable educators to reach remote communities (see box 3.2).

Mobile technology is becoming an important aspect of educational services, and it is a noticeable trend in the field of student education and teacher training. In the Philippines, the mobile phone and SMS are being used as the primary means for interactive learning and for providing information to students. In the United Republic of Tanzania, the BridgeIT project used mobile phones to provide support for teacher training.[28] Mobile technology has rapidly gained in importance across the educational sector. Some even say that the current state of mobile education technology, or

Box 3.2 **'Shrinking' Australia with e-education services**

When it comes to Australia, with its vast area and sparse population, going the distance and providing teachers and students with ICT educational tools is extremely important. E-education services help 'shrink' Australia. Motivated to invest in ICT by its geographical characteristics, Australia enjoys the benefits of remote education and is now home to many remote e-education companies.

Source: Smart Technology (2007)

m-education, may be at the stage where mobile health, or m-health, was just a few years ago. In Bangladesh, more than 50 percent of the population gained access to mobile phones in the past decade. Mobile applications for English-language teachers in Bangladesh enable them to access training materials including audio and video at all times.[29] Soon the mobile applications will be linked to the Government's school curriculum, textbooks and assessment procedures.[30]

Mobile devices (e.g. cell phones, handheld devices and handheld computers) are among the most ubiquitous technologies in children's lives today in countries like the United States. Mobile applications are likely to become an important part of a more effective approach to learning in the near future, which has an important implication for governmental educational services as they prepare to facilitate and encourage 'anywhere, anytime' learning.

In addition to the emergence of m-education applications, there is an increasing trend towards learning as a more participative and collaborative process, which should be encouraged by governments. Learning is becoming a more participative and collaborative process in which Web 2.0 tools facilitate activities of teachers and students as co-producers of knowledge and educational content. An illustrative example is the School of Tomorrow project at the Aruba Pedagogical Institute, which has engaged in group-blog collaborations with Dutch students and others, incorporating ICTs into many aspects of teaching and learning in its technology-rich model classroom.[31] It is also interesting to note that Iceland, one of the most crisis-affected countries in the world, has started promoting free and open source software in the country's schools, which will open up new opportunities for more collaborative learning processes (see box 3.3).

Box 3.3 **Promoting free and open source software in schools in a crisis-affected country**

The Ministry of Education in Iceland recently announced its plan to promote the use of free and open source software in schools across the country. This is based on the government's policy on free and open source software for all institutions that are operated by public funds, with the objective of augmenting students' skills in ICTs, which present cost-effective educational method for schools. The key advantage of open source software for education is its openness enabling any organization or individual to use free of charge, change and improve the software for one's own use and thereby explore a new idea about learning. When combined with open software standards, open source becomes even more powerful, emerging as new kinds of software to support collaborative learning.

Source: ePractice.eu (2009)

3.2.3 Gender-inclusive approaches to public service delivery

The issue

Seventy percent of the world's poor are women, and the financial and economic crisis has gender-specific impacts. Women tend to face greater income insecurity, and cuts in social spending also tend to disproportionately affect access to education and health services for women and girls. The United Nations Conference on the World Financial and Economic Crisis and Its Impact on Development recognized that crisis responses need to have a strong gender perspective.[32]

Including women in economic development is an issue high on the current agenda of the international community. There is consensus that the adverse impacts of the crisis on women's economic empowerment, including women's employment, present a major challenge to governments worldwide. Economic empowerment is mainly about securing economic opportunities. It includes mobilizing women to eliminate gender gaps in access to resources and services that are a major obstacle to women's development. Microenterprise development, job creation and security, and above all, availability of microfinance loans are important.[33]

Access to the labour market has much to do with economic empowerment for women. Women are often in vulnerable employment and overrepresented in insecure, part-time and short-term jobs, including particularly, in the agricultural sector. As regards women's unemployment, the Millennium Development Goals Report 2009 highlights its critical importance and notes that the crisis may hold back progress towards gender equality by creating new hurdles to women's employment.[34] The United Nations Committee on the Elimination of Discrimination against Women also warns that the current crisis is likely to have a serious impact on the realization of gender equality, especially in relation to employment.[35]

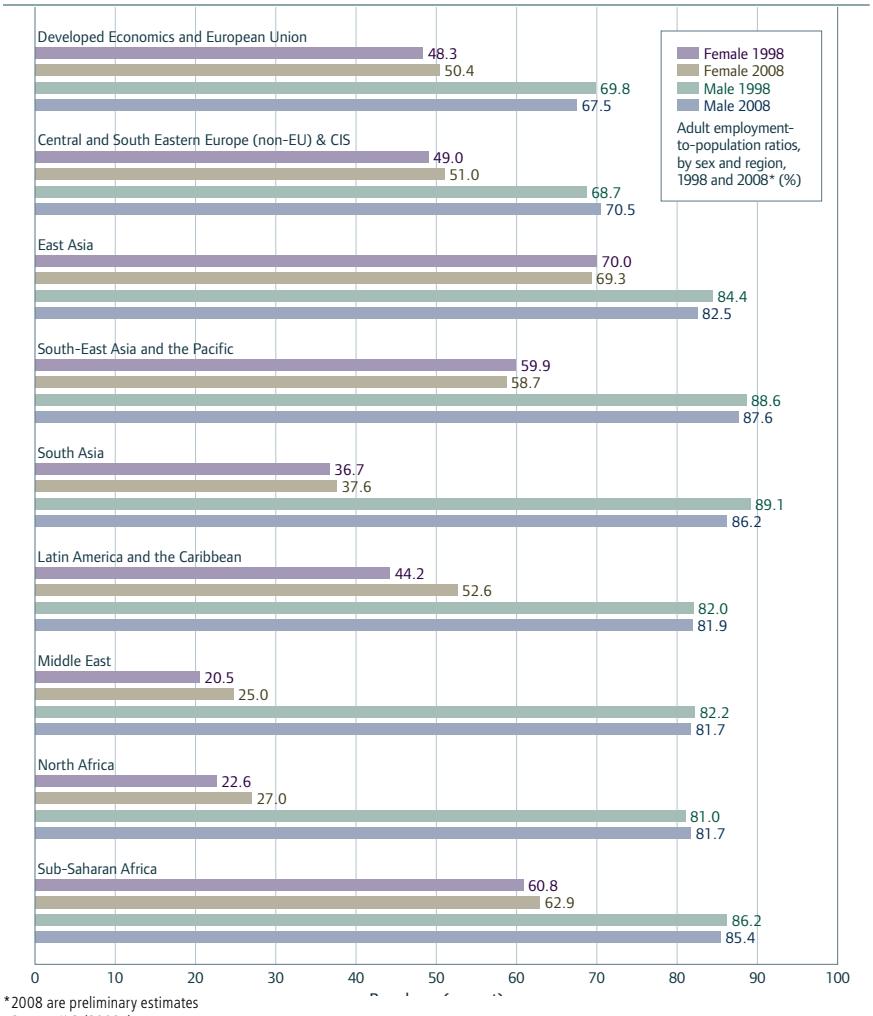
Female employment and microfinance are key issues arising from the financial and economic crisis. According to the World Bank, loss of

employment constitutes the first round impact of the crisis on women and families, mainly as a result of the drop in aggregate demand and exports. Another important first round impact is the fall in lending resources from microfinancing institutions, as a result of tightened credit markets.[36]

It is in view of these problems, the United Nations Millennium Campaign has called for the establishment of a 'vulnerability fund' in which each developed country would devote 0.7 percent of its stimulus package to aid poor countries to set up safety net programmes, including microfinance institutions. Governments are also urged to design and implement the packages, with explicit consideration of the labour market disadvantage that women face, and set explicit employment growth targets for women.[37] It is important to ask if the current stimulus packages contain gender-specific provisions for empowerment and employment opportunities (see box 3.4).

The gender impact of the economic crisis in terms of unemployment rates is expected to be more detrimental for females than for males in most regions, and especially so in Latin America and the Caribbean. Figure 3.1 shows gender-disaggregated employment-to-population ratios prior to the crisis.

Figure 3.1 **Gender-disaggregated employment-to-population ratios**



*2008 are preliminary estimates
Source: ILO (2009a)

Possible solutions

E-government can be effectively leveraged for women's economic empowerment and employment in the crisis. Employment-related e-government solutions include online provision of information on job opportunities for women, in particular for women who can use skills for the global digital economy beyond the limits of their local economy; online skills training for female jobseekers; and online distance learning.

E-government can also enhance information service delivery for much-needed women's economic empowerment. It can help women to weather the crisis by disseminating information on income-generating opportunities, and by alerting women to other relevant information services. Women need information about microenterprise loans and other forms of capital for female entrepreneurship, as well as local, regional and global market information and market pricing information. Indeed, uninterrupted flows of microfinance are key to the economic empowerment of women, especially in a time of decreased lending. E-government can provide information about financial and other forms of assistance provided by governments, international donors and non-governmental organizations. In addition to these information services, women need to know about online business training and support for women-headed microenterprises, online marketing assistance and online financial services.

A number of conditions would facilitate the delivery of information to women, including: (a) public access (e.g. mobile Internet kiosks, especially in rural areas); (b) free access to training on the use of the technology; (c) technological solutions that promote targeted access to women, such as voice recognition for people with little or no formal

education, graphic interfaces and touch screens; and (d) the provision of information that rural women in developing countries need in an accessible language and format.

Recent actions

Some countries have taken steps in fiscal stimulus packages to protect and increase funding to microfinance lending institutions, which are important to women's empowerment. It is also important that public expenditure monitoring systems are in place to ensure that stimulus funding and other budgetary allocations actually reach the intended groups, including women.[38] In this regard, the latest ICT applications for tracking and monitoring of stimulus funding are likely to be useful, especially in countries like Uganda, which is one of the first developing countries to successfully implement a public expenditure tracking system and which has already built relevant capacity.

In direct response to the financial and economic crisis, China focused on women in the area of information service and assistance for female jobseekers and entrepreneurs. The Women's Federation of the City of LianYunGang made a significant effort to improve the female employment rate in the city during the current crisis. The Federation reported that more than 60 per cent of the female population was unemployed. Events were organized to strengthen employment placement services for women, and the Federation established a database for unemployed women. The qualifications of female jobseekers were analysed and the Federation then recommended women to various organizations for employment according to their qualifications. The database is updated once every quarter, which aids in monitoring the employment situation. The Federation also created a special website column, where women could post their experiences with successful start-up microenterprises and published handbooks for female entrepreneurs.[39]

A good example of a microfinance initiative comes from India, where commercial banking entities including State Bank of India have linked with the respective Service Centre Agencies in the states under the framework of the National e-Governance Plan to provide Banking Correspondent status to the Common Service Centres equipped with ICT infrastructure, and have provided microfinance services through them. For the cost of sending an SMS message, the microfinance client uses an application stored on her mobile phone to initiate an account transfer to her bank account. Applications for microfinance may be led by the private sector, with government and non-governmental organizations in support. In this case, the government has also routed various developmental schemes through microfinance.[40]

A trend observed is the growing importance of mobile usage, especially for women entrepreneurs, who need access to credit and capital. This development seems similar to the growing importance of mobile applications in other priority areas of the MDGs, such as m-education and m-health. There are some indications that it is one of the more accessible technologies for women. In fact, women's mobile phone access in Africa is equal to that of men.[41]

3.2.4 Health care and the advent of m-health

The issue

The financial and economic crisis may have a serious impact on the health-related MDGs. In the crisis, governments around the world are under increasing pressure to maintain the level and quality of health services with limited and decreasing resources. Even more demands will be placed on public health services as income decreases and governments cut their budgets. The crisis is expected to negatively impact HIV/AIDS treatment programmes in one third of countries surveyed in 2009, with its adverse effects worsening over the year. The crisis will inevitably impact and exacerbate many of the problems facing healthcare. Previous crises in Asia and Latin America show the negative impact that crises can have on access to health outcomes. Women and children are especially vulnerable.

Possible solutions

ICT applications in the health sector can bring efficiency gains, much as they can for education, employment and other priorities of the MDGs. ICT applications could, for example, improve the

The advent of m-health is a harbinger of more mobile public services to come.

monitoring of demand for and supply of HIV/AIDS drugs, which would be highly relevant given the current lack of funding for these drugs. The current crisis is intensifying the challenge of maintaining access to HIV treatment and prevention, especially in high-prevalence countries in Eastern and Southern Africa.[42]

ICT applications can engage citizens in participatory decision-making about health care, considerably expanding the scope of e-participation, These technologies offer the potential to empower citizens with medical information and knowledge that can facilitate improved decision-making and care. They can enable for stakeholders such as patient groups and providers to agree on priorities and then streamline services to make them more efficient, which can reduce costs and help to mitigate the impact of the crisis.[43]

Recent actions

E-health, a process of administering health care through ICT tools, is rapidly growing in importance in all parts of the world. Telemedicine, for example, is a process of accessing health care from a distance through ICT tools. Telemedicine has been successfully implemented in several developing countries, including Bhutan, Ghana, Indonesia, Niger, Nigeria, Pakistan, Peru and South Africa.

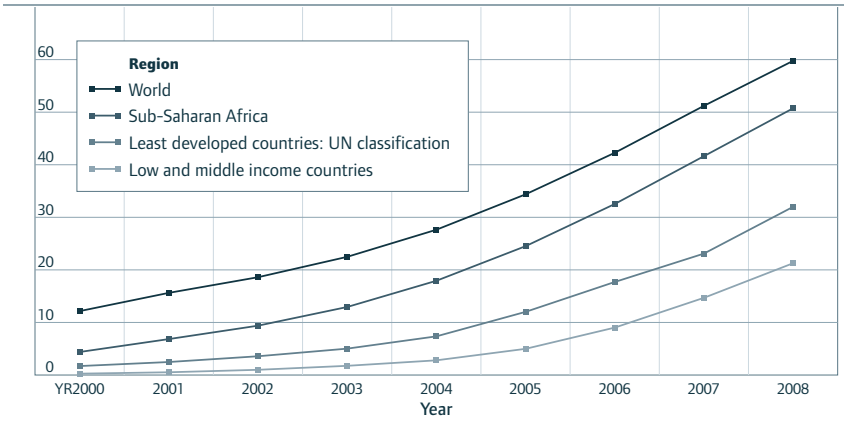
Electronic health records are another example of ICT use in this sector. The stimulus package in the United States contains $19 billion for health care technology spending and the adoption of electronic health records.[44] The use of computerized medical records has slowly been adopted in many developed countries such as Singapore and several European countries. In Qatar, electronic health records are a key component of the national e-health programme for all, which aims to increase the efficiency and effectiveness of the healthcare system. The Supreme Council of Information and Communication Technology, ictQATAR, will first promote the standardization of health records and the creation of the Electronic Patient Record, and will then focus on providing online healthcare information and services through portals and applications with a view to developing an integrated health network.[45]

In the United Kingdom, recent initiatives are taking advantage of technology in innovative ways and building on Web 2.0 technologies. One example is the Wii platform development, which extends telehealth and telecare systems to include a range of new devices around the home. The technology creates a virtual community of connected carers and cared-for, and it enhances community-based care and health information. The aim is to help prolong independent living for elderly and chronically ill patients.[46] Another e-health project is PatientOpinion, which allows patients of the British National Health Service to share their experiences at local hospitals, hospices and mental health services and to rate them based on criteria such as standard of medical care, being treated with respect and dignity, clear information and cleanliness.

More than half of all patients between the ages of 25 and 34 in the United States are influenced by social media when it comes to health care decisions, recent studies have found. Social media is a group of Internet-based applications that allow users to generate and exchange content, including blogs, wikis, podcasts, instant messaging and other social networking and communications software applications. The concentration of such activity in the most developed countries may result in an accentuation of the digital divide in health care, urgently necessitating a concerted effort for more inclusive e-health care on a global scale.

Using mobile phones, m-health stands out among the many emerging uses of ICT in healthcare. It delivers health services and information (over distance) to patients and has become a critical

Figure 3.2 **Mobile cell phone subscriptions per 100 people**



Source: World Bank (2009c)

segment of e-health in recent years. M-health is the fastest growing part of e-health, and its importance is increasing. Documented results reveal that mobile technology improves the efficiency of healthcare delivery. The rapidly increasing importance of mobile phones as a platform for healthcare delivery in recent years is mainly attributable to substantial price reductions and the resulting rapid expansion of mobile phone use around the world (see figure 3.2).[47] There are presently 4 billion to 5 billion mobile phones in the world.

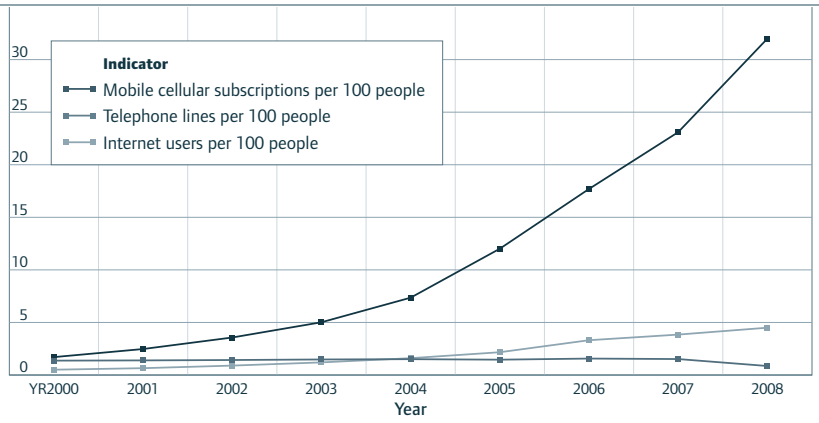
Mobile phone use has been rapidly expanding, especially in Africa (see figure 3.3). When compared to the growth rate of telephone lines, that of mobile phone subscriptions in Africa is dramatically faster.

Capacities of mobile phones are rapidly expanding to include voice, text messages, email and even full Internet browsers, leading many experts in the field of technology to agree that mobile access is the communication medium of the future. This offers unprecedented opportunities to improve the health of people living in underserved communities that lack health care facilities or medical staff. Information provided via mobile phones can help to diagnose and treat illness and assist in the early detection and containment of epidemics. For many countries, mobile technology may be the only feasible way to reach out to the wider population, especially in rural areas.

M-health has demonstrated a positive impact on health care and has the potential to deliver health care more efficiently. To date, key applications for m-health in developing countries and accruing benefits include:

- Disease and epidemic outbreak tracking and dissemination of public health information to citizens (e.g. AESSIMS system in India);
- Remote data collection and remote monitoring to closely track and minimize treatment interruptions (e.g. Cell-PREVEN initiatives in Peru, Dokoza System in South Africa);
- Medication reminders (e.g. reminders for tuberculosis patients in Thailand) and applications for protection of patients from fake medicines (e.g. mPedigree application to check drugs in Ghana);
- Diagnostic and treatment support in rural and marginalized areas (e.g. M-DOK project in the Philippines, Mobile Telemedicine System).[48]

Figure 3.3 **ICT trends in sub-Saharan Africa (2000-2008)**



Source: World Bank (2009c)

The adoption of mobile phones as a platform for health care delivery can be found even in least-developed countries such as Rwanda (see box 3.4).

3.2.5 Keeping up environmental management

The issue

The current financial and economic crisis could have an adverse impact on a number of environmental services. There is concern that the environmental agenda could be sidelined, countries could be distracted from addressing climate change and other environmental problems, and they could potentially make substantial cuts in their investments in new technology and environmental services.

Cuts in funds could hurt environmental services, but there are also some positive developments created by stimulus packages in response to the current

Box 3.4 **Mobile phones support life-saving HIV/AIDS electronic records system in Rwanda**

"Rwanda sees mHealth as part of a larger eHealth vision"

—eHealth Coordinator for Rwanda's Ministry of Health

A major component of Rwanda's e-health programme is the country's rapidly growing m-health portfolio, which is being used to deliver vital health services even in the most remote rural areas. TRACnet is an electronic records system that can be uploaded to mobile phones. It was created in Rwanda in 2005 for remote data collection by the TRAC Centre, part of the Ministry of Health. The system is used to manage critical information on HIV/AIDS patients, ensure drug adherence, monitor anti-retroviral treatment (ART) programmes nationwide, and access the most up-to-date information about HIV/AIDS care and treatment. TRACnet was designed for use with all types of technology and information systems, but today 90 percent of the system's users access it on their mobile phones. Given the popularity of mobile phones, Rwanda's Ministry of Health is piloting a Phones-for-Health programme and has registered interest in using mobile phones to report on maternal mortality and to track progress towards reaching the health-related MDGs.

Source: mHealth Alliance (2009)

crisis. 'Green growth' makes up an important portion of stimulus packages after infrastructure investments, education and research and development, including specific 'green measures' in the proposed or announced fiscal stimulus packages in China, Germany, Japan, the Republic of Korea and the United States. Substantial amounts of money are directed at green technology research areas.[49] Some tropical countries have announced stimulus packages with programmes such as Indonesia's tree-planting and forest rehabilitation programmes.[50]

In most developing countries, the mobilization of funds and the proportion earmarked for green investment will be limited. Missing the opportunity to stimulate green investments in developing countries now, and to unlock low-carbon opportunities, even as their economies are in a downturn, could mean storing up problems for the future that are far larger than the current financial and economic crisis.

Possible solutions

Environmental protection needs to be an integral part of countries' recovery from the crisis, and ICT can help countries to achieve their goals in more cost-effective ways. It is estimated that ICT-enabled improvements in non-ICT sectors could save about 15 percent of total carbon emissions by 2020. Significant ICT-enabled energy efficiency gains are expected to be achievable in the short term in buildings and construction, in transport, logistics and energy end-use. It is estimated that the wider use of applications such as online public services and applications, and advanced collaboration technologies could save at least 1 to 2 percent of total energy use by 2020 worldwide. For some, broadband is green technology. In fact, it is an enabler of efficiencies that could drive major reductions in carbon emissions.[51]

E-government applications are already in position to bring substantial gains for environmental transactional services including, for example, cash-back incentives for green products, subsidies, tax rebates and environmental permit applications. These efficiency gains are particularly significant at a time of financial and economic crisis, when many stimulus packages include direct public spending and tax incentives to support green investments.

ICT-enabled environmental services also include provision of public environmental information and data, and enhance opportunities for monitoring and public awareness. In an example from the water sector, the Seoul Metropolitan Government in the Republic of Korea recently initiated an online real-time water quality assessment service to assess and monitor the quality of tap water. With the system, citizens can check online and in real-time the quality of water supplied to their houses from water purification plants.[52] In an example from the forestry sector, geographic information systems (GIS) are considered powerful tools for tracking and monitoring deforestation (see box 3.5).

Recent actions

Only recently have countries recognized the potential of ICT-based innovations to contribute to environmental issues. Yet they are already being recognized for their contributions, as in the case of an e-catalog for procurement by government agencies in the United States, which has improved the tracking and monitoring of green purchases.[53] The country's General Services Administration has been using social media tools to ask citizens how to do better at procuring environmental goods and services.

E-government has a uniquely low-carbon delivery process for its services, and this is being recognized for its positive impact to environment. In the United Kingdom, a study of the Sunderland City Council demonstrated how e-government service delivery can serve the environmental objectives of government. The study examined the carbon footprint of five services provided by the local government, and found that a shift towards

Box 3.5 **Spatially enabled e-government tools for forest management**

The Asian financial crisis provides ample evidence that illegal forest activities at both industrial and subsistence levels increase in terms of economic strife. Deforestation is an important climate change issue and a significant contributor of CO2.

E-government tools can support the environmental services offered by the initiative Reducing Emissions from Degradation and Deforestation (REDD) and related initiatives. REDD is a crucial strategy for dealing with climate change that requires slowing the growth of agriculture, forestry and cattle ranching to protect forests in places such as Brazil and Indonesia.

GIS can play an important role in assisting government agencies in tracking and monitoring. This system enables an effective use of geographic information, designed for the collection, storage and analysis of objects, where geographic location is critical to the analysis. It aids users in organizing the data about problems, understanding their spatial relationship associations, and analyzing and synthesizing information about them.

Source: ESRI (2009)

greater provision of these services via e-mail and the Internet would lead to a reduction in the Council's carbon footprint.[54]

Governments were already grappling with many environmental issues prior to the crisis. After the onset of the crisis, some existing e-government tools were being scaled up or new tools were created. The spatially enabled e-government tools such as GIS, mentioned earlier, are increasingly being used to track and monitor environmental changes. A case in point comes from the United Kingdom's National Weather Service, which features an interactive map on the Met Office website that demonstrates the impact of global warming in decades to come.

Another trend in e-government is the use of applications that enhance public participation to improve environmental service delivery. Social media tools enable active social networking and consensus-building among environmental activists, who are one of the most vocal groups. Some governments actively encourage citizen participation in combating climate change, using innovative e-government tools. Examples include the Climate Atlas of the German Federal Environment Ministry on the new online portal, Es ist Dein Klima (It's your climate).[55] The Atlas shows who is committed to tackling climate change in individual municipalities. The objective is to motivate citizens and encourage participation in combating climate change.

3.3 Conclusions

Faced with pressure to do more with less, governments find themselves in the position of having to be more efficient and agile in delivering public services in order to meet national development objectives. The 'e' of e-government services brings several important advantages in the current financial and economic crisis, most notably improved efficiency. These benefits, however, need to be assessed against existing constraints and limitations. Potential and actual e-government applications vary across countries and groups. Issues of public service delivery arising from the current financial and economic crisis also vary across countries and group. This high degree of variation is reflected in the many different e-government approaches taken in employment, education, women's empowerment, health care and the environment – five selected priority areas of the MDGs. For example, ICT tools have helped female jobseekers and entrepreneurs find opportunities for jobs and loans; m-health has delivered vital health services even in remote rural areas of developing countries, including services for HIV/AIDS; and ICT tools have enhanced environmental monitoring and raised awareness through effective provision of public environmental information.

Across these varied sectors there are common features and trends, due in part perhaps to the shared experience of the financial and economic crisis.

- A major part of the current e-government activity entails the provision and delivery of information service, a finding common to the five selected areas of the MDGs. ICT-enabled transactional services have been used to meet the drastically increasing demand for social welfare and other benefits, and they have gained in importance and usage.
- E-transaction services present an important issue in connection with stimulus funding, not only to enhance transparency (see chapter 1 of the United Nations E-Government Survey) but from the perspective of public service delivery. E-government tools can expand and enhance public service delivery capacity through, for example, efficient processing and distribution of stimulus grants.
- Another important trend involves e-participation, closely linked to public service delivery. Many countries, especially developed countries, show increasing use of new Web 2.0 and other social media tools to create a more interactive environment between governments and citizens. Several countries have invested substantial resources and effort into experimenting with these tools, finding innovative ways to use them for more effective delivery of public services.
- One of the most noteworthy developments is the rapid and ubiquitous emergence of mobile technology as a powerful tool for public service provision and delivery, especially in developing countries. Mobile service delivery is becoming pervasive in employment, education, women's empowerment and the environment but nowhere it is advancing more quickly than in the health sector. It is at an

A country's capacity to achieve the MDGs can be greatly enhanced with the right e-government applications.

early and dynamic stage, and the scope of its application is rapidly expanding. The mobile platform is widely seen as the direction of the future and will continue to play an increasingly important role in public service delivery. Despite the current crisis, the mobile technology industry shows resilience.

Governments responded to the financial and economic crisis by developing new e-government tools, scaling up existing initiatives and by refocusing or stepping up their overall e-government efforts. Some governments benefit from pre-existing e-government systems and initiatives. E-government work, which has already carried out has proven invaluable in the current crisis, allowing some governments to accelerate their e-government programmes, with a view to realizing benefits such as enhanced efficiency, effectiveness and financial savings on the delivery of public services.[56]

Looking ahead, constant progress in ICTs is driving rapid change, presenting both new challenges and new opportunities for public service delivery. Technological developments will continue to provide new possibilities for e-government to address both immediate problems such as those arising from the current financial and economic crisis and long-term challenges for public service delivery. At the present time, due to pressures on ICT budgets, many countries have cancelled or postponed their ICT projects. Ultimately, however, the crisis may act as a powerful catalyst for improvement in the delivery of public services by governments, which could prove advantageous in the long run.

Progress in ICT infrastructure will help advance e-government and service delivery in all areas including, in particular, those advancing the MDGs. It follows, for example, that the provision of interactive public services is high in countries with large broadband penetration.[57] There are encouraging developments in this regard, especially in Africa, and despite the global financial and economic crisis. Rwanda, for example, continues to invest in ICT applications and e-government. In South Africa, the government has said that ICT sector would be used to deal with the current crisis. Plans to develop Internet connections in developing countries are making steady progress despite the global financial and economic crisis. The Eastern Africa Submarine Cable System has been successfully launched, which could drastically reduce the cost of Internet access in East Africa and landlocked central regions in the near future. The future progress of e-government depends on this kind of infrastructural progress.

E-government is practical today as well as being an investment in the future, yet an example from the past helps make the point. In the Asian financial crisis of the 1990s, the Republic of Korea continued and even enhanced its investment in ICT development and use of ICTs for public service delivery, experiencing particular success with its e-procurement system. This continuing investment contributed to the country's economic recovery.[58] ■

Part 2

The state of e-government around the world

Part 2

The state of e-government around the world

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Chapter 4

World e-government rankings

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The United Nations E-Government Survey 2010 finds that citizens are benefiting from more advanced e-service delivery, better access to information, more efficient government management and improved interactions with governments, primarily as a result of increasing use by the public sector of information and communications technology. Most countries have published a tremendous amount of information online, many going beyond basic websites to provide national portals that serve as a major starting point for users to connect to government services in different ministries. At the same time, many developing countries need to devote additional energy to transactional services as well as the electronic means of engaging citizens in public consultation and decision-making.

To better reflect the higher expectations of e-government development around the world, the United Nations Department of Economic and Social Affairs introduced significant changes to the survey instrument in this round, focusing more on how governments are using websites and Web portals to deliver public services and expand opportunities for citizens to participate in decision-making. The number of questions increased from 86 in 2008 to 95 in 2010. More specifically, twenty-five questions were added and 16 questions removed from the questionnaire in the 2010 survey round, while 29 questions were modified.

Table 4.1 **Top 20 countries in e-government development**

Rank	Country	E-government development index value
1	Republic of Korea	0.8785
2	United States	0.8510
3	Canada	0.8448
4	United Kingdom	0.8147
5	Netherlands	0.8097
6	Norway	0.8020
7	Denmark	0.7872
8	Australia	0.7863
9	Spain	0.7516
10	France	0.7510
11	Singapore	0.7476
12	Sweden	0.7474
13	Bahrain	0.7363
14	New Zealand	0.7311
15	Germany	0.7309
16	Belgium	0.7225
17	Japan	0.7152
18	Switzerland	0.7136
19	Finland	0.6967
20	Estonia	0.6965

As a result of these changes, the world average of the e-government development index registered a slight decline compared to previous years. Nevertheless, the decline should not be interpreted as the degeneration of e-government on a global scale since the index measures e-government development of countries relative to one another within a given year. More importantly, a drop in a country's ranking may serve as a reminder of the need to devote greater resources to improving online services and expanding access to telecommunication infrastructure.

Box 4.1 **United States Social Security Administration leads in customer satisfaction**

United States: Social Security Administration

According to the American Customer Satisfaction Index for the 3rd quarter of 2009, the Social Security Administration (SSA) is the top government portal in terms of citizen satisfaction. Citizens have rated the SSA's Retirement Estimator and the IClaim as the two highest e-government services with a score of 91 and 90 respectively.

The Customer Satisfaction Index looks at functionality, navigation, look and feel, site performance and content to determine the level of customer satisfaction. The SSA portal receives a high number of repeat customers and has become one of the primary resources for information on social services in the United States. The SSA portal has continued to make improvements to respond to customers' needs, which has led to an increase in loyalty and cost savings.

http://www.ssa.gov

Box 4.2 **Bahrain embraces Web 2.0**

Bahrain: Web 2.0

Bahrain's e-government programme has been innovative when it comes to customer's centricity. Citizen involvement has been ensured right from the strategy formulation and continuous feedback has been obtained during implementation. In continuation to this philosophy, the Bahrain e-government program has embraced the Web 2.0 to reach its customers. Ministers and senior government officials have established an open-door policy to interact with citizens. The e-government program has its presence on social networking sites such as Facebook and You Tube. In addition, the national portal and ministry websites provide features such as open forums, blogs, live chats, online polls, e-newsletters and other interactive services that involve citizens in government decision making. For instance, two of the ministers and the CEO of the e-Government Authority have interacted with citizens through such blogs.

Citizens' participation and constructive feedback was recognized and implemented by changing the national portal and reprioritizing its objectives, thereby achieving 85 % of customer satisfaction on the e-government programme as per the May 2009 Survey.

http://www.bahrain.bh/

4.1 Global e-government development

High-income countries enjoy the top rankings in the e-government development index in 2010 as in previous years. Among the top five countries in the 2010 United Nations E-Government Survey, the Republic of Korea received the highest score (0.8785), followed by the United States (0.8510), Canada (0.8448), the United Kingdom (0.8147) and the Netherlands (0.8097).

Figure 4.1 shows that Europe (0.6227) and the Americas (0.4790) score above the world average (0.4406). Asia (0.4424) is almost the same as the world average. Africa (0.2733) and Oceania (0.4193) score below the world average.

The majority of positions in the top 20 rankings belong to high-income countries, which is not surprising since they have the financial resources to develop and rollout advanced e-government initiatives, as well as to create a favorable environment for citizen engagement and empowerment. Developed countries have a distinct advantage in achieving higher rankings in the survey, as nearly two-thirds of the weight of e-government development index is allocated to the telecommunication infrastructure and human capital components, which both require long-term investment. For emerging and developing countries, the challenge is to invest in all three dimensions – online services, telecommunication infrastructure and education – to narrow the current digital gap. In other words, having a great website does little in e-service provision if the majority of people in the country cannot read or write, nor if they have no access to the Internet.

What is noteworthy is that some developing countries have begun to catch up with higher-income countries despite these challenges. Bahrain (0.7363), for example, has made significant strides in the two years since the previous survey, moving up in the rankings to 13th place in 2010 from 42nd place in 2008. Bahrain's recent emphasis on citizen engagement and the electronic provision of government services has propelled the country into the top 15 in e-government development, somewhat closer to Singapore (0.7476) which is among the global leaders in provision of electronic and mobile public services.

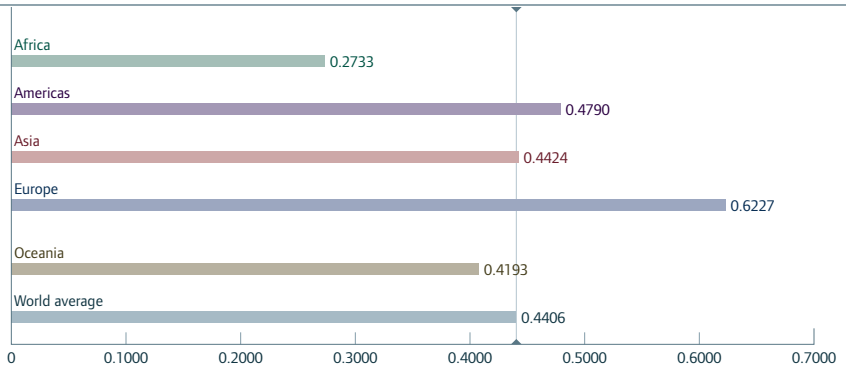
Mobile technology will become an affordable tool to fill in the digital gap between developed and developing countries, given the rapid price decline of mobile products. Emerging and least developed countries have already demonstrated that they are capable of narrowing the digital gap by investing in websites and Web portals and by applying tools such as telecentres, kiosks, community centres and other similar outlets to increase access to the Internet. They are adopting the use of mobile technology at a fast rate, which will trigger the need to develop more mobile e-government services. The private sector in these countries has an opportunity to work with government to create and distribute mobile services. The 2010 survey recorded an increase in the use of mobile technology for communication from governments to citizens, whether it is simple SMS, alert notification or a full-fledged mobile service.

In general, Member States are channelling more human and financial resources to fulfill the ever-increasing digital needs.

The 2010 survey found that some countries are increasingly active in seeking customer satisfaction through online polls, blogs, surveys and other means. This indicates that a growing number of countries have recognized the importance of citizen feedback via Internet and are taking advantage of social networking tools to create better websites and Web portals.

Though emerging and developing countries have yet to fill the digital gap, table 4.1 shows that those developing countries that have channeled more investment to telecommunications infrastructure, education and online services could compete with developed countries and, in some cases, even score higher.

Figure 4.1 **E-government development index regional averages**



4.2 Regional comparisons

On a regional basis, Europe receives the highest score, followed by the Americas. These are the only two regions above the world average. Africa continues to lag far below the world average, given that most of the world's least developed countries are in this region and they generally lack the financial and human resources to fully implement e-government. The Asian region is slightly above the world average, but the Republic of Korea is the exception, as it stands at the top of 2010 rankings in the e-government development index.

4.2.1 E-government in Africa

Figure 4.2 indicates that all sub-regions in Africa fall below the world average. However, there has been some improvement in the region, especially in Middle, Northern and Western Africa since the 2008 survey. Northern Africa leads the region and is closely followed by the Southern Africa. Western Africa lags far behind the other sub-regions and is the lowest scoring sub-region in the 2010 Survey.

Table 4.3 shows that Tunisia leads Africa in e-government development, followed by Mauritius and Egypt. It also shows that the majority of countries in the 'top ten' rankings are developing countries from Northern and Southern Africa.

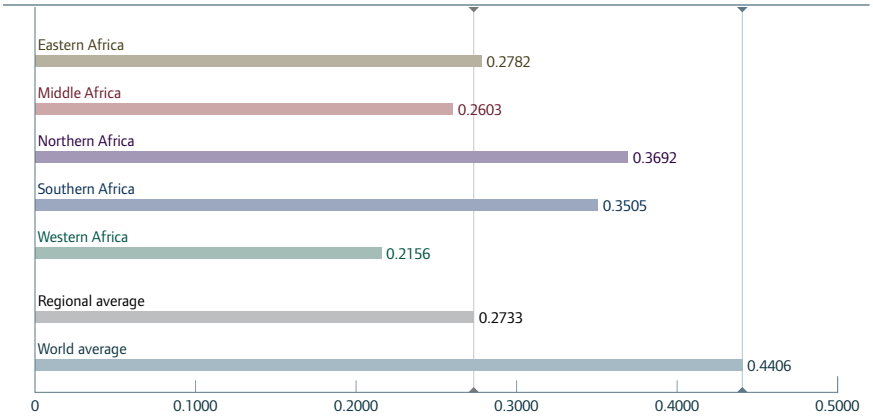
Eastern Africa

Mauritius (0.4645) and the Seychelles (0.4179) continue to lead the region, though both countries register lower rankings in the 2010 Survey. Mauritius dropped by 14 positions and the

Table 4.2 **Regional comparisons**

Region	E-government development index value	
	2010	2008
Africa	**0.2733**	**0.2739**
Eastern Africa	0.2782	0.2879
Middle Africa	0.2603	0.2530
Northern Africa	0.3692	0.3403
Southern Africa	0.3505	0.3893
Western Africa	0.2156	0.2110
Americas	**0.4790**	**0.4936**
Caribbean	0.4454	0.4480
Central America	0.4295	0.4604
Northern America	0.8479	0.8408
South America	0.4869	0.5072
Asia	**0.4424**	**0.4470**
Central Asia	0.4239	0.3881
Eastern Asia	0.6470	0.6443
Southern Asia	0.3248	0.3395
South-Eastern Asia	0.4250	0.4290
Western Asia	0.4732	0.4857
Europe	**0.6227**	**0.6490**
Eastern Europe	0.5449	0.5689
Northern Europe	0.7113	0.7721
Southern Europe	0.5566	0.5648
Western Europe	0.7165	0.7329
Oceania	**0.4193**	**0.4338**
World average	**0.4406**	**0.4514**

Figure 4.2 **E-government development in Africa**



Map 4.1 **Sub-regions of Africa**

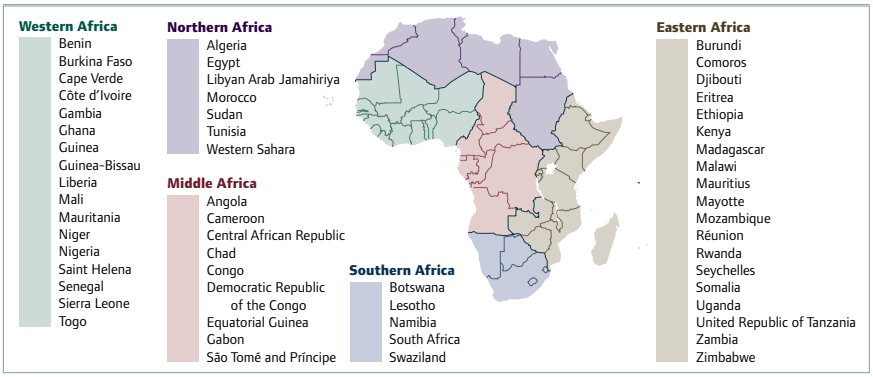


Table 4.3 **Top ranked countries in Africa**

Rank	Country	E-government development index value 2010	E-government development index value 2008	World e-government development ranking 2010	World e-government development ranking 2008
1	Tunisia	0.4826	0.3458	66	124
2	Mauritius	0.4645	0.5086	77	63
3	Egypt	0.4518	0.4767	86	79
4	South Africa	0.4306	0.5115	97	61
5	Seychelles	0.4179	0.4942	104	69
6	Cape Verde	0.4054	0.4158	108	104
7	Libya	0.3799	0.3546	114	120
8	Botswana	0.3637	0.3647	117	118
9	Lesotho	0.3512	0.3805	121	114
10	Gabon	0.3420	0.3228	123	129
	World average	0.4406	0.4514		

Seychelles dropped by 35 positions. Seychelles has the best infrastructure and education indices, which explains its high ranking in the region.

Zambia (0.2810) and Zimbabwe (0.3230) both improved in e-government development. Zambia jumped 15 positions to stand at 143rd in the 2010 Survey ranking and Zimbabwe jumped 12 positions to rank the 129th.

Table 4.4 **E-government development in Eastern Africa**

Country	E-government development index value 2010	E-government development index value 2008	World e-government development ranking 2010	World e-government development ranking 2008
Mauritius	0.4645	0.5086	77	63
Seychelles	0.4179	0.4942	104	69
Kenya	0.3338	0.3474	124	122
Zimbabwe	0.3230	0.3000	129	137
United Republic of Tanzania	0.2926	0.2929	137	143
Madagascar	0.2890	0.3065	139	135
Uganda	0.2812	0.3133	142	133
Zambia	0.2810	0.2266	143	158
Rwanda	0.2749	0.2941	148	141
Malawi	0.2357	0.2878	159	146
Comoros	0.2327	0.1896	160	170
Mozambique	0.2288	0.2559	161	152
Djibouti	0.2059	0.2279	170	157
Ethiopia	0.2033	0.1857	172	172
Burundi	0.2014	0.1788	174	174
Eritrea	0.1859	0.1965	175	169
Somalia	…	…	…	…
Sub-regional average	0.2782	0.2879		
World average	0.4406	0.4514		

Notwithstanding the overall low scores of the e-government development index in the region, some countries have managed to improve their Web presence either in national portals or ministry websites.

Kenya's national portal received the highest score in the region, followed by Mauritius and Madagascar. Ethiopia registered the third highest online service score in the region, whilst its infrastructure and education indices hindered it from scoring higher in the e-government development index.

The websites of most ministries in the region provide basic information, but e-services are generally not available. The Ministry of Education of Mauritius scored the highest among ministries in the region.

Middle Africa

The majority of countries in Middle Africa generally scored higher in the 2010 Survey and improved their respective rankings.

Gabon (0.3420) leads the sub-region in the 2010 Survey and has moved up six positions compared to the 2008 Survey. This should be attributed to Gabon's edge in infrastructure and education indices. São Tomé and Príncipe (0.3258) stands at the second position in the ranking, followed by Angola (0.3110) and Congo (0.3019).

Table 4.5 **E-government development in Middle Africa**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Gabon	0.3420	0.3228	123	129
São Tomé and Príncipe	0.3258	0.3215	128	130
Angola	0.3110	0.3328	132	127
Congo	0.3019	0.2737	135	148
Equatorial Guinea	0.2902	0.2890	138	145
Cameroon	0.2722	0.2734	149	149
Democratic Republic of the Congo	0.2357	0.2177	158	162
Central African Republic	0.1399	0.1412	181	179
Chad	0.1235	0.1047	182	182
Sub-regional average	0.2603	0.2530		
World average	0.4406	0.4514		

In the area of 'online service assessment', Cameroon's ministries of health and education enjoyed the highest scores among all ministries in the region. These ministries were the only ones in the region to benefit from some degree of citizen involvement.

Northern Africa

The region as a whole performed better in the 2010 Survey. Tunisia (0.4826) received the highest score in the region, followed by Egypt (0.4518), Libya (0.3799) and Morocco (0.3287). Tunisia's Ministry of Finance provides a number of e-services and a wealth of information and scored the highest among all ministries in the region. In addition, each ministry's websites in Tunisia (health, education, labour and social services) all receive the highest scores in the region in its respective category.

Egypt stands the second in the regional ranking, but its national portal enjoys the highest ranking in the region. Egypt and Algeria both regressed in the 2010 Survey, falling to the 86th and 131st positions respectively. Morocco has jumped 14 positions to a global rank of 126th. Libya and Sudan have improved their rankings as well since the 2008 Survey.

Libya continues to lead in the human capacity index, followed by Tunisia and Algeria. The telecommunication infrastructure in the region remains low compared to other regions, with Tunisia having the highest infrastructure index. Morocco leads the region with the highest ratio of Internet users per 100 inhabitants.

Table 4.6 **E-government development in Northern Africa**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Tunisia	0.4826	0.3458	66	124
Egypt	0.4518	0.4767	86	79
Libya	0.3799	0.3546	114	120
Morocco	0.3287	0.2944	126	140
Algeria	0.3181	0.3515	131	121
Sudan	0.2542	0.2186	154	161
Sub-regional average	0.3692	0.3403		
World average	0.4406	0.4514		

Box 4.3 **AfriAfya, Kenya**

Kenya: AfriAfya

AfriAfya, the African Network for Health Knowledge Management and Communication is comprised of seven of the largest health NGOs in Kenya with the goal of harnessing ICTs to improve community health in rural and other marginalized Kenyan communities. The network provides communities with relevant up-to-date health information through a two-way communication with health-care providers.

http://www.afriafya.org/

Box 4.4 **Cyber Ethiopia**

Ethiopia: Cyber Ethiopia

The Amharic language has Africa's oldest script, which has been used for written communication since 100 B.C. The CyberEthiopia initiative has converted the Amharic script so that it is Web-friendly, responding to the challenge of digital multilingualism and the development of the local script for digital use. The use of the Amharic script on the Internet facilitates Ethiopia's digital inclusion and full participation in the information society.

http://www.cyberethiopia.com

Box 4.5 **Algeria alerts citizens to their new national hotline for H1N1**

Algeria: H1N1 National Hotline

On the national portal of Algeria http://www.ands.dz/ there is a link titled "Alerte Grippe Porcine", for the H1N1 flu. The feature takes the user to a portal page with a specific section for health care professionals along with resources for citizens with links to information and medical resources, a new telephone hot line number, audios from radio spots sharing information on symptoms to watch for and hygiene protocol, and weekly health newsletters have been archived.

http://www.ands.dz/

Southern Africa

All the countries in Southern Africa scored lower in the 2010 Survey than they did two years ago. South Africa (0.4306) continues to lead the region, but it also witnessed the most dramatic drop in rank, to 97th in the 2010 Survey. Botswana, Lesotho and Namibia have maintained the similar e-government rankings in 2010 Survey as compared to the 2008 Survey. Swaziland did not receive any scores in the online service index because none of its websites could be opened during the review period.

The Western Africa region is the lowest ranking region in the 2010 Survey, showing virtually no improvement since the 2008 Survey. This should be mainly attributed to poor telecommunications infrastructure and low human capacity in the region. Broadband access is practically non-existent in the region, and the best case is Cape Verde with only 1.48 subscribers per 100 inhabitants.

Table 4.7 **E-government development in Southern Africa**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
South Africa	0.4306	0.5115	97	61
Botswana	0.3637	0.3647	117	118
Lesotho	0.3512	0.3805	121	114
Namibia	0.3314	0.3445	125	126
Swaziland	0.2757	0.3454	145	125
Sub-regional average	0.3505	0.3893		
World average	0.4406	0.4514		

Cape Verde (0.4054) leads the regions thanks to its higher telecommunication infrastructure and human capacity components, followed by Côte d'Ivoire (0.2805) and Ghana (0.2754).

Côte d'Ivoire enjoys the highest online service score followed by Cape Verde, Mali, Senegal and Burkina Faso. Côte d'Ivoire also experienced the most significant change in rankings as compared to the 2008 Survey, gaining 29 positions to rank 144th globally. Côte d'Ivoire barely had a Web presence in 2008 but the current survey finds that the national and ministry websites are much more robust and offer a wealth of information. Mauritania also improved its ranking by 9 positions from the 2008 Survey to rank 157th globally. Other countries remained essentially unchanged in global rankings.

Western Africa

Table 4.8 **E-government development in Western Africa**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Cape Verde	0.4054	0.4158	108	104
Côte d'Ivoire	0.2805	0.1853	144	173
Ghana	0.2754	0.2997	147	138
Nigeria	0.2687	0.3063	150	136
Mauritania	0.2359	0.2028	157	168
Senegal	0.2241	0.2531	163	153
Togo	0.2150	0.2191	165	160
Liberia	0.2133	0.2170	166	163
Gambia	0.2117	0.2253	167	159
Benin	0.2017	0.1860	173	171
Mali	0.1815	0.1591	176	175
Sierra Leone	0.1697	0.1463	177	178
Burkina Faso	0.1587	0.1542	178	176
Guinea-Bissau	0.1561	0.1521	179	177
Guinea	0.1426	0.1402	180	180
Niger	0.1098	0.1142	183	181
Sub-regional average	0.2156	0.2110		
World average	0.4406	0.4514		

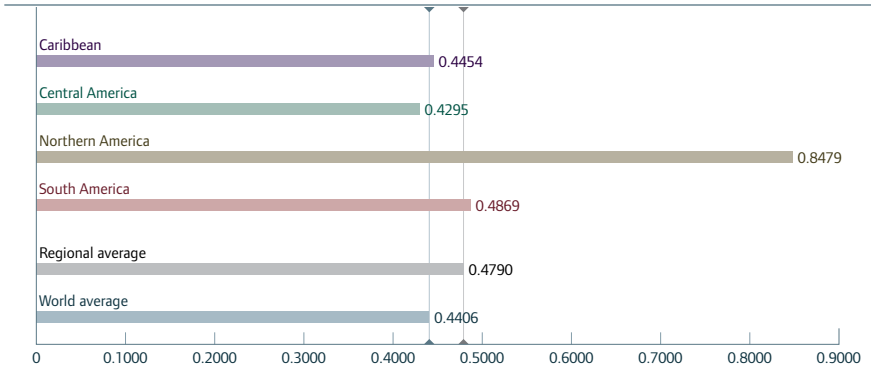
Any substantive progress in e-government development in the region is likely to be a long way off, given its poor telecommunication infrastructure, low human resources capacity and the amount of investment required – which far exceeds the financial capacity of the region. Despite limited resources, a few countries managed to improve their e-government. The national website of Benin features podcasting and online forums with a dozen thematic areas for its citizen's participation. Ghana's national website utilizes a 'social media' box featuring tools such as YouTube and containing direct links to the Facebook accounts of government officials in the Ministry of Information.

4.2.2 E-government in the Americas

Figure 4.3 illustrates that the status of e-government development in Northern America, which is far ahead of other regions. The region's two countries, the United States and Canada, enjoy the second and third global ranking respectively in the 2010 Survey. Central America is the only region in the Americas that registered a regional average below that of the world average, though many developing countries in this region scored above the world average.

Among the top 10 countries in the Americas, five countries are from South America, three are from the Caribbean, and one is from Central America.

Figure 4.3 **E-government development in the Americas**



Caribbean

In the 2010 Survey, the Caribbean region witnessed some improvement and consequently elevated its score above the world average. In the 2008 Survey, its e-government development index was slightly below the world average.

Table 4.10 **E-government development in the Caribbean**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Barbados	0.5714	0.5667	40	46
Antigua and Barbuda	0.5154	0.4485	55	96
Bahamas	0.4871	0.4911	65	71
Trinidad and Tobago	0.4806	0.5307	67	54
Saint Kitts and Nevis	0.4691	0.4814	75	78
Dominican Republic	0.4557	0.4943	84	68
Saint Lucia	0.4471	0.4746	88	80
Jamaica	0.4467	0.4679	89	85
Saint Vincent and the Grenadines	0.4355	0.4306	94	98
Cuba	0.4321	0.3990	96	111
Grenada	0.4277	0.4545	99	92
Dominica	0.4149	0.3746	105	116
Haiti	0.2074	0.2097	169	165
Sub-regional average	0.4454	0.4480		
World average	0.4406	0.4514		

Barbados (0.5714) continues to lead the region thanks to its better telecommunication infrastructure and higher adult literacy and gross enrolment, followed by Antigua and Barbuda (0.5154) and the Bahamas (0.4871). Barbados leads the Caribbean in both Internet users and broadband subscribers per 100 inhabitants. This advantage allowed Barbados to maintain its e-government edge despite the fact that other countries scored more highly in online services.

Map 4.2 **Sub-regions of the Americas**

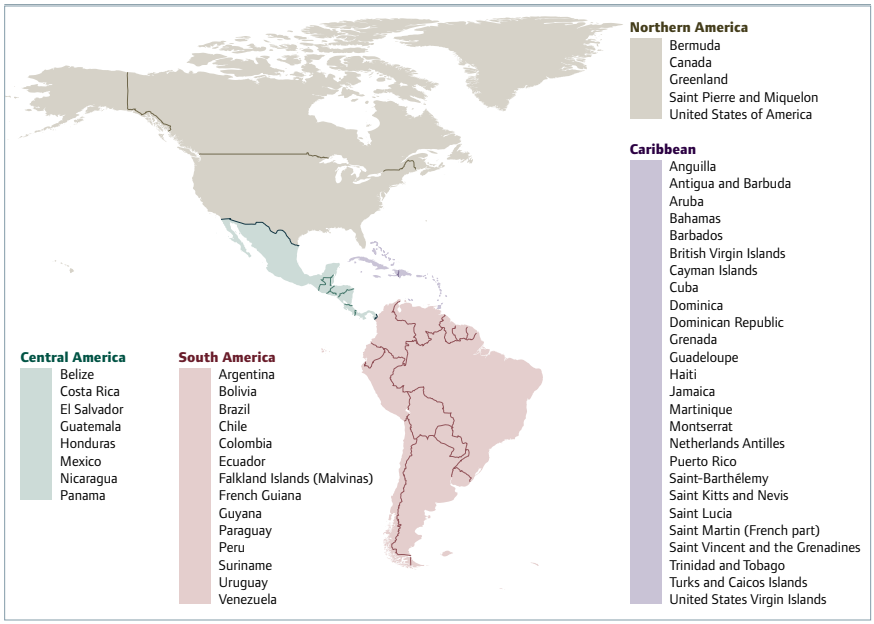


Table 4.9 **Top ranked countries in the Americas**

Rank	Country	E-government development index value		World e-government development ranking	
		2010	2008	2010	2008
1	United States	0.8510	0.8644	2	4
2	Canada	0.8448	0.8172	3	7
3	Colombia	0.6125	0.5317	31	52
4	Chile	0.6014	0.5819	34	40
5	Uruguay	0.5848	0.5645	36	48
6	Barbados	0.5714	0.5667	40	46
7	Argentina	0.5467	0.5844	48	39
8	Antigua and Barbuda	0.5154	0.4485	55	96
9	Mexico	0.5150	0.5893	56	37
10	Brazil	0.5006	0.5679	61	45
	World average	0.4406	0.4514		

Barbados is the first country in the region to have an integrated single-sign-on service for its national portal. Single-sign-on services allow citizens greater ease and flexibility in performing necessary online tasks with the government.

Antigua and Barbuda saw the biggest increase in the global ranking by 41 positions to rank 55th globally. Cuba and Dominica also had their rankings increase significantly over the 2008 Survey by 15 and 11 positions respectively. Cuba is now ranked 96th and Dominica 105th globally.

The Dominican Republic, Trinidad and Tobago and Cuba led the region in the area of online services. Top scores in ministry sites were received by Education and Labour in the Dominican Republic along with the Ministry of Health in Cuba.

The Dominican Republic's Ministry of Labour offers key user services to citizens, including Empleateya.net, an employment seeking portal with polls and online form submissions and a related website, FlujoMigratorio, for tracking emigration and employment in Spain.

The national portal for Grenada integrates great design with social media elements that enable its citizens, especially youth, to share information on social networking platforms with the government.

The Ministry of Finance of Trinidad and Tobago has implemented a Web-based procurement tool, Finance.gov.tt, that allows suppliers to bid online for contracts to supply of goods or services.

Central America

The region of Central America has regressed in relative terms since the 2008 Survey, when it scored higher above the world average. In the 2010 Survey, its e-government scoring falls below the world average. The vast majority of countries in the region received lower scores in the 2010 Survey as compared to the 2008 Survey. Mexico (0.5150) leads the region followed by Costa Rica (0.4749) and El Salvador (0.4700).

Mexico experienced the most significant drop in global rankings. It fell by 19 positions from the 2008 Survey to the 2010 Survey and is currently ranked 56th globally. The degeneration of Mexico's e-government is mainly attributed to the much lower score for online services, which dropped from 0.7057 to 0.4413. The following countries also saw significant drops, with Costa Rica down by 12 positions, Guatemala by 13 positions and Belize by 13 positions.

Table 4.11 **E-government development in Central America**

	E-government development index value		World e-government development ranking	
Country	2010	2008	2010	2008
Mexico	0.5150	0.5893	56	37
Costa Rica	0.4749	0.5144	71	59
El Salvador	0.4700	0.4974	73	67
Panama	0.4619	0.4718	79	83
Honduras	0.4065	0.4048	107	110
Guatemala	0.3937	0.4283	112	99
Nicaragua	0.3630	0.3668	118	117
Belize	0.3513	0.4102	120	107
Sub-regional average	0.4295	0.4604		
World average	0.4406	0.4514		

Northern America

The United States and Canada continue to score high in the 2010 Survey. The United States (0.8510) was ranked the second and Canada (0.8448) was ranked the third globally. The United States and Canada were also ranked the second and the third respectively in the online service index. Both countries have well-developed portals with a wide spectrum of e-services for their citizens. They have both created a favorable environment to encourage citizens to participate in decision-making around political issues and to provide feedback.

Table 4.12 **E-government development in Northern America**

	E-government development index value		World e-government development ranking	
Country	2010	2008	2010	2008
United States	0.8510	0.8644	2	4
Canada	0.8448	0.8172	3	7
Sub-regional average	0.8479	0.8408		
World average	0.4406	0.4514		

Canada has a strong online presence with a national portal that offers quick access to government programmes and information on popular services. It links to Service Canada, a robust e-services portal for citizens, Canada Business for entrepreneurs and Canada International for Canadians living abroad. The national portal also has a 'My Government Account' feature that provides a

single point of access for a citizen to manage a personalized set of links to the information and services offered by the Government of Canada. A mobile wireless portal is being developed to provide news, directories and other information.

The national portal of the United States is a leader in e-government. The USA.gov homepage links to more than 100 online government services and transactions. A navigational tool bar organizes information in categories for citizens, business and non-profit organizations, government employees, and visitors to the country. It then breaks these categories down even further so users can quickly locate the information and services. In addition, the national portal also offers its general information in 88 languages with extensive online services for foreigners wishing to conduct business, work, study and travel in the United States. It also includes live personal assistance via 'Live Help/Web Chat'. The site also makes it very easy to connect and communicate with the government via social media tools such as YouTube, Twitter, Facebook and the 'Gov Gab Blog', where bloggers share tips and information from the Federal government and where citizens can comment and share their own experiences.

In response to the global economic crisis, the national portal also provides a link to Recovery.gov, which offers information and data on the current economic crisis, tracking of the recovery funding, and how citizens can benefit from it.

South America

Colombia (0.6125) enjoys the highest global ranking in the region in the 2010 Survey, climbing by 21 positions from the 2008 Survey. It ranked higher than Chile, Argentina, Brazil and Uruguay. Chile (0.6014) and Uruguay (0.5848) stand second and third in the region.

The national portal of Colombia features a variety of online services, especially with the procedures and services section, which allows citizens to search by department or region. The site also provides a link to Programa Gobierno en Linea, a comprehensive and user-friendly information resource about e-government activities that is easy to navigate. Colombia's national website also features e-Cuidadano, an initiative on digital literacy through which citizens can take courses and become certified.

Box 4.6 **Panama's Primera Dama**

Panama: The First Lady's website Primera Dama

The First Lady's website Primera Dama is making a considerable effort to support the poor and women. Her site can be browsed by a direct link from the national website and has a national campaign of 'No Violence Against Women'. In conjunction with the Ministry of Agricultural Development, a micro-credit initiative was implemented to support rural and indigenous women. The initiative, which is promoted on the First Lady's website, is geared to improving the economic activity in the community that is dedicated to domestic activities and production for food consumption.

http://www.presidencia.gob.pa

Box 4.7 **Guatemala e-procurement**

Guatemala: E-procurement Website

Guatemala has well-organized e-procurement website linked directly from the national website as well as from most of the ministry websites. It provides information about the contracts and procurement system of the state, with comprehensive e-government features and services including registration with authentication and viewing of contracts awarded. It lists all opportunities for suppliers and products for buyers.

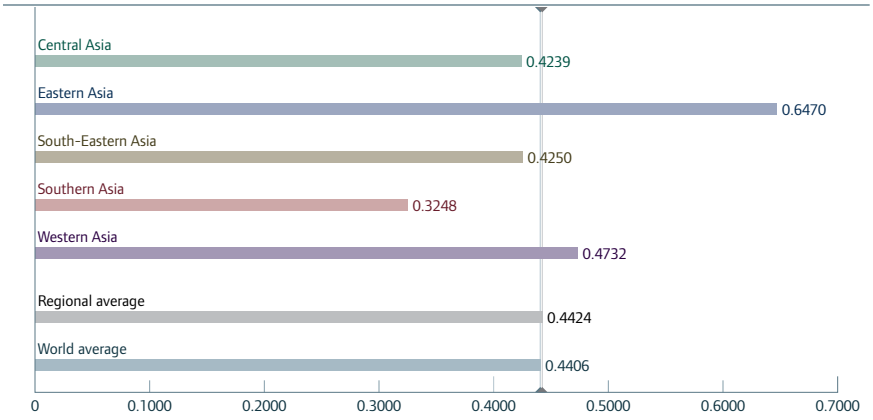
http://www.guatecompras.gt/

The website of the Ministry of Labour of Peru was the only ministry site in the region to offer a page, Revalora Perú, dedicated to unemployment in light of the global economic crisis. It explains the government's reponse and features a special programme on labour restructuring and government stimulus activities.

Table 4.13 **E-government development in South America**

	E-government development index value		World e-government development ranking	
Country	2010	2008	2010	2008
Colombia	0.6125	0.5317	31	52
Chile	0.6014	0.5819	34	40
Uruguay	0.5848	0.5645	36	48
Argentina	0.5467	0.5844	48	39
Brazil	0.5006	0.5679	61	45
Peru	0.4923	0.5252	63	55
Venezuela	0.4774	0.5095	70	62
Ecuador	0.4322	0.4840	95	75
Bolivia	0.4280	0.4867	98	72
Paraguay	0.4243	0.4654	101	88
Guyana	0.4140	0.4375	106	97
Suriname	0.3283	0.3472	127	123
Sub-regional average	0.4869	0.5072		
World average	0.4406	0.4514		

Figure 4.4 **E-government development in Asia**



Map 4.3 **Sub-regions of Asia**

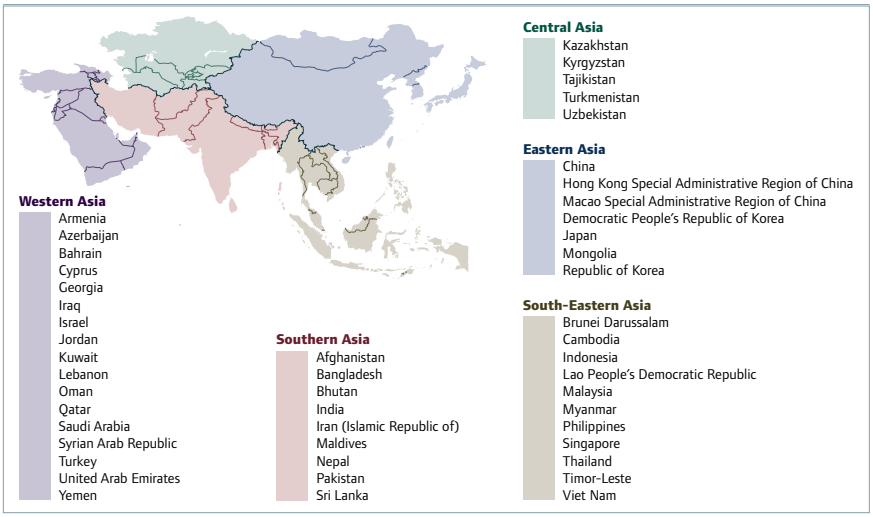


Table 4.14 **Top ranked countries in Asia**

Rank	Country	E-government development index value		World e-government development ranking	
		2010	2008	2010	2008
1	Republic of Korea	0.8785	0.8317	1	6
2	Singapore	0.7476	0.7009	11	23
3	Bahrain	0.7363	0.5723	13	42
4	Japan	0.7152	0.7703	17	11
5	Israel	0.6552	0.7393	26	17
6	Malaysia	0.6101	0.6063	32	34
7	Cyprus	0.5705	0.6019	42	35
8	Kazakhstan	0.5578	0.4743	46	81
9	United Arab Emirates	0.5349	0.6301	49	32
10	Kuwait	0.5290	0.5202	50	57
	World average	0.4406	0.4514		

Uruguay offers customized online services through Mi Portal, a prominent link on the home page of the national website. Mi Portal offers strong online features organized by thematic areas for citizens, business and government.

Argentina's Ministry of Health provides an official page on the H1N1 flu virus with downloadable videos, informational pamphlets and links to virtual libraries. Argentina's Ministry of Labour dedicates sections of its homepage to special topics such as child labour, women in the workplace and war veterans.

Bolivia's Ministry of Health and Sports (Social Welfare) offers a one-stop portal at Promocion de la Salud that covers special topics ranging from gender violence to environmental health to disability.

4.2.3 E-government in Asia

The Asian region presents a mixed picture with Eastern Asia far exceeding the world average for e-government development while Southern Asia lags far behind, as illustrated in figure 4.4. This dichotomy also mirrors the income disparities between the two regions. Central and South-Eastern Asia are slightly lower than the world average, while Western Asia is above the world average.

Table 4.14 shows that the Republic of Korea, Singapore and Bahrain enjoy the top three rankings in the region. Five countries from Western Asia made the top 10 in the region. Eastern Asia and South-East Asia, each had two countries in the top 10, while Central Asia had one country in the top 10.

Central Asia

Table 4.15 **E-government development in Central Asia**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Kazakhstan	0.5578	0.4743	46	81
Uzbekistan	0.4498	0.4057	87	109
Kyrgyzstan	0.4417	0.4195	91	102
Tajikistan	0.3477	0.3150	122	132
Turkmenistan	0.3226	0.3262	130	128
Sub-regional average	0.4239	0.3881		
World average	0.4406	0.4514		

Central Asia has made the most significant improvement as a region from the 2008 Survey, with Kazakhstan (0.5578) making one of the most dramatic leaps in the 2010 Survey to continue

to lead the region. Uzbekistan, Kyrgyzstan and Tajikistan have all improved their national and ministry websites.

Among national portals, Kyrgyzstan received the highest ranking in the region. The national portal includes transactional aspects and was is strong on citizen engagement.

Eastern Asia

The Republic of Korea (0.8785) was the highest ranking country in the 2010 Survey and its national portal also received the highest ranking. It scored particularly high in providing e-services and tools for citizen engagement. The ministries of health, education and social welfare scored the highest among ministries.

Table 4.16 **E-government development in Eastern Asia**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Republic of Korea	0.8785	0.8317	1	6
Japan	0.7152	0.7703	17	11
Mongolia	0.5243	0.4735	53	82
China	0.4700	0.5017	72	65
Democratic People's Republic of Korea	…	…	…	…
Sub-regional average	0.6470	0.6443		
World average	0.4406	0.4514		

Japan (0.7152) ranked second in the region in the 2010 Survey, dropping down one place from the previous survey. Mongolia (0.5243) gained 29 positions to be ranked 53rd globally, a dramatic rise due primarily by efforts to enhance its national portal and ministry websites to offer more e-services available and more online content.

China fell slightly in the 2010 Survey and the Democratic People's Republic of Korea has a very limited Web presence as in the 2008 Survey.

The national portal of Japan was ranked the second highest in Asia. The portal is rich in e-information and content and provides extensive links to ministries and key government resources.

The Ministry of Finance of Mongolia scored the highest in the region for its category. Its portal provides comprehensive e-services and opportunities for citizens to provide feedback.

The Ministry of Finance of Mongolia provides a portal for e-procurement where users can register for online bids, sort through different types of tenders, see upcoming tenders, and find out results of previous tenders. E-Procurement is available in the Mongolian and English languages. There is a newsletter and additional information regarding legislation, bidding and guidelines.

Southern Asia

Table 4.17 **E-government development in Southern Asia**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Maldives	0.4392	0.4491	92	95
Iran (Islamic Rep. of)	0.4234	0.4067	102	108
Sri Lanka	0.3995	0.4244	111	101
India	0.3567	0.3814	119	113
Bangladesh	0.3028	0.2936	134	142
Pakistan	0.2755	0.3160	146	131
Bhutan	0.2598	0.3074	152	134
Nepal	0.2568	0.2725	153	150
Afghanistan	0.2098	0.2048	168	167
Sub-regional average	0.3248	0.3395		
World average	0.4406	0.4514		

In this region, most portals and websites have remained stagnant since the 2008 Survey in terms of developing new features. As a result, the region as a whole has regressed in the 2010 Survey and remains far below the world average. Maldives (0.4392) continues to lead the region because it gained the highest scores for infrastructure and education indices. Nevertheless, its online services received very low scores and made very limited progress in overall e-government development. Iran (0.4234) and Bangladesh (0.3028) are the two

Box 4.8 **Kazakhstan – putting citizens first**

Kazakhstan: User-friendly site

The national website of Kazakhstan is a user-friendly one-stop-shop that allows a one click access to E-Gov.kz, the country's e-government portal, which offers a comprehensive selection of e-services for citizens. The portal also provides information on the national e-government development programme with 17 different projects aimed at improving services to the citizen in a convenient (online) and cost-effective manner. E-services include e-payments, e-documents, e-registrations, e-signatures, e-forms, etc. The portal also contains videos and educational programmes for children, online discussions and consultations, and other citizen engagement tools. This distinctive approach is intended to enhance the role of the government and facilitate building citizens' trust in government authoritiest.

E-Gov.kz

Box 4.9 **Japanese portal provides access to statistical information**

Japan: Statistical information portals

Japan's E-Stat portal is directly accessible and prominently featured on the extensive national e-government portal. A user-friendly interface provides users with options to gain easy access to official Japanese statistics, learn about meta data, understand statistical systems and study statistics. There is also a search option to find further statistics by ministries and government agencies. Users can securely register to receive email updates on statistics and have the option to subscribe to RSS Feeds. A mobile version of the portal is also available.

http://www.e-stat.go.jp/
http://www.e-gov.go.jp/
http://e-stat.go.jp/SG1/estat/mbTopE.do/

Box 4.10 **Republic of Korea's national portal**

Republic of Korea: National portals

The Republic of Korea's national portal is exceptional in its design and provision of features to its citizens. It is an integrated system allowing citizens easy access to government information and contains features for mobile alerts, forms, transactions and online consultation. For e-participation, users are connected to ePeople, a single online service that integrates the e-services of all government agencies. The aim of ePeople is to improve the transparency of government administration, improve corruption reporting and engage citizens through petitions, proposals and policy discussions. Users are connected to a secure login portal for all e-government transactions and form submissions.

http://www.korea.go.kr/
http://www.epeople.go.kr/
http://egov.go.kr/

Box 4.11 **Singapore spearheads development of mobile services**

Singapore: Mobile government

Singapore's mobile cellular market is characterized by energy and innovation with some 6.5 million mobile devices in use for a penetration rate of 136 percent. Mobile service delivery is a strategic initiative of the country's iGov2010 master plan. Citizens and businesses have expressed a high level of satisfaction and enjoy the convenience of accessing more than 300 public services through mobile technology. The next wave of mobile services planned by the Singapore Infocomm Development Authority will support even more 24/7 transactions, including some that use near field technology to enable payment of train and bus fares, redemption of e-coupons, and even the opening of doors with the tap of a phone against a wireless reader. Commercial relationships between mobile cellular companies and network providers help ensure availability of the requisite technology.

http://www.ecitizen.gov.sg/mobile/

exceptions, both having significantly improved their government development scores and global rankings in 2010 Survey.

Among national portals in the region, India has the highest ranking portal with the highest online services score. It has the most e-services and tools for citizen engagement in the region.

South-Eastern Asia

The national portal of Singapore has an organized and effective online approach to providing information to its users through portals and micro-sites. Each main tab directs its site visitors to portals by user group. Businesses access EnterpriseOne, a portal with e-services and information tailored to businesses. Citizens and residents are directed to E-Citizen, an e-services portal that features the personlized single sign-on site SingPass for payment services and mobile services.

Table 4.18 **E-government development in South-Eastern Asia**

	E-government development index value		World e-government development ranking	
Country	2010	2008	2010	2008
Singapore	0.7476	0.7009	11	23
Malaysia	0.6101	0.6063	32	34
Brunei Darussalam	0.4796	0.4667	68	87
Thailand	0.4653	0.5031	76	64
Philippines	0.4637	0.5001	78	66
Viet Nam	0.4454	0.4558	90	91
Indonesia	0.4026	0.4107	109	106
Cambodia	0.2878	0.2989	140	139
Myanmar	0.2818	0.2922	141	144
Lao People's Democratic Republic	0.2637	0.2383	151	156
Timor-Leste	0.2273	0.2462	162	155
Sub-regional average	**0.4250**	**0.4290**		
World average	**0.4406**	**0.4514**		

Box 4.12 **Malaysia – utilizing mobile technology**

Malaysia: mySMS system

Malaysia's mySMS system won the 2009 APICTA award given to projects of creativity and excellence in ICT in Malaysia. The system enables users to receive information on demand, documents on demand, and broadcast information from government agencies, including emergency information to basic notifications. The system also allows users to provide complaints to government agencies.

Western Asia

The majority of countries in this region have witnessed noticeable changes in their respective rankings. Bahrain (0.7363) has emerged as the new leader in the region.

Launched in early 2009, Bahrain's e-government portal system provides its citizens with a wealth of information, e-services and links to national and ministry sites. 'E-Government for a Better Life' is the motto for the government's initiative. E-participation and citizen engagement features are accessible throughout the portal sites. The government publishes a Customer Charter available in the page footer.

Table 4.19 **E-government development in Western Asia**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Bahrain	0.7363	0.5723	13	42
Israel	0.6552	0.7393	26	17
Cyprus	0.5705	0.6019	42	35
United Arab Emirates	0.5349	0.6301	49	32
Kuwait	0.5290	0.5202	50	57
Jordan	0.5278	0.5480	51	50
Saudi Arabia	0.5142	0.4935	58	70
Qatar	0.4928	0.5314	62	53
Turkey	0.4780	0.4834	69	76
Oman	0.4576	0.4691	82	84
Azerbaijan	0.4571	0.4609	83	89
Lebanon	0.4388	0.4840	93	74
Georgia	0.4248	0.4598	100	90
Armenia	0.4025	0.4182	110	103
Syrian Arab Republic	0.3103	0.3614	133	119
Iraq	0.2996	0.2690	136	151
Yemen	0.2154	0.2142	164	164
Sub-regional average	**0.4732**	**0.4857**		
World average	**0.4406**	**0.4514**		

Israel (0.6552), Cyprus (0.5705) and United Arab Emirates (0.5349), were ranked as the second, the third and the fourth in the region. Although Israel scored lower in the 2010 Survey, its Ministries of Finance and Labour scored the highest in the region. The national portal of Cyprus scored high within the region; it provided e-tools to empower citizens to dialogue with the government.

Iraq, Oman, Saudi Arabia and Turkey improved their rankings in the 2010 Survey, while Azerbaijan, Jordan, Kuwait, Lebanon and Syria dropped to lower positions.

Oman's Ministry of Education promotes e-learning by having its own e-learning system that features virtual classrooms and a self-learning system. Communication can occur via audio, video and text. The Ministry also employs an SMS feature for parents. Through Oman Mobile, the Ministry has set up a system that allows parents to follow their children's school performance on mobile phones. Parents can track student attendance, receive calls to visit the school, learn about temporary suspensions, pull student ID, and receive grade reports.

Saudi Arabia's national portal features links to 215 e-services. While not a single-sign-on system, the electronic portal easily connects its citizens to the online services of various government agencies for such purposes as obtaining personal documents, filing complaints, utilizing business services and paying utilities. In conjunction with this directory of e-services is SADAD, an e-payment system through which the Kingdom of Saudi Arabia facilitates and streamlines bill payment transactions.

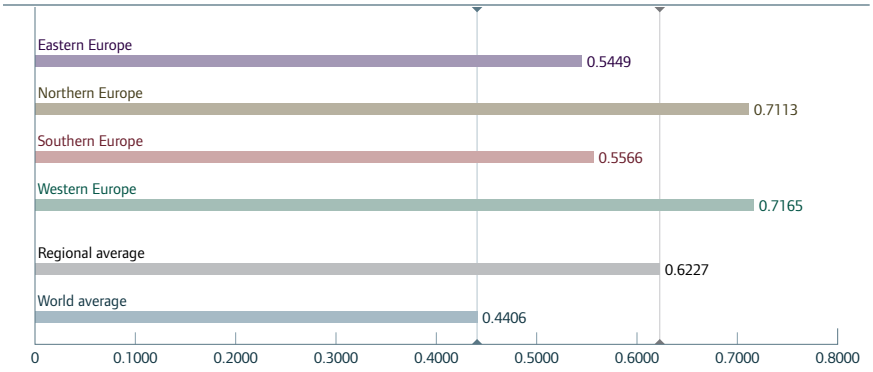
4.2.4 E-government in Europe

All European sub-regions excel in the e-government development index and achieve high scores far above world average. Drawing on the advantages of the well-developed telecommunication infrastructure and high human resources capacity, Western and Northern Europe perform especially well in e-government development, followed by Southern and Eastern Europe. Many countries in Europe are high-income developed countries, and this advantage is reflected in the ranking shown in figure 4.5.

Table 4.20 **Top ranked countries in Europe**

Rank	Country	E-government development index value		World e-government development ranking	
		2010	2008	2010	2008
1	United Kingdom	0.8147	0.7872	4	10
2	Netherlands	0.8097	0.8631	5	5
3	Norway	0.8020	0.8921	6	3
4	Denmark	0.7872	0.9134	7	2
5	Spain	0.7516	0.7228	9	20
6	France	0.7510	0.8038	10	9
7	Sweden	0.7474	0.9157	12	1
8	Germany	0.7309	0.7136	15	22
9	Belgium	0.7225	0.6779	16	24
10	Switzerland	0.7136	0.7626	18	12
	World average	**0.4406**	**0.4514**		

Figure 4.5 **E-government development in Europe**



Map 4.4 **Sub-regions of Europe**

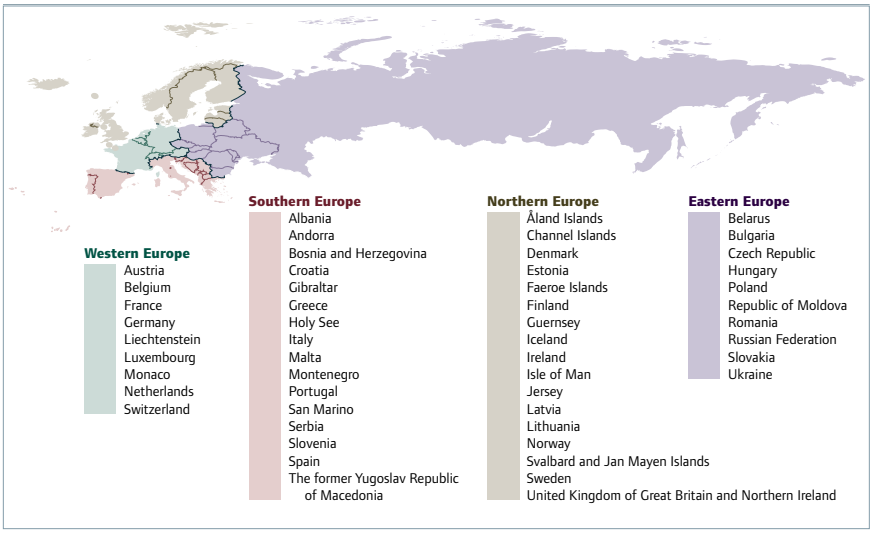


Table 4.20 shows that the United Kingdom emerged as the new leader in Europe in the 2010 Survey, followed by the Netherlands. In the top 10 list, Western Europe had five countries, Northern Europe had four countries, Southern Europe had one country and there were no countries from Eastern Europe.

Eastern Europe

The region as a whole has not changed much since the 2008 Survey. In the 2010 Survey, Hungary (0.6315) has moved ahead of the Czech Republic (0.6060) to lead the region. The national portal of Hungary was ranked the highest in the region. Poland and Ukraine moved down in the rankings. The Republic of Moldova (0.4611) moved up 13 positions to be ranked 80th globally.

Table 4.21 **E-government development in Eastern Europe**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Hungary	0.6315	0.6494	27	30
Czech Republic	0.6060	0.6696	33	25
Slovakia	0.5639	0.5889	43	38
Bulgaria	0.5590	0.5719	44	43
Poland	0.5582	0.6134	45	33
Romania	0.5479	0.5383	47	51
Ukraine	0.5181	0.5728	54	41
Russian Federation	0.5136	0.5120	59	60
Belarus	0.4900	0.5213	64	56
Republic of Moldova	0.4611	0.4510	80	93
Sub-regional average	0.5449	0.5689		
World average	0.4406	0.4514		

The website of the Ministry of Finance of Ukraine scored the highest among ministries based on its content and citizen engagement, although e-services were limited. The Ministry of Finance of Romania also scored high for the region due to the availability of a number of e-services as well as extensive content.

Northern Europe

Table 4.22 **E-government development in Northern Europe**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
United Kingdom	0.8147	0.7872	4	10
Norway	0.8020	0.8921	6	3
Denmark	0.7872	0.9134	7	2
Sweden	0.7474	0.9157	12	1
Finland	0.6967	0.7488	19	15
Estonia	0.6965	0.7600	20	13
Ireland	0.6866	0.7296	21	19
Iceland	0.6697	0.7176	22	21
Lithuania	0.6295	0.6617	28	28
Latvia	0.5826	0.5944	37	36
Sub-regional average	0.7113	0.7721		
World average	0.4406	0.4514		

The United Kingdom (0.8147) enjoys the highest ranking in Europe. The national portal of the United Kingdom was ranked the third in the 2010 Survey. The Scandinavian countries as a whole scored lower. Sweden dropped from first position in the 2008 Survey to the 12th in global ranking in the 2010 Survey, which is mainly attributed to the regression of its online services.

With the exception of the United Kingdom, all the countries in the region had lower e-government indexes in the 2010 Survey.

The United Kingdom offers a comprehensive and user-friendly national portal. The home page features 16 categories of information most often accessed, e.g. Motoring, Parents, Environment & Greener Living, Disabled, Money, Tax & Benefits, Government & Citizens' Rights, Health & Wellbeing and Crime & Justice. A tab on the top navigation tool bar titled 'Do It Online' also links to the 16 categories, and specifically to all of the transactions that can be conducted online within these categories. Citizens can text in a key word and receive information via mobile phone on job opportunities, public transport delays, train schedules, nearest passport or doctors offices, emergency and terror alerts and many other services. The United Kingdom's Web network also features a wide range of public consultations, mostly available at specific ministry sites; model-practice portals for public tenders and contracts; and e-services at the Government Gateway.

The website of the Ministry of Finance of Norway was ranked highest among ministries in the region in the 2010 Survey.

Southern Europe

Table 4.23 **E-government development in Southern Europe**

	E-government development index value		World e-government development ranking	
Country	2010	2008	2010	2008
Spain	0.7516	0.7228	9	20
Slovenia	0.6243	0.6681	29	26
Malta	0.6129	0.6582	30	29
Croatia	0.5858	0.5650	35	47
Italy	0.5800	0.6680	38	27
Portugal	0.5787	0.6479	39	31
Greece	0.5708	0.5718	41	44
TFYR Macedonia	0.5261	0.4866	52	73
Andorra	0.5148	0.5175	57	58
Montenegro	0.5101	0.4282	60	100
Bosnia and Herzegovina	0.4698	0.4509	74	94
Serbia	0.4585	0.4828	81	77
Albania	0.4519	0.4670	85	86
San Marino	…	…	…	…
Sub-regional average	**0.5566**	**0.5642**		
World average	**0.4406**	**0.4514**		

Spain (0.7516) continues to lead the region and moved up in the global ranking in the 2010 Survey. Spain enjoys a well-developed online e-services portal, Red.es, with clear statements to citizens about its purpose and mission, plus services from its national portal. Slovenia (0.6243) and Malta (0.6129) were ranked the second and the third in the region. The former Yugoslav Republic of Macedonia, Montenegro, and Bosnia and Herzegovina improved the most in the region in the 2010 Survey,

Box 4.13 **Belgium's electronic identification card**

Belgium: My Belgium national portal

The national portal of Belgium has a link called My Belgium that is the single point of contact to government information and services. Over 9 million Belgians have eID cards that allow them to download authenticated certificates from their personal file from the MyBelgium portal.

http://www.belgium.be
http://www.mybelgium.be

Box 4.14 **Austria – support for gender equality**

Austria: Gender equality website

Austria has a website that supports gender equality. It provides information about current government initiatives such as 'Equal pay and revenue transparency for women' and the 'New Child' law. The website promotes a programme provides parents with additional income during the first 14 months of the child's life, supporting mothers, fathers and single parents during difficult economic times.

http://www.frauen.bka.gv.at

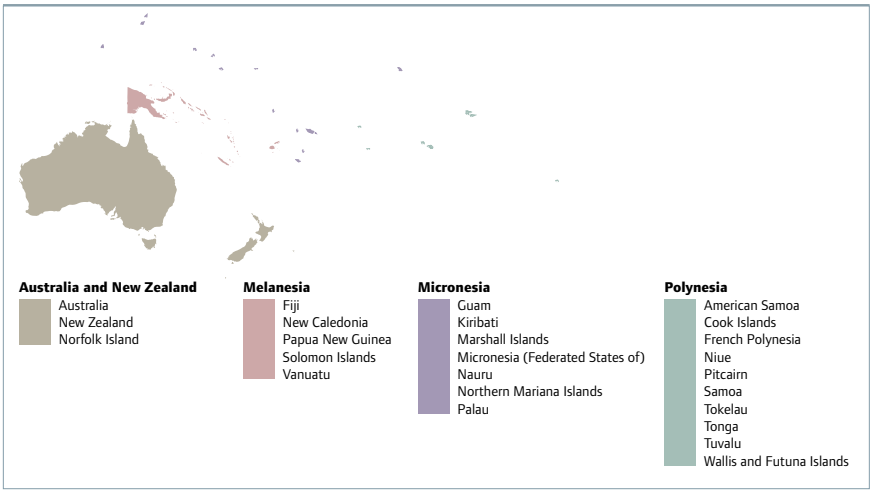
Box 4.15 **Germany – applying e-government tools to educate children**

Germany: Gender equality website

The national portal of Germany has a link off the homepage to a website for children to learn how their government works, Regierenkapieren. It has tabs for interactive features titled such as 'discover', 'games' and 'questions' and a daily news section. It captures the children's attention and gives them a better understanding of the process of government.

http://www.bundesregierung.de/
http://www.regierenkapieren.de/

Map 4.5 **Sub-regions of Oceania**



with the former Yugoslav Republic of Macedonia gaining 21 positions to be ranked 52nd globally, Montenegro gaining 40 positions to be in 60th position and Bosnia and Herzegovina gaining 20 positions to be 74th. These changes were attributable to the improvement in telecommunication infrastructure and online services.

Western Europe

The Netherlands (0.8097) continues to lead the region in the global rankings of the 2010 Survey, with France (0.7510) and Germany (0.7309) ranked second and the third respectively. Liechtenstein saw the most significant progress and was ranked 23rd globally in the 2010 Survey, which could be attributed to its efforts to improve online services.

Table 4.24 **E-government development in Western Europe**

	E-government development index value		World e-government development ranking	
Country	2010	2008	2010	2008
Netherlands	0.8097	0.8631	5	5
France	0.7510	0.8038	10	9
Germany	0.7309	0.7136	15	22
Belgium	0.7225	0.6779	16	24
Switzerland	0.7136	0.7626	18	12
Liechtenstein	0.6694	0.5486	23	49
Austria	0.6679	0.7428	24	16
Luxembourg	0.6672	0.7512	25	14
Monaco	…	…	…	…
Sub-regional average	0.7165	0.7329		
World average	0.4406	0.4514		

The national portal of Portugal is informational and integrated and provides a clear gateway to services for citizens, including e-services. The site provides link to all ministries, including links to various services for citizens, such as Emprego 2009 for access to educational and professional resources.

Montenegro combined effective graphic design with efficient navigation for a visually related series of portals and websites, including those of the national government and all of its ministries. It worked well as a result of investment in back office integration. The various sites polling users about what they would like to see changed or improved on their government's websites.

The Education Ministry of Serbia had one of the best online resources for students including information on student loans and scholarships, foreign government and foundations scholarships, international competitions, and Republic of Serbia Foundation Scholarships. Students can buy their books online and access their school records.

The website of the Ministry of Health of Belgium received the second highest ranking among that of the health ministries in the 2010 Survey based on the excellent provision of e-services to citizens. The country's Ministry of Labour has a website with a notable usability/user experience. For example, when a user searches on its site, any results that are associated with an e-government feature or service will be marked with the letter 'e' in the form of a red icon next to the search results, cuing the user to click.

The national portal of the Netherlands offers a gateway to the municipalities of the Netherlands. It also harbors a substantive resource for elderly and disabled individuals wishing to locate online government services.

4.2.5 E-government in Oceania

Australia (0.7863) continues to lead the Oceania region with New Zealand (0.7311) in second position. Among the island states in the Pacific, Palau (0.4189) and Fiji (0.3925) are the leading countries in e-government development.

The extensive national portal for Australia helps citizens to navigate to key features, government initiatives, services and information. The website prominently features the Social Inclusion website with the

vision of society in which all Australians feel valued and are equipped with the opportunity to participate fully in society. New features on the site include State, Territory and Local Government Search within the national site, smart forms for enrolling to vote and making complaints, and new e-consultation features for public consultation, blogs and a feature called Bright Ideas where citizens can provide new ideas and perspectives on a specific or any subject.

Table 4.25 **E-government development in Oceania**

Country	E-government development index value		World e-government development ranking	
	2010	2008	2010	2008
Australia	0.7863	0.8108	8	8
New Zealand	0.7311	0.7392	14	18
Palau	0.4189	0.0000	103	…
Fiji	0.3925	0.4156	113	105
Samoa	0.3742	0.3761	115	115
Tonga	0.3697	0.3950	116	112
Vanuatu	0.2521	0.2510	155	154
Solomon Islands	0.2445	0.2748	156	147
Papua New Guinea	0.2043	0.2078	171	166
Kiribati	…	…	…	…
Marshall Islands	…	…	…	…
Micronesia (Federated States of)	…	…	…	…
Nauru	…	…	…	…
Tuvalu	…	…	…	…
Sub-regional average	0.4193	0.4338		
World average	0.4406	0.4514		

4.3 Economic groupings

Table 4.26 illustrates the top 25 developing countries in the 2010 Survey. Many developing countries have been investing in streamlining the national and ministry portals and websites to better offer more e-services and more actively engage citizens in dialogues with government. The digital divide between the developed countries and developing countries is gradually closing in the e-government arena.

Table 4.27 provides a list of the least developed countries, which face severe constraints to e-government development.

Finally, some countries do not appear in the ranking of the 2010 United Nations E-Government Survey. The Survey lacked data in significant areas for these countries, which made it impossible to either construct an index on infrastructure or human resources capacity, or both. Tables in the Annex provide the raw scores for the telecommunication infrastructure, human capacity and online service indexes of these countries.

Table 4.26 **Top ranked developing countries**

Rank	Country	E-government development index value		World e-government development ranking	
		2010	2008	2010	2008
1	Republic of Korea	0.8785	0.8317	1	6
2	Singapore	0.7476	0.7009	11	23
3	Bahrain	0.7363	0.5723	13	42
4	Israel	0.6552	0.7393	26	17
5	Colombia	0.6125	0.5317	31	52
6	Malaysia	0.6101	0.6063	32	34
7	Chile	0.6014	0.5819	34	40
8	Uruguay	0.5848	0.5645	36	48
9	Barbados	0.5714	0.5667	40	46
10	Cyprus	0.5705	0.6019	42	35
11	Kazakhstan	0.5578	0.4743	46	81
12	Argentina	0.5467	0.5844	48	39
13	United Arab Emirates	0.5349	0.6301	49	32
14	Kuwait	0.5290	0.5202	50	57
15	Jordan	0.5278	0.5480	51	50
16	Mongolia	0.5243	0.4735	53	82
17	Ukraine	0.5181	0.5728	54	41
18	Antigua and Barbuda	0.5154	0.4485	55	96
19	Mexico	0.5150	0.5893	56	37
20	Saudi Arabia	0.5142	0.4935	58	70
21	Russian Federation	0.5136	0.5120	59	60
22	Brazil	0.5006	0.5679	61	45
23	Qatar	0.4928	0.5314	62	53
24	Peru	0.4923	0.5252	63	55
25	Belarus	0.4900	0.5213	64	56
	World average	0.4406	0.4514		

A number of countries are engaged in the development of regional e-government strategies, as illustrated by the examples in box 4.16.

4.4 Progress in online service provision

The number of e-services available on government websites continues to grow by leaps and bounds. Every year it is evident that more and more e-services are put into operation in government websites. A country's strength in online service provision is measured against four benchmarks.

- Does the national government provide basic information services online?
- Does the national government use multimedia technology and promote two-way exchanges with citizens?

Table 4.27 **E-government development in least developed countries**[1]

Rank	Country	E-government development index value		World e-government development ranking	
		2010	2008	2010	2008
1	Maldives	0.4392	0.4491	92	95
2	Samoa	0.3742	0.3761	115	115
3	Lesotho	0.3512	0.3805	121	114
4	São Tomé and Príncipe	0.3258	0.3215	128	130
5	Angola	0.3110	0.3328	132	127
6	Bangladesh	0.3028	0.2936	134	142
7	United Republic of Tanzania	0.2926	0.2929	137	143
8	Equatorial Guinea	0.2902	0.2890	138	145
9	Madagascar	0.2890	0.3065	139	135
10	Cambodia	0.2878	0.2989	140	139
11	Myanmar	0.2818	0.2922	141	144
12	Uganda	0.2812	0.3133	142	133
13	Zambia	0.2810	0.2266	143	158
14	Rwanda	0.2749	0.2941	148	141
15	Lao People's Democratic Republic	0.2637	0.2383	151	156
16	Bhutan	0.2598	0.3074	152	134
17	Nepal	0.2568	0.2725	153	150
18	Sudan	0.2542	0.2186	154	161
19	Vanuatu	0.2521	0.2510	155	154
20	Solomon Islands	0.2445	0.2748	156	147
21	Mauritania	0.2359	0.2028	157	168
22	Democratic Republic of the Congo	0.2357	0.2177	158	162
23	Malawi	0.2357	0.2878	159	146
24	Comoros	0.2327	0.1896	160	170
25	Mozambique	0.2288	0.2559	161	152
26	Timor-Leste	0.2273	0.2462	162	155
27	Senegal	0.2241	0.2531	163	153
28	Yemen	0.2154	0.2142	164	164
29	Togo	0.2150	0.2191	165	160
30	Liberia	0.2133	0.2170	166	163
31	Gambia	0.2117	0.2253	167	159
32	Afghanistan	0.2098	0.2048	168	167
33	Haiti	0.2074	0.2097	169	165
34	Djibouti	0.2059	0.2279	170	157
35	Ethiopia	0.2033	0.1857	172	172
36	Benin	0.2017	0.1860	173	171
37	Burundi	0.2014	0.1780	174	174
38	Eritrea	0.1859	0.1965	175	169
39	Mali	0.1815	0.1591	176	175
40	Sierra Leone	0.1697	0.1463	177	178
41	Burkina Faso	0.1587	0.1542	178	176
42	Guinea-Bissau	0.1561	0.1521	179	177
43	Guinea	0.1426	0.1402	180	180
44	Central African Republic	0.1399	0.1412	181	179
45	Chad	0.1235	0.1047	182	182
46	Niger	0.1098	0.1142	183	181
47	Kiribati	…	…	…	…
48	Somalia	…	…	…	…
49	Tuvalu	…	…	…	…
	World average	0.4406	0.4514		

- Does the national government use the Internet to deliver public services and solicit occasional input on matters of public interest?
- Does the national government connect public service functions and routinely consult with citizens on matters of public policy?

If there is clear evidence that a country does all four of these things well, and therefore has established a digital foundation for citizen empowerment and inclusion, then it will be highly placed in the online service index.

Overall, the bar for online service has shifted up and the global index average is down in the 2010 Survey as compared to 2008. The present Survey gives more weight to more advanced stages of online development, e.g. availability of transactional services and promotion of the connected approach to e-government. Half of the total available points for online services are assigned to these stages. Specifically, the survey instrument allocates 68 points to characteristics of an emerging online presence (16.9 percent), 116 points to an enhanced online presence (28.8 percent), 169 points to a transactional presence (41.9 percent) and 50 points to a connected presence (12.4 percent) for a maximum possible score of 403.

4.4.1 How governments rank in online services

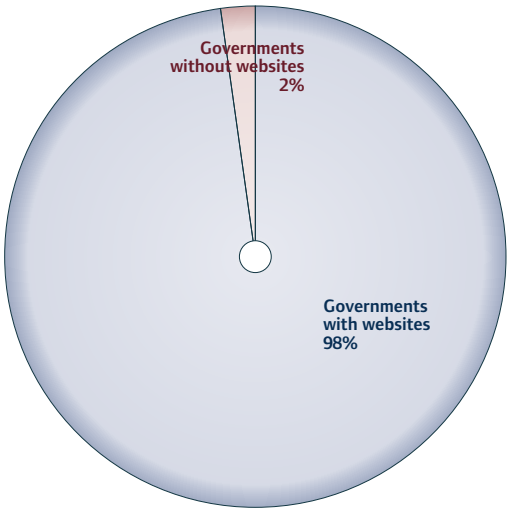
First position in online services is held by the Republic of Korea (1.0000), followed by the United States (0.9365) and Canada (0.8825). Several of the top-ranked countries in 2010, as seen in table 4.28, are newcomers or have otherwise made significant gains in the last two years. Notable climbers include Bahrain, Chile, Colombia, Singapore and the United Kingdom, which have joined the world's top performers in online service development.

Growth of online services is especially strong in the case of middle-income countries. In 2010, middle-income countries accounted for four positions among the top 10 in the online service development index, and 14 positions among the top 35 countries.

A country's strength in online service provision correlates positively with its use of new technology such the emerging tools for social networking. The 2010 Survey put greater emphasis on online service provision and networking with citizens,

engaging and empowering them to be part of the governance process. Social networking tools enable governments to consult with citizens and expand opportunities for participation in decision-making processes. They can be used to garner feedback and opinions and to elicit support for public policy. To engage citizens, more countries have developed sites in the social networking arena and more are in the process of doing so.

Figure 4.6 **Nearly all governments have websites**



Some low-income countries are lagging far behind the world trend towards more and better e-government development. Some countries have no national portal or ministry websites for education, finance, health, labour and social services. Consequently, these countries receive a score of zero for the online service index. Countries with no online presence include Central African Republic, Somalia and Swaziland. These countries could not be ranked for online services development because they had no government websites. However, Central African Republic and Swaziland received an e-government development score because the country had sufficient data to calculate the indexes for telecommunications infrastructure and human capacity.

Sometimes e-government development can change quickly. The 2008 Survey reported that Zambia had no online presence and yet by the 2010 Survey the country's national sites were readily available and easily assessed.

Table 4.28 **Top 20 countries in online service development**

Rank	Country	Online service index value
1	Republic of Korea	1.0000
2	United States	0.9365
3	Canada	0.8825
4	United Kingdom	0.7746
5	Australia	0.7651
6	Spain	0.7651
7	Norway	0.7365
8	Bahrain	0.7302
9	Colombia	0.7111
10	Singapore	0.6857

Rank	Country	Online service index value
11	France	0.6825
12	Netherlands	0.6794
13	Denmark	0.6730
14	Japan	0.6730
15	New Zealand	0.6381
16	Malaysia	0.6317
17	Belgium	0.6254
18	Chile	0.6095
19	Israel	0.5841
20	Mongolia	0.5556

4.4.2 About the services governments provide online

An increasing number of governments are endeavouring to meet the needs of the citizens by providing more online content and e-services and by creating a level of online dialogue that was not in place even a few years ago, according to the 2010 Survey. Portals are becoming more integrated and streamlined. It is easier than ever for citizens to find information and services online. This is especially true in developed and middle-income countries. Least developed countries are starting to incorporate many of the online tools that developed and middle-income countries now use, including videos and social networking tools. Only a few countries are able to offer many secure transactions online, however, although the trend is toward more e-forms and e-payments.

Box 4.16 **Regional e-government strategies**

Ministers responsible for e-government policy in the European Union issued a "Ministerial Declaration on e-Government" in November 2009 that shared a common vision, objectives and implementation approach for 2011-2015.

The Persian Gulf region has developed e-government standards and structures that are implemented throughout the region. The countries in the Gulf Cooperative Council are working together and sharing their e-government experiences to advance the region as a whole. All GCC countries were represented at a regional e-government conference in December 2009 in Oman. Awards were presented for innovative e-government programmes, services and solutions in the region.

African Ministers confirmed their willingness to promote inter-governmental cooperation in having common frameworks for e-Government regional development at a meeting in Mexico in September 2009. In February 2010, ICT will be the focus of the Summit of the African Union, with the theme 'Information and Communication Technologies in Africa: Challenges and Prospects for Development.'

A draft regional Caribbean e-Government strategy 2010-2014 was prepared in 2009 with the active participation of senior e-government representatives of Caribbean States and UNDESA support. It produced by Caribbean Centre for Development Administration (CARICAD), an agency of CARICOM. This strategy contains a consensus on e-government vision, goals, strategic initiatives, immediate outcomes and implementation plan for Caribbean countries.

The International Telecommunication Union (ITU) is planning to organize a series of regional summits, strategies and products, including the Arab States and the Americas. The effort is part of its 'Connect the World by 2015 initiative'.

Ninety-eight percent of countries have some presence on the Web, either by having a national portal or ministry website, as illustrated in figure 4.6. This number has not changed since 2008.

Certain features are common across many websites. Table 4.29 reveals that most government websites have a section for archived information and a section called 'What's New'. These features enable users to find information on past activities that are no longer highlighted on the website and encourage users to browse updated information. In contrast, only 44 percent of governments have a section that provides ready answers to frequently asked questions (FAQ). The use of FAQs can reduce the amount of time and human resources devoted to public inquiry functions, and improve public perception that the goverment is responsive to citizens' concerns.

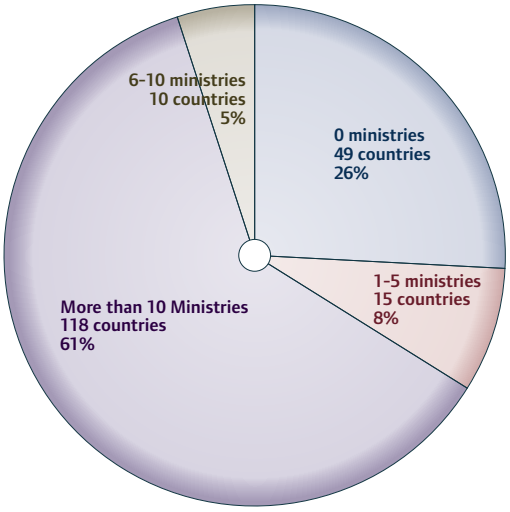
Table 4.29 **Characteristics of an emerging online presence**

Feature	Number of countries	Percent
What's new?	156	81
Frequently asked questions	85	44
Archived information	166	86

Most national portals have direct links to their respective ministries. The 2010 Survey finds that 61 percent of national portals contain links to more than 10 ministry websites, as illustrated in figure 4.7. These links allow citizens visiting a national portal to link quickly and directly to the information and services offered by a particular ministry, avoiding separate searches. They can simply go to the national homepage and access the ministry websites.

Figure 4.7 also shows that one quarter of national portals do not have links to any ministries, which means that they are either completely segregated from the websites of ministries, or the ministries in these countries do not have websites at all. Citizens visiting national portals with links to only five or less ministries in their homepages must search outside for information that should be readily accessible. Ideally, the homepage of a country's national portal should have links to all ministry and government agency websites.

Figure 4.7 **Number of ministries linked to a national portal**



Site maps can be found on slightly over 50 percent of national portals, as per table 4.30. This very useful feature helps citizens to find pages on the website without having to guess where information might be found. Links to other public sector services are provided on 67 percent of national portals, which makes them a one-stop shop for information and services.

Table 4.30 **Site maps and linkages from national portals**

Feature	Number of countries	Percent
Site map is available	102	53
Links between national home pages and ministries/departments	143	74
Links between national home page and public sector services	129	67

More than 50 percent of ministry websites have site maps, help or FAQs available or are integrated with the national portal, as shown in figure 4.8. Ministries of finance are more likely than other ministries to be integrated with the national portal and to include a site map.

Even static forms are not widely available on national portals. Figure 4.9 indicates that 63

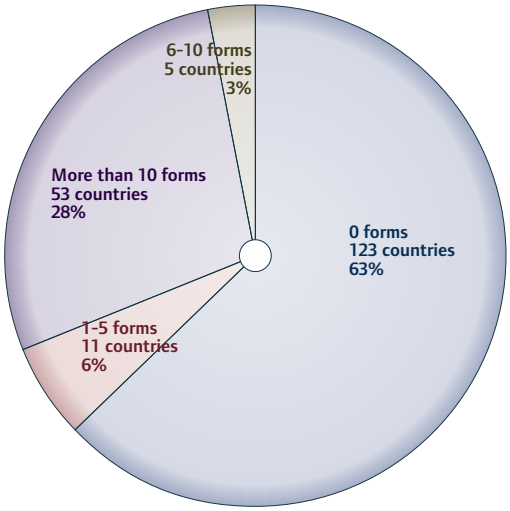
Box 4.17 **Leaders in transactional and connected e-government**

Who are the world leaders in transactional and connected e-government? The following countries are in the third or fourth stage of online services development: Australia, Austria, Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Japan, Malaysia, Netherlands, New Zealand, Norway, Republic of Korea, Singapore, Spain, Sweden, United Kingdom and United States.

These countries have been integrating back-office operations and providing e-services to citizens in a seamless manner. Information is efficiently transferred between agencies and departments. In addition, these countries have a proven track-record of using Web 2.0 tools to communicate with citizens and regularly receive inputs from them. These inputs are used to shape public policy and law. The level of public trust in government is higher among advanced e-government countries than in many other places.

percent of countries have not provided citizens with the capability of downloading static forms, let alone forms that can be filled-out and submitted online. In many least developed countries citizens can download forms, complete them by hand and manually submit them to the relevant ministry or department.

Figure 4.9 **Availability of static online forms**



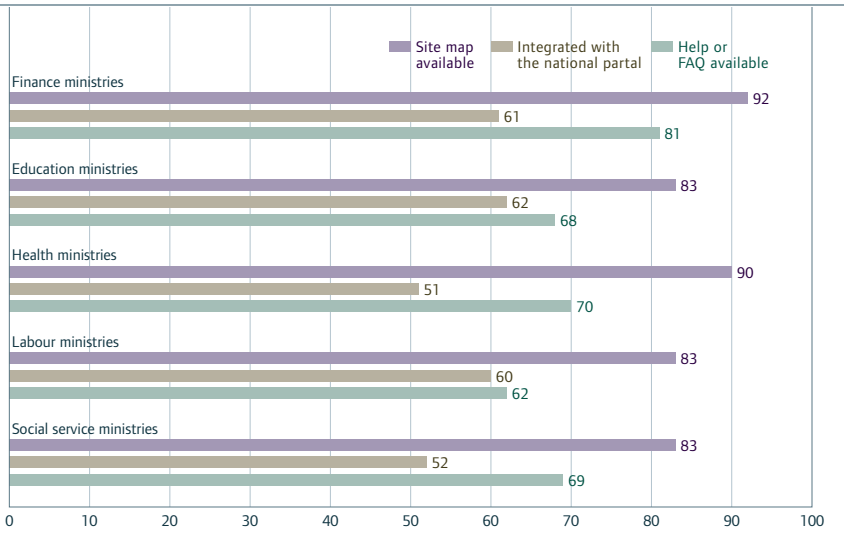
Some 49 percent of national portals or websites are in more than one language. Where a site has more than one language, English is usually the second language, demonstrating the continued importance of that language on the Internet. In a few cases, ministry websites are in English only, while English is not the first language of that country.

Table 4.31 **Website design features: RSS, audio, video, language**

Feature	Number of countries	Percent
Site meets provides at least minimal level of web content accessibility	24	13
Site support audio and/or video content	95	49
Site provides real simple syndication (RSS)	68	35
Site offers content in more than one language	95	49

The use of real simple syndication (RSS) feeds jumped from 10 percent of national portals in the 2008 Survey to 35 percent in the 2010 Survey. This means that more national portals are automatically releasing information and content to individual subscribers. Citizens are informed whenever any updates are made.

Figure 4.8 **Features of ministry websites**



Multimedia is gaining importance in the configuration of most national and ministry websites, with 49 percent of national portals supporting audio and/or video content, up from only 38 percent in 2008.

Table 4.32 **Support of mobile access**

Feature	Number of countries	Percent
Site supports WAP/GPRS access	24	13
Site offers service to send alert messages to mobile phones	25	13
User can apply for registration or application by mobile phone	14	7
Users can pay registration fees, fines, etc. by mobile phone	17	4

Figure 4.10 **Selected countries with high transactional presence scores**

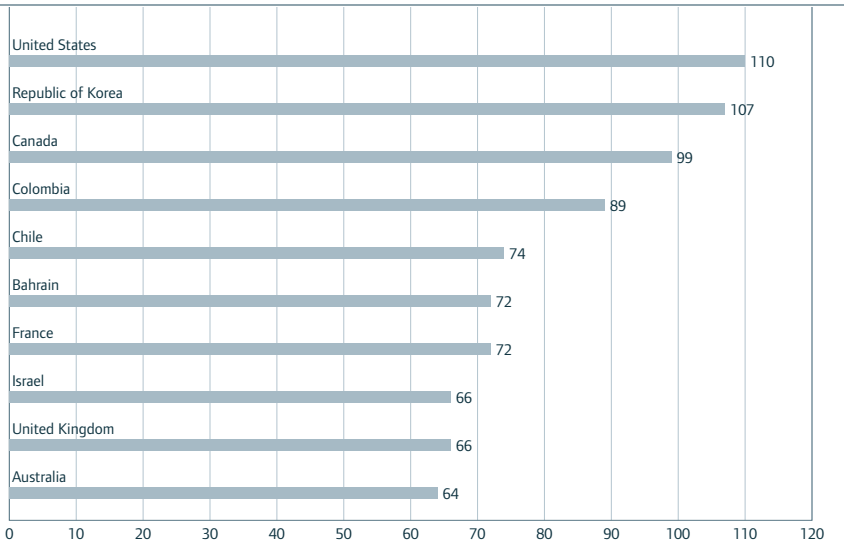
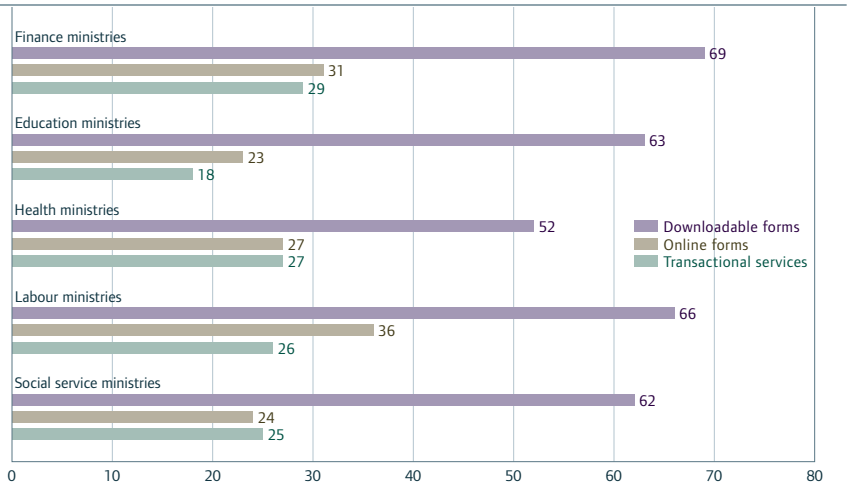


Figure 4.11 **Number of ministry websites with online forms and transactional services**



Wireless devices such as mobile phones are being used by some governments to provide services in the form of alert messages, applications or fee payment. Table 4.33 indicates a slight increase in the number of national portals using wireless application protocol (WAP) for wireless communication. In 2008, 19 national portals had WAP implemented.

Wireless devices such as mobile phones are almost equally popular in developing countries as they are in developed countries. In 2008, 14 national sites offered mobile alerts, while in 2010, that number increased to 25. Such an increase is minor compared to the major opportunity that wireless devices offer to governments interested in providing electronic content and services to their citizens. Meanwhile, only in seven countries can users pay registration fees, fines, etc. via mobile access provided through their national portals. These countries are Bahrain, Croatia, Estonia, Israel, Mongolia, New Zealand and Sudan.

Table 4.33 **Online payment**

Payment type	Number of countries	Percent
Taxes	34	18
Registrations	36	19
Permits, certificates, identification cards	33	17
Fines	22	11
Utilities	18	9

Compared to mobile payment options, more are offered through online portals. How many countries allow online payment of taxes, fines, registrations, utilities, and certificates from their national portals? The majority of countries in table 4.33 were middle income countries. Since 2008, there has been a slight increase of governmental online payment facilities.

Transactional services

Only a few countries are able to offer many transactional services online at this time. However, countries with the highest scores in figure 4.10 offer a wide range of integrated transactional e-services that cater to many segments of society. They have comprehensive back office integration systems and secure networks on which these e-services operate, giving citizens security and confidence. The United States, the Republic of Korea and Canada are the top three countries in terms of transactional opportunities. The developing countries are well-represented in the top 10 with four countries: Bahrain, Chile, Colombia and Israel.

Table 4.34 **Online submissions**

Feature	Number of countries	Percent
Online forms	53	28
Online transactions	60	32
Application for government benefits	32	17
Acknowledgement of receipt	19	10

Table 4.35 **Connected presence**

Feature	Number of countries	Percent
Single sign-on	31	16
Electronic identity management and authentication	33	17
One-stop shop	130	68
Information in machine readable format	74	39
Interaction with Head of State	61	32

Table 4.36 **Connecting to citizens**

Feature	Number of countries	Percent
Citizens can request personal information about themselves	21	11
Users can tag, assess and rank content	7	4
Users can initiate proposals	16	8
Users can personalize the website	12	6
Government has committed to incorporating e-participation outcome in decision making	22	11

Fewer than one-third of governments provide citizens with the possibility of online transactions and the online submission of e-forms, as shown in table 4.34 on online submissions. In addition, less

than 20 percent of governments allow citizens to apply for government benefits online. The main reason for this low number is the complex integration that is required among different systems to ensure compatibility and a seamless interaction. All administrative or financial transactions need to be performed over a secure network. The threat of identify theft or financial fraud is too great on an unsecured network.

The websites of ministries of finance have the most downloadable forms and online transaction services available for citizens, while the ministries of labour have the most e-forms, as seen in figure 4.11.

Governments are having some success in creating a 'connected presence' with their national portals. Table 4.37 shows that they are creating websites that support citizens by making it easier for them to find information, by integrating sites into a one-stop shop, and by creating single-sign-on for access to all government services. The level of sophistication of the single-sign-on varies greatly among countries. Very few single-sign-on systems have reached the level of Singapore's Sing-pass.

Governments are inviting citizens to become more actively involved in determining the design and content of portals and websites. Table 4.36 lists a variety of ways this is being done. Some countries allow users to personalize their own 'Mysite' from the information found on government portals. Six countries allow citizens to tag and rank content, which allows them to have more control of the information provided in the portals.

4.4.3 The data behind the rankings

What kind of data goes into measuring a country's performance in online services? Table 4.37 shows categories on online service data including emerging information services, enhanced information services, transactional services and connected services. The scores include the total scores for the national portal and five ministries. The maximum points that a country could attain is 403.

Table 4.38 shows online service data for selected developing countries. Most developing countries are still limited in the transactional aspect of e-government. None of the countries listed were able to obtain over 50 percent of the points available in the transaction stage.

Table 4.37 **Breakdown of online service scores for top ranked countries**

		Emerging information services (stage 1)		Enhanced information services (stage 2)		Transactional services (stage 3)		Connected services (stage 4)		Total	
Rank	Country	Points	Score (%)	Points	Score (%)	Points	Score (%)	Points	Score (%)	Points	Score (%)
1	Republic of Korea	66	97	106	91	112	66	31	62	315	78
2	United States	62	91	97	84	115	68	21	42	295	73
3	Canada	59	87	83	72	104	62	32	64	278	69
4	United Kingdom	61	90	87	75	71	42	25	50	244	61
5	Australia	58	85	76	66	69	41	38	76	241	60
5	Spain	60	88	88	76	68	40	25	50	241	60
7	Norway	61	90	85	73	69	41	17	34	232	58
8	Bahrain	63	93	72	62	72	43	23	46	230	57
9	Colombia	57	84	51	44	89	53	27	54	224	56
10	Singapore	54	79	82	71	64	38	16	32	216	54
11	France	54	79	71	61	77	46	13	26	215	53
12	Netherlands	60	88	80	69	55	33	19	38	214	53
13	Denmark	54	79	88	76	52	31	18	36	212	53
13	Japan	59	87	78	67	56	33	19	38	212	53
15	New Zealand	59	87	76	66	46	27	20	40	201	50
16	Malaysia	51	75	73	63	55	33	20	40	199	49
17	Belgium	57	84	66	57	54	32	20	40	197	49
18	Chile	57	84	44	38	74	44	17	34	192	48
19	Israel	49	72	45	39	66	39	24	48	184	46
20	Mongolia	47	69	49	42	54	32	25	50	175	43
21	Germany	54	79	76	66	23	14	20	40	173	43
22	Jordan	50	74	44	38	57	34	17	34	168	42
23	Egypt	55	81	51	44	49	29	12	24	167	41
24	Kazakhstan	66	97	53	46	24	14	23	46	166	41
24	Sweden	54	79	67	58	26	15	19	38	166	41

Table 4.38 **Online service levels in selected developing countries**

		Emerging information services (stage 1)		Enhanced information services (stage 2)		Transactional services (stage 3)		Connected services (stage 4)		Total	
Rank	Country	Points	Score (%)	Points	Score (%)	Points	Score (%)	Points	Score (%)	Points	Score (%)
30	Tunisia	52	76	40	34	50	30	10	20	152	38
32	Uruguay	51	75	43	37	36	21	21	42	151	37
36	Kuwait	41	60	39	34	58	34	7	14	145	36
39	Mexico	45	66	52	45	26	15	16	32	139	34
40	El Salvador	48	71	30	26	46	27	10	20	134	33
44	Argentina	53	78	42	36	22	13	13	26	130	32
45	Peru	53	78	37	32	26	15	13	26	129	32
49	Philippines	48	71	25	22	35	21	16	32	124	31
53	Uzbekistan	52	76	39	34	18	11	10	20	119	30
54	Cyprus	44	65	39	34	19	11	15	30	117	29
55	Brazil	53	78	34	29	10	6	19	38	116	29
55	China	54	79	40	34	4	2	18	36	116	29
55	India	45	66	41	35	22	13	8	16	116	29
55	Oman	47	69	33	28	26	15	10	20	116	29
59	Dominican Republic	46	68	30	26	24	14	15	30	115	29
62	Turkey	57	84	29	25	9	5	14	28	109	27
62	Ukraine	55	81	31	27	7	4	16	32	109	27
65	Trinidad and Tobago	50	74	39	34	12	7	6	12	107	27
67	Thailand	50	74	31	27	15	9	9	18	105	26
68	Russian Federation	49	72	28	24	15	9	12	24	104	26

Table 4.39 **Online service levels in least developed countries**[1]

Rank	Country	Emerging information services (stage 1)		Enhanced information services (stage 2)		Transactional services (stage 3)		Connected services (stage 4)		Total	
		Points	Score (%)	Points	Score (%)	Points	Score (%)	Points	Score (%)	Points	Score (%)
60	Bangladesh	48	71	44	38	5	3	15	30	112	28
65	Angola	52	76	38	33	9	5	8	16	107	27
95	Lesotho	52	76	29	25	1	1	1	2	85	21
106	Afghanistan	41	60	25	22	5	3	2	4	83	21
111	Ethiopia	32	47	23	20	3	2	5	10	73	18
114	Bhutan	30	44	21	18	6	4	2	4	63	16
116	Mali	29	43	12	10	9	5	8	16	59	15
120	Senegal	32	47	14	12	3	2	7	14	58	14
121	Rwanda	34	50	14	12	2	1	5	10	56	14
121	United Republic of Tanzania	34	50	21	18	…	…	…	…	55	14
124	Mozambique	32	47	13	11	3	2	6	12	55	14
125	Nepal	30	44	22	19	…	…	1	2	54	13
126	Madagascar	28	41	13	11	4	2	7	14	53	13
127	Maldives	27	40	24	21	…	…	…	…	52	13
129	Burkina Faso	26	38	13	11	…	…	10	20	51	13
129	Sudan	23	34	16	14	2	1	8	16	49	12
134	Samoa	24	35	21	18	…	…	…	…	49	12
135	Cambodia	25	37	13	11	2	1	3	6	45	11
138	Timor-Leste	23	34	16	14	…	…	3	6	43	11
143	Benin	20	29	10	9	4	2	3	6	42	10
145	Zambia	21	31	8	7	…	…	4	8	37	
146	Uganda	18	26	11	9	…	…	3	6	33	
150	Democratic Republic of the Congo	17	25	7	6	…	…	4	8	32	
150	Mauritania	11	16	13	11	1	1	3	6	28	
150	São Tomé and Príncipe	21	31	7	6	…	…	…	…	28	
154	Gambia	16	24	9	8	…	…	1	2	28	
154	Myanmar	19	28	7	6	…	…	…	…	26	
156	Lao People's Democratic Republic	12	18	9	8	2	1	2	4	26	
160	Togo	6	9	8	7	3	2	5	10	25	
163	Liberia	11	16	7	6	…	…	2	4	22	
167	Djibouti	9	13	3	3	…	…	3	6	20	
167	Yemen	9	13	4	3	…	…	2	4	15	
169	Solomon Islands	7	10	6	5	…	…	1	2	15	
170	Burundi	8	12	2	2	…	…	3	6	14	
172	Niger	4	6	2	2	3	2	3	6	13	
173	Guinea	5	7	2	2	3	2	1	2	12	
174	Equatorial Guinea	2	3	5	4	…	…	3	6	11	
175	Comoros	5	7	3	3	…	…	1	2	10	
175	Kiribati	4	6	5	4	…	…	…	…	9	
179	Eritrea	3	4	4	3	…	…	…	…	9	
181	Chad	3	4	2	2	1	1	…	…	7	
181	Haiti	3	4	2	2	…	…	1	2	6	
184	Guinea-Bissau	…	…	3	3	1	1	1	2	6	
184	Malawi	3	4	2	2	…	…	…	…	5	
186	Tuvalu	1	1	3	3	…	…	…	…	5	
186	Vanuatu	1	1	2	2	…	…	1	2	4	
189	Sierra Leone	…	…	…	…	…	…	1	2	4	
…	Central African Republic	…	…	…	…	…	…	…	…	1	
…	Somalia	…	…	…	…	…	…	…	…	…	

Least developed countries have no real e-services, nor are they providing citizens with transactional opportunities, as presented in table 4.39. The vast majority of the sites surveyed primarily contain e-information and the beginning stages of citizen engagement with polls and feedback forms. The top two positions among least developed countries in the online service assessment went to Bangladesh and Angola. ■

Chapter 5

Citizen empowerment and inclusion

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E-government can be used by governments to empower and include citizens. Individuals and their democratic governance systems as a whole stand to benefit from better access to information and services, and from more opportunities for their voices to be heard by decision makers. The United Nations E-Government Survey assesses citizen empowerment and inclusion by reviewing channels for online participation in public affairs. The area of online services that opens up channels for online participation in public affairs is termed 'e-participation'. Given special attention by Survey, it is measured using an index that isolates Internet-based consultative and decision-making mechanisms. A country's strength in e-participation is measured against three benchmarks:

- Does the national government publish information on items under consideration?
- Are there ways for the public to engage in consultations with policy makers, government officials and one another?
- Can citizens directly influence decisions, for example by voting online or using a mobile telephone?

Countries that have been actively developing participatory features fare better in e-participation rankings.

5.1 Progress in e-participation

The provision of online services, as described above, provides a transformative platform for the public sphere. It intersects with the process of social communication where opinions are expressed, synthesized and coalesced. There are many types of public spheres operating across many different platforms, including the traditional mass media of television, radio and newspapers. The Internet is transformative because it allows anyone to be a publisher. This changes the power relationships in the public sphere in profound ways. It affords political leaders new routes to power. It affords citizens new ways to have their say. Even the voices of the marginalized can now be heard making the public sphere increasingly rich and diverse.[1]

5.1.1 About e-participation

Many governments are engaging citizens for feedback via their websites. The majority of sites have polls or surveys or feedback buttons, but this is just the tip of the iceberg. Web 2.0 (and Web 3.0 in the near future) will provide citizens with an avenue for direct impact on how government operates. E-participation goes well beyond e-voting; it changes the dynamics between government and citizens. Web 2.0 and social networking tools have created an environment that politicians and decision-makers must adjust to and incorporate in their daily work. In the United States, for example, more than 2 million followers subscribe to the Twitter feed of President Barack Obama. Politicians have been inclined to embrace and encourage the use of these e-participation and e-tools. They are providing information directly to citizens, which may help citizens to have a better understanding of their politicians. E-participation is one of the key assessments of the current e-government survey. It reflects on how well governments are keeping citizens at the centre of e-services.

Many governments have enhanced their national and ministerial websites to incorporate interactive tools to strengthen citizen e-participation. As citizens are empowered, they create a different relationship with their respective governments, characterized by enhanced effectiveness, as government are able to respond to the needs of citizens in a more direct manner. The e-participation index is indicative on how governments create an environment in which citizens can be more active and supportive of their governments.

Citizens express their views in environments they feel are acceptable. The 2010 Survey assesses how governments are interacting with citizens using popular Web 2.0 tools such as blogs, chat rooms and SMS as well as communication technologies such as Facebook, Twitter and other social networking tools.

Web 2.0 and social networking tools have empowered citizens to become more active in expressing their views on many issues, especially on issues concerning environment, health, education and other areas of government policy. Citizens use Web 2.0 and social networking tools to galvanize other like-minded citizens to share ideas and to develop collaborative approaches in tackling the issues that are important to them. Politicians and other decision-makers need to tap into this wealth of information and knowledge in order to be more responsive to their constituents.

As more and more people create their own blogs and issue-based social networking groups, they are becoming power-brokers in influencing governmental policies. Today, many citizens are interested in the views of bloggers and those of other members of their social networking groups. This new-found power and influence is contributing to higher standards of transparency in government.

The United Nations E-Government Survey recognizes the importance of e-participation in all its aspects ranging from e-information, e-consultation to e-decision-making. Politicians and political decision makers represent the voice of citizens within government. Now these politicians and decision makers are soliciting information and knowledge from the constituents online and in real-time, seeking to respond more efficiently to their constituents.

There is a growing global trend towards listening to citizen's voices and engaging their participation. This trend is likely to continue and expand in the next few years and beyond. Citizens are employing more e-participation tools. Politicians and decision-makers seem to be inclined to listen to the citizens. Although this movement is primarily taking hold in high-income countries, middle-income

countries are not far behind. Governments are now creating portals on social networking sites in order to reach out to citizens and promote their programmes, messages and policies. Citizens using e-participation tools have influenced several major presidential elections in recent years.

E-participation goes well beyond presidential and parliamentary elections; it is the empowerment of citizens to have an open dialogue with government. In densely populated countries, one sees e-participation working at the local levels, where district and village leaders are able to communicate with their constituency by using different e-tools. In smaller countries, e-participation can take place at the national level, where decision-makers can have direct access to citizens.

5.1.2 How governments rank in e-participation

The e-participation index shows how governments performed in 2010 compared to 2008. The 2010 Survey included a comprehensive review of how governments are including citizens in their decision-making process, how governments are providing information and knowledge, and how governments are consulting citizens to obtain feedback and opinions.

The best performing e-participation countries as expressed in the e-participation index are listed in table 5.1. The e-participation index combines the cumulative scores from the national portals plus the scores for the citizen-empowerment.

The Republic of Korea leads the e-participation index, followed by Australia, Spain and New Zealand. More than one third of the countries in the top 35 list are new and, notably, the majority are middle-income countries. Since 2008, a number of middle-income countries have revamped their websites to obtain more feedback and start the dialogue process with citizens.

'Best practices' were noted in Chile, Croatia, Cyprus and Mongolia. The countries placed more emphasis on obtaining feedback and inputs from citizens and also included more e-participation tools such as blogs, discussion forum, social networking sites, polls and citizen feedback.

Kazakhstan and Kyrgyzstan stand out for embracing the concept of e-participation. Their national portals allow citizens to initiate their own proposals, which the government reviews in the decision-making process. Citizens receive an acknowledgement that their inputs on e-deliberations or e-opinions have been received. The national portals allow discussion via social networking tools and they also post past forum debates. Their senior officials respond directly to the opinions from the online forums.

Table 5.1 **Top 20 countries in e-participation**

Rank	Country	2010 e-participation index value	2010 rank	2008 rank	Change +/(-)
1	Republic of Korea	1.0000	1	2	1
2	Australia	0.9143	2	5	3
3	Spain	0.8286	3	34	31
4	New Zealand	0.7714	4	6	2
4	United Kingdom	0.7714	4	25	21
6	Japan	0.7571	6	11	5
6	United States	0.7571	6	1	(5)
8	Canada	0.7286	8	11	3
9	Estonia	0.6857	9	8	(1)
9	Singapore	0.6857	9	10	1
11	Bahrain	0.6714	11	36	25
12	Malaysia	0.6571	12	41	29
13	Denmark	0.6429	13	3	(10)
14	Germany	0.6143	14	74	60
15	France	0.6000	15	3	(12)
16	Netherlands	0.6000	15	16	1
17	Belgium	0.5857	17	28	11
18	Kazakhstan	0.5571	18	98	80
19	Lithuania	0.5286	19	20	1
20	Slovenia	0.5143	20	55	35

Figure 5.1 **Geographic distribution of best performing countries in e-participation**

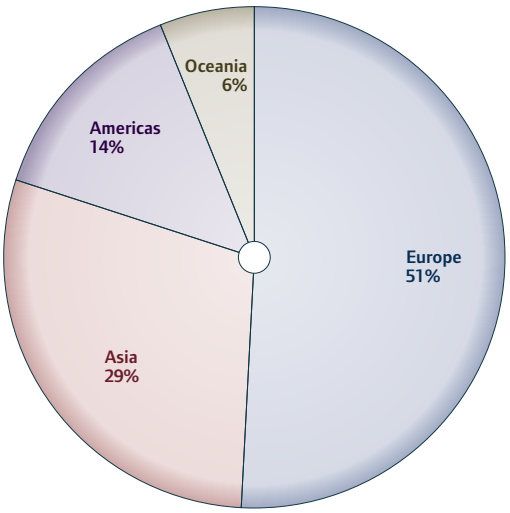


Figure 5.1 is a graphical presentation of table 5.1. The European continues to dominate the top list with almost 50 percent of the countries from the region appearing in the list. The Asian region is next with a little over 30 percent followed by the Americas and Oceania. There were no African countries in the top 35.

Figure 5.2 **Government interactions with citizens**

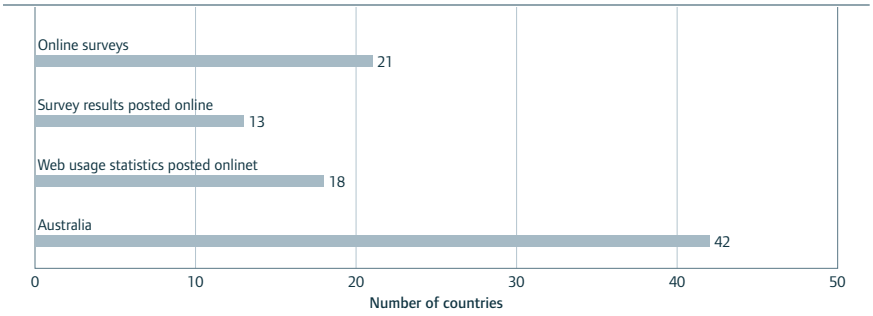


Figure 5.3 **Countries with high points for connected services**

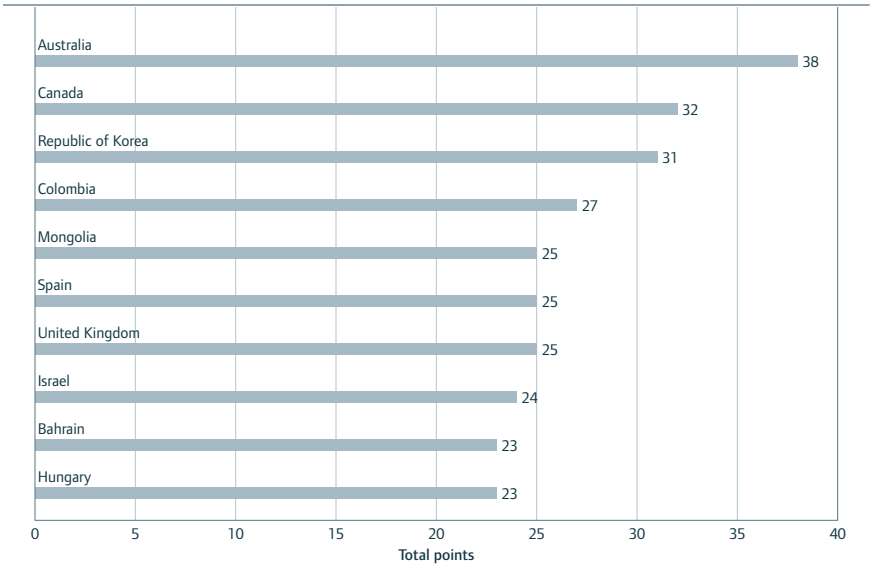
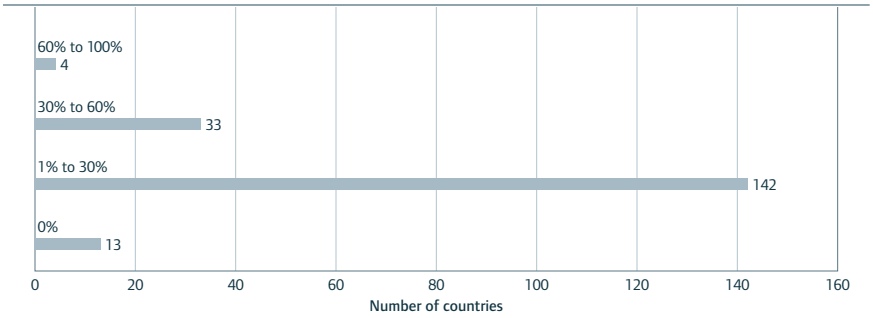


Figure 5.4 **E-participation utilization levels**



What is the level of interaction between government and citizens? How does government track citizen usage of its websites? Figure 5.2 is about government interactions with citizens. It also shows the number of countries that have created a secure network for citizens to participate. As figure 5.2 indicates, a very limited number of countries carry out surveys and report the results online.

Figure 5.3 shows the best-performing countries with the largest number of aggregate points for connected services. Australia had the highest connected score in 2010, followed by Canada and the Republic of Korea. The top 10 countries are evenly distributed with 50 percent coming from developing and developed regions.

The quality of e-participation in government websites is shown in table 5.2. The e-participation section of the survey was strengthened for the 2010 Survey by adding more questions to the survey instrument. As a result, countries generally scored lower. Also, more countries have some aspects of e-participation on their websites, with seven additional countries receiving scores above zero for participation. More specifically, 20 countries received scores of zero for e-participation in 2008, while this figure has been reduced to 13 countries in 2010. In addition, as the threshold for the e-participation section was elevated due to changes in the survey instrument introduced in 2010, fewer countries could receive scores above the 60 percent of the maximum points.

Figure 5.4 shows the breakdown of countries and their respective e-participation range. There was a slight increase from the 30 percent to 60 percent range and a slight decrease in the over 60 percent range in the 2010 Survey.

E-information

The assessement of e-information determines if governments are providing the kind of information that encourages and empowers citizen participation. This includes online publishing of e-participation policies, a calendar of online discussion forums, and electronic notification tools to alert citizens who want to participate.

Australia scored the highest on the e-information assessment in the 2010 Survey. Japan, Mexico and the Republic of Korea tied for second place. Of all

countries surveyed, 88 percent have some information about e-participation on their national portals.

How many countries have information about inclusiveness and e-participation on their national websites? Table 5.3 suggests that governments are encouraging citizens by providing information that invites them to be active and to participate. These governments also provide the necessary e-tools to do so.

Table 5.3 **Information about e-inclusivness and e-participation**

Feature	Number of countries	Percent
Site provides information about inclusiveness in e-government	49	26
Site provides information about e-participation	39	20

The following countries provide citizens with an updated calendar of events on e-participation that allows people to plan ahead of time if they want to participate: Australia, Belize, Cyprus, Egypt, Japan, Kazakhstan, Kuwait, Libya, Mauritania, Mexico, Pakistan, Peru, Spain and Uruguay. Only 7 percent of the countries surveyed have this option. This represents a slight increase from the 2008 Survey where only 5 percent of the countries surveyed had this option.

Citizen charters or service-level statements are becoming more popular as governments begin to treat citizens as customers. Very few countries had this option in the 2008 Survey. Table 5.4 suggests that governments are now letting the citizens know what is required of the government when citizens are making requests online. Citizens can now hold governments accountable for failing to meet the benchmarks within these charters or service level statements.

Table 5.4 **Interaction with citizens**

Feature	Number of countries	Percent
Citizen charter or service level statement	41	21
Facility for citizen feedback	76	40
Information about employment opportunities	66	34

E-consultation

Governments are starting, albeit slowly, to use interactive tools to conduct dialogue and receive feedback and inputs from citizens with online survey beginning to gain importance. More governments are embedding surveys within their portals and websites in order to capture the citizen's view. The United States is leading the field in this category with most government websites being mandated to have a customer satisfaction survey to gauge the sentiments of citizens. Table 5.5 identifies a number of interactive tools now in use.

Table 5.2 **Quality of e-participation websites of selected countries**

Range	Country	Score (%)			
		E-information	E-consultation	E-decision making	Total
Over 60%	Republic of Korea	87.50	78.79	75.00	78.95
	Australia	100.00	60.61	68.75	68.42
	Kazakhstan	87.50	66.67	62.50	68.42
	Bahrain	75.00	66.67	56.25	64.91
30-60%	Spain	75.00	63.64	37.50	57.89
	Kyrgyzstan	50.00	63.64	31.25	52.63
	Mongolia	62.50	54.55	43.75	52.63
	Israel	50.00	51.52	50.00	50.88
	New Zealand	50.00	54.55	43.75	50.88
	United Kingdom of Great Britain	50.00	60.61	31.25	50.88
	Japan	87.50	39.39	50.00	49.12
	United States of America	50.00	54.55	37.50	49.12
	Canada	75.00	36.36	50.00	45.61
	China	37.50	39.39	62.50	45.61
	Colombia	75.00	39.39	43.75	45.61
	Mexico	87.50	51.52	12.50	45.61
	Slovenia	50.00	45.45	43.75	45.61
	Chile	75.00	39.39	31.25	42.11
	Cyprus	50.00	30.30	62.50	42.11
	Estonia	50.00	42.42	31.25	40.35
	Singapore	50.00	48.48	18.75	40.35
Under 30%	Belarus	37.50	33.33	18.75	29.82
	France	37.50	36.36	12.50	29.82
	Netherlands	75.00	18.18	31.25	29.82
	Belgium	62.50	12.12	43.75	28.07
	Kenya	37.50	33.33	12.50	28.07
	Kuwait	75.00	21.21	18.75	28.07
	Turkey	37.50	18.18	37.50	26.32

Table 5.5 **Interactive tools used by governments**

Payment type	Number of countries	Percent
Online polls	30	16
Online surveys or feedback forms	55	29
Chat rooms or instant messaging	11	6
Web logs	20	10
List services or newsgroups	16	8
Other interactive tools	33	17

The assessment of e-consultation considers the means used to solicit citizen opinion, feedback and input through online polls, chat rooms, instant

Box 5.1 **Citizen engagement in economic crisis response**

At this time of economic crisis, citizens have also been very active in following what governments are doing with taxpayer dollars. Of the 54 countries that had committed public funds to addressing the financial and economic crisis as of October 2009,[2] 49 of them have created websites geared to providing information on fiscal stimulus measures and other forms of support to the economy. However, citizen engagement seems to follow the same old patterns. Only nine governments give citizens a say in how taxpayer dollars are spent using online tools.

Observation	Number of countries	Percent of total
Commitment of public funds to addressing the financial and economic crisis	54	100
Government website provides information on financial and budgetary measures linked to the crisis	49	91
Government website give citizens a say on how funds are spent using online tools	9	17

messaging, blogs, etc. The Republic of Korea scored the highest in the e-consultation section, with Bahrain and Kazakhstan tied for second. Seventy-nine percent of the countries surveyed in 2010 have some aspect of e-consultation.

The use of Web 2.0 tools on government portals and websites is still at its infancy stage, with a small number of countries providing this service to its citizens. The number of government sites with online discussion forums rose slightly in 2010.

Feedback forms or online surveys are more commonly used online polls in ministry websites. The ministries of labour tend to use online polling more than other ministries, while the websites of ministries of social services have more feedback mechanisms. Figure 5.5 illustrates the use of e-consultation tools to gather public opinion.

E-decision making

The e-decision making component of the Survey assesses the extent to which countries are committed to empowering citizens to be involved and are committed to taking into account the citizen's view when making policy decisions. The Republic of Korea leads in the e-decision making assessment, followed by Australia and Kazakhstan.

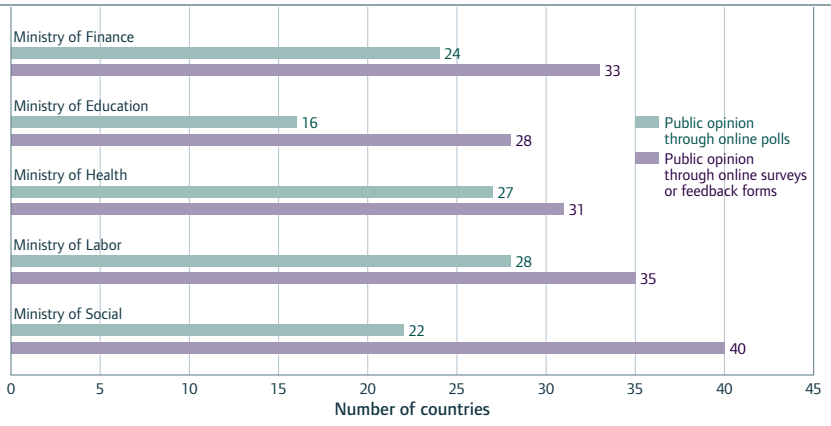
Only 9 percent of countries surveyed allow for e-petitions to be submitted to government for consideration from their national and ministry websites. The United Kingdom is one of the leaders, with features that allow citizens to sign their petitions and send them directly to the Prime Minister's Office. E-petition was reviewed as a separate item in the 2010 Survey, whereas in 2008 it was grouped with other electronic tools.

Table 5.6 **Web 2.0 tools used in e-decision-making**

Feature	Number of countries	Percent
Online discussion forums	32	17
Archive of past discussion forums	27	14
Government officials respond to citizen input	16	8
Government officials moderate e-consultations	8	4
Online petitions	17	9
Online voting	17	9

The percentage of countries with government officials responding to citizen feedback is slightly higher in 2010 than it was in 2008. For the most part, government officials at the local levels have a higher level of response to citizen feedback. As in the past, the 2010 Survey only captures data at the national level. It does not include any data on e-government at the local level. Table 5.6 looks at the range of Web 2.0 tools used in e-decision-making.

Figure 5.5 **Ministry websites with e-consultation features**



5.2 Questions of access and diversity

5.2.1 The digital divide and inclusive e-government

There is some debate about how fast the digital gap is expanding, but there is no question that it is expanding. As the population continues to grow in developing countries, outpacing that of developed countries, more and more people will be joining the group of digital 'have-nots' unless governments work together to dramatically expand access to information and knowledge. One of the most critical e-government challenges facing many governments today is how to bridge the digital divide.

Even in developed countries, many elderly people, low-income individuals and families, and minorities are outside the realm of the digital society. In order for e-government to be inclusive, it must reach out to all segments of the population with e-services that meet the needs of the digitally disadvantaged.

In developing countries, expanding access to information and knowledge includes these basic steps:

- Increasing the number of Internet users and personal computer usage;
- Increasing the broadband capacity to allow for greater use of mobile devices for e-government;
- Developing content that citizens find important and useful;
- Improving education levels, so that citizens are able to use the information and knowledge provided; and
- Encouraging citizen participation.

Governments should take into account language, culture, content, accessibility and alternate delivery methods in e-services to all segments of the population.

Inclusive planning with citizens prior to the implementation and delivery of services is critical to the success of most e-services. Top-down approaches do not always work. Segments of society that are consulted are more likely to use the e-services when they are operational. Outreach early on allows governments to take time to communicate with the beneficiaries of the service prior to its development.

Another aspect of inclusive e-government is service personalization. Personalized and user-driven services should meet and reinforce shared expectations and principles of social justice as well as personal and public value, so they must also be genuinely universal and available to all.[3]

Inclusive e-government means using a variety of interfaces such as voice, touch-screen and other modalities in the future. The use of multi-channel systems is also important, not only personal computers and the Internet, but also mobile devices, telephone, digital TV, kiosks, etc. Thus, the technology should also result in simplicity, flexibility and choice, with any complex systems hidden to users.[4]

Box 5.2 **Singapore's REACH**

Singapore: Government policies and issues

http://app.reach.gov.sg/reach/

The Government of Singapore assigned the REACH portal as the main online platform for e-engagement on public policies and issues. To encourage online engagement with citizens, ministries and agencies use REACH for announcements and feedback exercises such as the annual budget and rallies for May Day and National Day. A dedicated micro-site provides details of the consultation exercise as well as information on budget-related issues. Citizens post their feedback and suggestions on the micro-site's discussion threads and, in addition, citizens not online are involved in the feedback exercise through a series of face-to-face dialogues.

Discussion forums are separated into two segments. Posts initiated by REACH appear in 'REACH's Discussion Corner' and posts initiated by citizens appear in 'Your Discussion Corner'. Two thirds of all discussions are initiated by citizens. The online discussion forums are considered very effective in enabling the government to gauge sentiments on the ground.

Many citizens use the multi-lingual feature to post translations and to initiate translations.

Box 5.3 **E-participation in China**

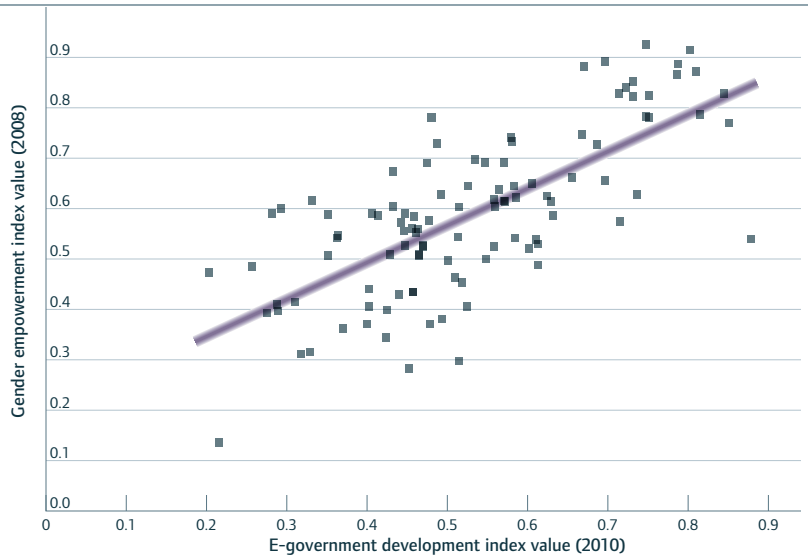
China: Netizens interact with Government officials

http://ask1.news.cn/

With increased Internet penetration in China and increasing citizenship awareness of the opportunities presented by e-participation in public affairs, the Government has been active in soliciting comments through online channels for consideration in decision-making. Drawing on ideas expressed in online discussion forums, senior government officials have revised, or in some cases eliminated, a number of administrative rules. The emerging trend of e-participation in China has been given a boost by top leaders, among them Premier Wen Jiabao who has held online chat sessions with the aim of soliciting ideas that could inform Government policy in advance of the annual meeting of the National People's Congress. E-participation has also been taken up at the working level by the State Bureau of Anti-Corruption. The agency has started to use Government discussion forums to interact with citizens and gather clues that might be relevant to corruption investigations.

Digital inclusion is not necessarily social inclusion. Social inclusion through the use of ICTs may occur when social actors use it to promote the quality of life in communities; to express local values and cultures; to enhance the political dynamics within communities, countries and regions; to advocate rights and social campaigns; to denounce injustices and to promote gender equality. The possibilities are endless, yet social inclusion requires consistent policy support from public administration

Figure 5.6 **Gender empowerment and e-government development**



frameworks. Giving a community with a piece of hardware and software means little. Socially inclusive use of ICTs requires comprehensive education on the use of ICTs to diverse groups including marginalized social or cultural groups, the disabled – and the largest group of all: women. It is a matter of promoting a change of mentality and a change in the way ICT is developed, produced and used.

5.2.2 Unequal benefits for women and men

Women will not have access or benefit equally with men to information and communication technologies, including the Internet, unless specific and targeted gender goals and strategies are implemented in ICT projects.[5] If women are not directly targeted as beneficiaries of e-governance, they will not be able to access information on government services, health and other issues which they need to support their livelihoods and well-being; nor will they be able to interact meaningfully with their governments or have a say in local governance forums and decision making. And unless specific efforts are made to meet women's information needs, they will not find information that is relevant and useful.

Research shows that the percentage of women's Internet use does not correlate directly with a country's rate of Internet reach to its population.[6] If women are not using it, who is? The typical Internet user in developing countries is a male under 35 who is urban based, speaks English and has a good education and income level. Although indicators to measure the 'gender digital divide' are few and far between, the United Nations E-Government Survey demonstrated its reality in 2005. Since the 1990s, ICT researchers studying the gender digital divide and working to develop policies to mitigate it have called for more gender-based indicators.

A few examples of 'best practices', albeit anecdotal, include women-run telecentres in South Africa, Uruguay and Zambia; use of mobile technologies in Egypt, India and Jamaica; political participation of women by provision of information on elections in the former Yugoslav Republic of Macedonia and the United Republic of Tanzania; and national machineries on gender and ICTs in Malawi.

Despite a few positive examples, ICTs and the Internet in particular remain problematic. On one hand, this technology can be harnessed to promote development projects for women and girls, to combat human trafficking and to disseminate information among women's groups. ICT can work as an organizing and development tool to promote gender equality. On the other hand, the Internet is widely used to disseminate pornography and violence against women. In the United Kingdom, a May 2006 survey by the Daily Mail found that more than 9 million men (almost 40 percent of the adult male population) as well as 1.4 million women logged on to websites containing pornography.[8] In the United States, the Secure Computing Corporation estimated 420 million individual pornographic web pages in 2005, up from 14 million in 1998.[9]

In figure 5.6, the UNDP gender empowerment measure is compared with the e-government development index in the 2010 United Nations E-Government Survey.[10] Overall, there is a link

Box 5.4 **Women in rural India gain Internet access**

Government centres for e-Seva (e-services) have been set up in rural areas across India. The e-Seva effort in West Godavari district, Andhra Pradesh, was initiated to introduce C2C (citizen-to-citizen) and C2G (citizen-to-government) services in rural areas, particularly to women. Internet kiosks or e-Seva centres at the block level were put under the control of women's self-help groups. Over time, women became active users of the services and technologies offered at the centres, and the kiosks became an important interface for communication and transactions between the local administration and the community. The women managing the e-Seva centres have become information intermediaries and information leaders in their villages, with improved standing and increased influence as a result. Members of the e-Seva collective also travel from village to village with a portable receipt printer to provide utility payment services.[7]

between e-government development and gender empowerment although it would be wrong to conclude from this that gender-sensitive e-government policies are responsible. When telecommunication infrastructure and human capital are removed from the equation, the connection between e-government development and gender empowerment is found to be weak. This suggests that economic and social progress in general leads both to higher levels of e-government development and gender empowerment but that online public services as currently designed may not be contributing much to reduction of inequality between women and men.

Countries that wish to advance on gender equality goals may wish to explore the opportunities offered by e-government in general, and e-participation in particular, to reduce the gender gap.

For ICTs including the Internet, among the first steps are governmental policies addressing:

- Gender-conscious ICT policy development;
- Enactment of legal frameworks to promote ICTs for gender equality;
- Improved cross-jurisdictional coordination to promote gender equality across the actions of public administration institutions;
- Funding for gender equality initiatives using ICTs;
- Closer cooperation between electoral bodies and gender groups.

Information and communication technology, including the Internet, is a powerful enabler of development. It is realizing important efficiency and productivity gains when applied in the private sector, public sector management, health, and education programmes. ICTs are also connecting rural and remote populations to the global knowledge economy and supply chain.[11] Yet harnessing the power of the Internet for the good of all citizens is a goal that requires gender-specific action, in the same way that targeted action for gender equality is called for in the Millennium Development Goals.

The trend towards an increasing gender digital divide is alarming, as is and the tremendous difference between the volume of Internet content that denies women's rights in contrast to content that promotes them. These trends are particularly alarming when considering the array of internationally agreed development goals promoting gender equality. ■

Chapter 6

Measuring e-government

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Reliable and relevant e-government measurement can offer crucial signposts to point policy makers and practitioners in the right direction. Yet, how does one go about measuring e-government given the diversity of approaches? Some important common threads include a country's economic strength, technological development and aggregate level of education. All three of these factors pertain to capacity, and two of them – technology and education – are combined with a direct assessment of the state of national online services to produce the United Nations e-government development index.

Although methodological work on the United Nations e-government survey has helped elucidate some of the issues in e-government measurement, there is no formal agreement on a common international framework. There is also no single view of how such indicators should be designed so that they remain relevant and practical over time.

6.1 Towards consensus on indicators

The United Nations e-government development index is widely recognized as an authoritative measure of public sector capacity to provide electronic and mobile services. It is nonetheless one of several measurement instruments developed by public and private sector organizations to meet their own needs for assessing the state of e-government development.[1] Many of these assessments include a scan of governmental online services in combination with data from national statistical offices, information on e-government policy and indicators of administrative efficiency. The measurement techniques are diverse, yet some common threads emerge. All of these efforts reflect an increasing focus on the user dimension and the demand side of e-government, on outcome and impact measurement, and on connection with national policy objectives.

What's needed is international consensus about how to assess e-government performance. An international task force on e-government indicators was established in 2006 through the Partnership on Measuring ICT for Development, of which the United Nations Department of Economic and Social Affairs is a member.[2] The task force will recommend a core set of measures to be collected by governments. The aim is to root out inconsistency in definitions, methodology, reporting and monitoring of e-government development across countries and levels of government, while supporting international benchmarking efforts. A draft list of core indicators under consideration by the task force is shown in table 6.1.

There are substantial challenges to monitoring the efficacy of e-government development. Most of the statistics are derived from supply side indicators and often by website assessments alone. Little information is yet available on the demand side of e-government. Few surveys exist that would indicate 'how' citizens use these services and 'what' they see as maximizing public value.

Other significant questions for measurement experts are how to define the scope of governmental agencies, how to handle the issue of outsourced government functions, and how to accommodate heterogeneity among national and local institutions. Collecting internationally comparable data at the local level – where it even exists – is especially difficult due to differences in political and economic systems. A public function that is highly centralized in one country may be highly decentralized in another.

Another challenge relates to the pace of technological innovation, which needs to be taken into consideration when designing a framework for measuring e-government and monitoring its effects. Information technology continues to evolve rapidly. Five years ago, there were about 150 million fixed broadband subscribers in the world, mostly in developed regions; in 2009, there are some 500 million. The number of mobile cellular subscribers worldwide jumped from 1.3 billion in 2003 to 4.1 billion only five years later, with exponential growth in development countries. Governments trying to keep pace with technology may find themselves having to reconfigure services for emerging media. To get a clear picture of e-government development, international standards will also need to keep pace.

Table 6.1 **Task Group on E-Government of the Partnership on Measuring ICT for Development – draft list of core e-government indicators**

Capacity indicators	
EG1	Percent of staff in government institutions with a computer, disaggregated by gender
EG2	Percent of staff in government institutions with Internet access at the office, disaggregated by gender
EG3	Percent of government institutions with websites and/or databases
EG4	Percent of government institutions with corporate networks (LAN, intranet, extranet)
EG5	Percent of government institutions offering mobile phone technology accessible platforms
EG6	Percent of ICT personnel in government institutions, disaggregated by gender
EG7	Number of intrusions and hacking of networks and websites of government institutions
EG8	Percent of spam messages per total email messages received
EG9	Percent of expenditure on ICT per total expenditure of government institutions
EG10	Percent of ICT budget spent on institutional capacity-building and human resource development
EG11	Percent of government institutions with access to the Internet by type of access (narrowband, fixed broadband, mobile broadband)
Usage indicators	
EG12	Percent of open source software vis-à-vis proprietary
EG13	Percent and type of applications used, e.g. word processing, accounting, data base, website
EG14	Percent of staff in government institutions who are trained on use of ICTs, disaggregated by gender
Transformation indicators	
EG15	Percent of government institutions providing services online and type of services; e.g. retrieval and printing of online forms, use of interactive online forms, online bids, payment of bills, tax filing applications, company registration, car registration, voting, public grievance systems, online feedback
EG16	Percent of requests processed using ICTs vis-à-vis overall number of requests
EG17	Percent of requests processed online vis-à-vis overall number of requests processed using ICTs
EG18	Degree of satisfaction of e-government service users, disaggregated by gender

Source: Partnership on Measuring ICT for Development (2009)

Ultimately, the challenge is to assess impact. A few studies exist about the utility citizens derive from e-government, mostly relating to the performance of government in developed countries, but even less is known about the impact of e-government programmes on national development goals. E-government can serve as a conduit to strengthen the relationship between government and society, but in what way and why?

6.2 Assessing online services and e-participation

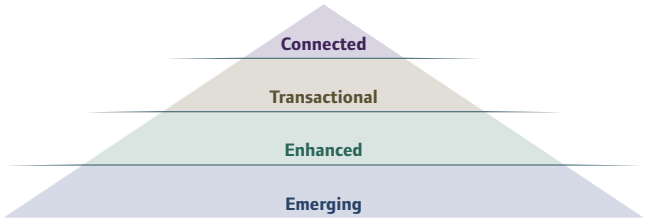
Online services

Evaluation of the quality, scope and utility of online services is one of the more straightforward aspects of e-government performance measurement. On the surface, indicators of electronic and mobile service delivery are conceptually easy. Does the government provide information on essential services? Is there a search feature and a site map available on every website? Can public services be accessed online? Are these e-services integrated with one another?

In practice, evaluation of online services is never that simple. Just as there is tremendous complexity in public performance measurement in general, so too are there substantial definitional and methodological challenges in monitoring and evaluating the efficiency and effectiveness of public service delivery through online media. Even an innocent-sounding question about the presence of a site map requires a considered response. After all the boundaries of a website are not always clear, nor is there is any standard of what a site map is, where it should appear and how it should be labelled.

Any serious effort at understanding the state of governmental online services calls for (1) careful consideration of the types of interaction expected among citizens, businesses and governmental actors and (2) some assumptions about minimally acceptable interface design across a range of technologies. Evaluation methods need structure, simplification and flexibility in evaluation methods, given the diversity of contexts and options for service provision.

Box 6.1 **The four stages of online service development**



Stage 1 **Emerging information services**

Government websites provide information on public policy, governance, laws, regulations, relevant documentation and types of government services provided. They have links to ministries, departments and other branches of government. Citizens are easily able to obtain information on what is new in the national government and ministries and can follow links to archived information.

Stage 2 **Enhanced information services**

Government websites deliver enhanced one-way or simple two-way e-communication between government and citizen, such as downloadable forms for government services and applications. The sites have audio and video capabilities and are multi-lingual. Some limited e-services enable citizens to submit requests for non-electronic forms or personal information, which will be mailed to their house.

Stage 3 **Transactional services**

Government websites engage in two-way communication with their citizens, including requesting and receiving inputs on government policies, programmes, regulations, etc. Some form of electronic authentication of the citizen's identity is required to successfully complete the exchange. Government websites process non-financial transactions, e.g. e-voting, downloading and uploading forms, filing taxes online or applying for certificates, licenses and permits. They also handle financial transactions, i.e. where money is transferred on a secure network to government.

Stage 4 **Connected services**

Government websites have changed the way governments communicate with their citizens. They are proactive in requesting information and opinions from the citizens using Web 2.0 and other interactive tools. E-services and e-solutions cut across the departments and ministries in a seamless manner. Information, data and knowledge is transferred from government agencies through integrated applications. Governments have moved from a government-centric to a citizen-centric approach, where e-services are targeted to citizens through life cycle events and segmented groups to provide tailor-made services. Governments create an environment that empowers citizens to be more involved with government activities to have a voice in decision-making.

The online services index is one of three components of the United Nations e-government development index. It attempts to capture a country's performance in a single internationally-comparable value using a four-stage model of online service maturity. The model assumes, based on extensive observation and reflection among experts, that countries typically begin with an emerging online presence with simple websites, progress to an enhanced state with deployment of multimedia content and two-way interaction, advance to a transactional level with many services provided online and governments' soliciting citizen input on matters of public policy, and finally to a connected web of integrated functions, widespread data sharing, and routine consultation with citizens using social networking and related tools.

E-participation

Assessment of e-participation is an area that requires particular attention. It is less well-defined than the quality, scope and utility of online service delivery but no less important to the realization of citizen-centric governance. This is particularly relevant at the local level where individuals are most likely to come into contact with public agencies. To what degree are governments providing supporting information, actively consulting with citizens through online channels, and involving them in decision-making as a matter of course? Each of these aspects of citizen-centric governance must be defined in concrete, measurable terms, and corresponding data collected, in order to monitor the relationship between online services and citizen empowerment.

The e-government development index is complemented by an e-participation index. This index attempts to bring some order to measurement of e-governance by positing the relevance of three factors in citizen engagement: electronic information dissemination, electronic consultation and electronic participation in decision-making.

Electronic information dissemination entails communication among government, citizens and businesses that supports policy-making. For citizens to become engaged in public policy, laws and regulations must be readily accessible, strategies and policies explained, and options under consideration clearly presented. This must be done with regard for inclusion of all segments of society, including rural or isolated areas. This information could be distributed via online newsletters, forums, blogs, community networks, text messaging, email, open data or other services.

Electronic consultation entails communication between government, citizens and businesses at the initiative of the government itself. For consultation to be effective, and for citizens to trust the outcome, feedback from citizens needs to be acknowledged with an appropriate response. For example, policy makers may report on the outcome of dialogue with citizens by summarizing the positions of various stakeholders and announcing a way forward. Relevant e-government tools include polls, surveys, chat rooms, blogs, social networks, newsgroups and other interactive services that facilitate engagement. Online consultation might also be initiated by citizen groups as in the case of electronic petitions.

Electronic participation in decision-making entails communication between citizens and government that results in direct citizen input into public policy. Governments elicit feedback from citizens and businesses on government proposals. Alternatively, citizen's groups might introduce their own proposals for creating or amending public policies or programmes to be taken up by political representatives and government officials.

6.3 Accounting for capacity constraints

E-government development is often impeded by constraints in public sector capacity. Such limitations often originate in the fragmented information systems that often accompany organizational complexity and, to a lesser degree, in deficiencies in ICT skills in the public sector work force. These problems are by no means the exclusive domain of developing countries. Indeed, early adopters of information technology in regions with expansive public institutions and programmes may find themselves called upon to integrate back office systems for improved e-government performance in the face of entrenched organizational structures designed with precisely the opposite purpose in mind, to delegate and decentralize administrative authority. Another common constraint in the public sector is the need to change mindset and behaviour, a process that can be enabled by appropriate skills development and institutional incentives to address some of the risk associated with implementing individual e-government initiatives.

Recognizing the importance of a supportive institutional framework, the United Nations E-Government Survey includes an indicator in its development index to capture the existence of a government-wide chief information officer or equivalent post for coordinating national e-government policy. This is a start. Future work on measuring e-government capacity within the public sector might usefully expand beyond ICT infrastructure

and human resource issues to cover, where feasible, adherence to recommended practice in design of institutional machinery, laws, regulations, policies and standards.

Constraints in public sector capacity extend to work processes and the need to measure the connectedness of public agencies behind the scenes. This would be a way of gauging a government's capacity to respond to citizen preferences for simplified access to online services. Despite the association between efficient administration and public satisfaction levels, work on measurement of ICT within the public sector has so far been quite limited. A newly developed set of indicators should assess the internal processes, systems and organizational arrangements required to support efficient e-government functions and better service delivery.

Capacity constraints are very much present on the demand side of the e-government equation as well. Here questions of national ICT development, human capital and service delivery preferences come into play. A general picture of a population's ability to access and take advantage of online services is provided by telecommunication infrastructure indicators that cover Internet usage, diffusion of personal computers, main telephone lines, and number of mobile cellular and fixed broadband subscribers – along with literacy and education levels.

Two factors are missing from the analysis in the Survey and its indexes. First, the national capacity indicators do not provide breakdowns by population segment. This makes it difficult to assess whether certain groups are at a particular disadvantage when it comes to accessing public services over the Internet. Telecommunication infrastructure data disaggregated by sex is unavailable in most countries, for example, and is not part of the official statistics collected by the International Telecommunication Union. The same is true for different age, language, cultural and income groups, though some of this information might be derived from geo-referencing data at the sub-national level.

Second, usage of e-government services by citizens is absent from most e-government measurement frameworks. The importance of accounting for demand is well-understood by e-government experts, especially when discussing global or regional aggregates. Ways to capture demand for e-government have been suggested by the task force of the Partnership on Measuring ICT for Development. This could be accomplished by measuring the percent of requests processed using ICT as a function of the overall number of requests, the percent of requests processed online as a function of the overall number of requests processing using ICT, and the degree of satisfaction of e-government service users. None of this data would be easy to collect without a concerted effort on the part of governments.

6.4 Conclusions

A global agreement on a consistent framework for measuring e-government development is called for. Such a platform will likely avoid inconsistent meanings and interpretation by national and local governments, allow for the more effective adoption of best practice solutions from around the world and advance the international comparison of e-government usage and development.

Stakeholders, particularly at the global level, need to continue to support e-government capacity-building at the national and local levels. At the same time, model surveys should continue to be followed since they form an important source of international comparability in e-government development. Surveys such as this one by the United Nations Department of Economic and Social Affairs provide a comparative global picture of ICT in the public sector. Ongoing cooperation in performance measurement could take many forms, from articulation of e-government principles, adoption of open standards and elaboration of indicators, to information sharing, development of interoperable systems, and multilateral technical assistance. ■

Notes

Chapter 1

1 United Nations (2009i).
2 Gros and Roth (2009).
3 Gros and Roth (2009).
4 See Welch, Hinnant and Moon (2005), Tolbert and Mossberger (2006), Freed (2009), Shim and Eom (2009), and Lazer, Neblo, Esterling and Goldschmidt (2009).
5 Parent, Vandebeek and Gemino (2005).
6 Weil (2008).
7 Brito and Okolski (2009).
8 Hameed (2005).
9 Kaplan, Morillas, Rusch and Baxandall (2009).
10 Brito and Okolski (2009).
11 Pearson's r = 0.008, sig. n.s., n = 50.
12 See, for instance, Baxandall and Magnuson (2008).
13 Perez and Hernandez (2007).
14 IMF (2009c).
15 Pratchett, Durose, Lowndes, Smith, Stoker and Wales (2009).
16 For a brief description of La Plata's experience see Verclas (2009).
17 In the framework of this study, the concept of online "provision of service" is broader than the simple automation of processes and delivery of traditional government services by means of ICT. Among others, we refer to initiatives that foster collaboration, participation and transparency.
18 An initiative of the Pew Charitable Trusts in conjunction with the Sunlight Foundation, see http://subsidyscope.com/projects/bailout/.
19 See, for instance, TechCrunch (2009).
20 See, for instance, Eups20 (2009).
21 Here understood as "information that has been organised to allow identification and separation of the context of the information from its content". See The New Zealand Government State Services Commission (2002).
22 Robinson et al. 2009.
23 Launched May 2009, see http://www.data.gov/.
24 James (2009).
25 Montanez (2009).
26 For instance, the contract for the second version of the United States recovery.gov website has been valued at $18 million, see GSA (2009).
27 Robinson, Yu, Zeller and Felten (2009).
28 Open Congress is a legislative monitoring website conceived by the Sunlight Foundation, a non-governmental actor, see http://www.opencongress.org/.
29 See Meu Parlamento website, http://meuparlamento.com.br/.
30 See Apps for Democracy website, http://www.appsfordemocracy.org/.
31 See My Society website, http://cee.mysociety.org/.
32 Haque (2001).
33 Brito (2008), Perez (2008).

Chapter 2

1 Within a time period that is appropriate for dealing with pressing competition (explicit or implicit) that may be arising on a number of fronts at roughly the same time.
2 On complexity in breadth vs. in depth, see Wang and von Tunzelmann (2000). Complexity in breadth is sometimes termed 'relational complexity', while complexity in depth can be called 'cognitive complexity'.
3 Guida and Crow (2008).
4 Norris (2001).
5 Norris (2001).
6 Aldrich, Bertot and McClure (2002).
7 Robinson, Yu, Zeller and Felten (2009).
8 Pärna and von Tunzelmann (2007).
9 On the urban electricity systems, see Hughes (1983); for the national 'grid' system, see Hannah (1979); for railways, see the recent study by Mark Casson (Casson, 2009).
10 Coglianese (2005).
11 Dugdale, Daly, Papandrea and Maley (2005).
12 Coglianese (2005).
13 Crowe and Meade (2008).
14 Ward (1996).
15 Clift (2004).
16 The Chief Information Officer of the Obama administration is also the first CIO in United States history to be a strong supporter of the democratization of data. Refer to the website http://www.data.gov/ for their recent efforts to open governmental data to citizens.
17 These terms are associated with Alan Greenspan, Chairman of the United States Federal Reserve (1987-2006), who coined 'irrational exuberance' in a speech in 1996, though the term was popularized by the economist Robert Shiller in his book with that title (Shiller, 2000). 'Social capabilities' was a phrase utilized in a more positive setting by the late Moses Abramovitz in his paper, 'Catching up, forging ahead and falling behind' (Abramovitz, 1986).
18 Lo (2008).
19 Greenspan (2008).
20 Compare: Akerlof and Shiller (2009).
21 For instance, Colander, Follmer, Haas, Goldberg, Juselius, Kirman, Lux and Sloth (2009).
22 Lawson (2009).
23 Gowan (2009).
24 The reference implied here is to the seminal study by Frank H. Knight (Knight, 1921). Andrew C. Stirling (Stirling, 2007) has suggested a 2x2 matrix of 'incertitude', pitting knowledge about outcomes against knowledge about likelihoods. Knight's category of 'risk' does well on both counts – the outcomes are widely recognized, and it is possible to assign a probability to each outcome. Knight's case of 'uncertainty' is far harder to agree on a probability but the outcomes are still well understood. With 'ignorance', this latter is also lacking.
25 These were explicitly stated to lie outside our remit. Although the beginning of the crisis is conventionally linked to the September 2008 collapse of investment bankers Lehman Brothers, in fact it began earlier. The dismembering of the subprime mortgage market, for instance, began at Lehman's more than a year before.
26 Geithner (2008).
27 See also Krugman (2008).
28 Gowan (2009).
29 Montgomery Investment Technology (2002).
30 Blankfein (2009).
31 Refer to the 'Private Fund Investment Advisers Registration Act of 2009' (July, 2009), see United States Department of Treasury (2009b).
32 Lo (2009).
33 Ross (2009).
34 Some of these features would be changed by the incoming reform of the regulatory regime.
35 Perez (2002).
36 Melvin, Menkhoff and Schmeling (2009).
37 Lo (2008).
38 Blankfein (2009).
39 Blankfein (2009).
40 Abramovitz (1986).
41 von Tunzelmann (2009).
42 The earlier of the two principal studies by Wesley M. Cohen and Daniel A. Levinthal (Cohen and Levinthal), especially, stresses this point. See also the yet more widely cited subsequent paper, 'Absorptive capacity' (Cohen and Levinthal, 1990).
43 Cohen and Levinthal (1994).
44 One can talk of a 'value network' when translating the various supply chains into functions, but not of a specific 'value chain'. The terminology is a source of great confusion in the literature, a confusion that dates back to some of the original contributions by Porter. See Porter (1985).
45 The phrase 'dynamic competition' was popularized by Schumpeter early in the 20th century; see Schumpeter (1934).
46 Penrose (2009).
47 In the case of governments, 'absorptive capacity' more or less equates to evidence-based policy learning.
48 Lo (2009).
49 Colander, Follmer, Haas, Goldberg, Juselius, Kirman, Lux and Sloth (2009).
50 Lawson (2009). Hodgson (2009).
51 Von Tunzelmann (2009).
52 Mervyn A. King, speech to Scottish business organizations, 20 October 2009: "To paraphrase a great wartime leader, never in the field of financial endeavour has so much money been owed by so few to so many. And, one might add, so far with little real reform."
53 United States Department of Treasury (2009a).
54 Creative accounting refers to accounting practices that may follow the letter of the rules of standard accounting practices, but certainly deviate from the spirit of those rules. See Griffiths (1986).
55 Ross (2009).
56 IMF (2009a).
57 Blankfein (2009).
58 Blankfein (2009).
59 Krugman (2008).
60 Ross (2009).
61 For example, Hooghe and Marks (2003).

62 According to the OECD (2009), in their economic stimulus packages, countries' investment in infrastructure in terms of shares in GDP are 0.82 percent for Australia, 1.27 percent for Canada, 0.50 percent for Chile, 0.48 percent for Finland, 0.24 percent for France, 0.5 percent for Germany, 0.16 percent for Norway, 0.27 percent for Sweden, 0.072 percent for Poland, 0.03 percent for Portugal and 0.70 percent for USA. Interestingly, only Japan (among a similar though not identical group of countries) specifically mentions "promotion of e-government" among its ICT targets.
63 Tao, Cheung, Painter and Li (Eds.) (2009).
64 IMF (2009b).
65 The phrase was popularized as a possible explanation of why Great Britain fell behind during the so-called Second Industrial Revolution after 1870, rather than leading it, as it had led the previous wave.
66 In the Economist Intelligence Unit's widely supported e-readiness index for 2009, out of a total of 70 countries reported, New Zealand ranked 11th overall and Estonia 24th, both well ahead of their rea GDP per capita rankings. New Zealand scored more highly than countries such as the United Kingdom, France, Switzerland or Germany, while Estonia ranked above Spain, Italy, etc. The United States was the only large country in the top 8, ranking 5th in 2009.
67 Fransman (ed.) (2006).
68 Guida and Crow (2008).
69 Such a view is sharply at odds with that of Milton Friedman on the role of 'positive economics'. See Friedman (1953).
70 Blankfein (2009).
71 Krugman (2008).
72 EIU (2009).

Chapter 3

1 United Nations (2009i).
2 United Nations (2009e).
3 Australian Government's latest report on the country's e-government services entitled, "Interacting with Government", shows that the Internet has replaced contact in person and by telephone as the most common way people has made their last contact with government in 2008, mainly for convenience reasons, see AGMIO (2008).
4 United Nations (2003).
5 Goh (2009).
6 OECD (2009a).
7 ITU (2009).
8 Information Society Commission (2003).
9 Osimo, Centeno and Burgelman (2007).
10 ILO (2009).
11 UNDP (2009a).
12 Devanathan (2008).
13 See Royal Court Affairs website, http://www.rca.gov.om/.
14 World Summit Award (2009).
15 Hinsberg (2009).
16 See Losing Your Job website, http://www.losingyourjob.ie/.
17 See Autravail website, http://www.autravail.be/.
18 New York State Department of Labor (2009).
19 UNESCO (2009).
20 Sabhavasu (2009).
21 Global Research (2009).
22 UNESCO (2008).
23 Asian Development Bank (2009b).
24 Ablett and Slengesol (2000).
25 See Student Finance website, http://www.studentfinance.ie/.
26 Unwin (2004).
27 United Nations (2009g).
28 Trucano (2009).
29 Pouezevara and Khan (2007).
30 The Guardian Wekly (2009).
31 Gaible (2008).
32 United Nations (2009d).
33 United Nations (2009j).
34 United Nations (2009f).
35 United Nations (2009b).
36 World Bank (2009a).
37 United Nations (2009a).
38 Sirimanne (2009).
39 Lianyungang City Women's Federation (2009).
40 Kashyapb (2009).
41 Hordosch (2009).
42 World Bank (2009b).
43 Cole (2009).
44 Howell (2009).
45 See the e-Health page on ICT Qatar, http://www.ict.gov.qa/output/Page6.asp.
46 Looking Local (2009).
47 World Bank (2009c).
48 Jose and Accra (2009).
49 Environmental Systems Research Institute (2009).
50 Asian Development Bank (2009a).
51 The Australian (2009).
52 United Nations (2009c).
53 Environmental Protection Agency (2004).
54 UK Department for Communities and Local Government (2008).
55 German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2009).
56 OECD (2009b).
57 OECD (2009c).
58 Kim (2009).

Chapter 4

1 The United Nations designation of least developed countries is given based on a review and recommendation of the Committee for Development Policy, a subsidiary body of the Economic and Social Council. The current list of least developed countries includes 49 countries, 33 in Africa, 15 in Asia and the Pacific, and 1 in the Caribbean.

Chapter 5

1 W3C Consortium (2009).
2 See World Economic Situation and Prospects 2010 and World Economic Situation and Prospects Monthly Briefing, April 2009.
3 United Nations (2009k).
4 Ibid.
5 Hafkin and Hambley (2002).
6 Huyer, Hafkin et al. (2005).
7 Nath (2006).
8 Daily Mail (2006).
9 Third Way (2005).
10 UNDP (2009b).
11 World Bank (2009d).

Chapter 6

1 United Nations (2009k).
2 The Partnership on Measuring ICT for Development is composed of 11 international organizations: the International Telecommunications Union, UN Department of Economic and Social Affairs, UN Conference on Trade and Development, UNESCO Institute for Statistics, World Bank, UN Economic Commission for Africa, UN Economic Commission for Latin America and the Caribbean, UN Economic and Social Commission for Asia and the Pacific, UN Economic and Social Commission for Western Asia, the, Organization for Economic Cooperation and Development and the Statistical Office of the European Communities.

References

Ablett, J. and I.-A. Slengesol. 2000. *Education in Crisis: The Impact and Lessons of the East Asian Financial Shock 1997-99*. Thematic Studies for World Education Forum Dakar, Senegal, 26 - 28 April 2000. Paris: UNESCO.

Abramovitz, M. 1986. "Catching Up, Forging Ahead and Falling Behind". *The Journal of Economic History* 46 (2): 385-406.

African Development Bank. 2009. "Impact of the Crisis on African Economies – Sustaining Growth and Poverty Reduction, African Perspectives and Recommendations to the G20". A report from the Committee of African Finance Ministers and Central Bank Governors established to monitor the crisis, March 2009.

Akerlof, G. A. and R. J. Shiller. 2009. *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton: Princeton University Press.

Aldrich, D., J. C. Bertot and C. R. McClure. 2002. "E-Government: Initiatives, Developments, and Issues". *Government Information Quarterly* 19 (4): 349-355.

Ash, K. 2009. "National Flu Readiness Initiative Taps Curriki for E-Learning". *Education Weeks*, Digital Education.

Asian Development Bank. 2009a. *The Economics of Climate Change in Southeast Asia: A Regional Review*. Mandaluyong City: Asian Development Bank.

—— . 2009b. "Proposed Asian Development Fund Grant Mongolia: Education for the Poor – Financial Crisis Response Project". Project no. 43127, August. Manila: Asian Development Bank.

Australian Government Information Management Office. 2008. *Interacting with Government: Australians' Use and Satisfaction with e-Government Services*. Canberra: AGMIO.

Baxandall, P. and B. Magnuson. 2008. *Transparency.gov 2.0: Using the Internet for Budget Transparency to Increase Accountability, Efficiency and Taxpayer Confidence*. Boston: Masspirg Education Fund.

Beyerstein, L. 2009. "Women's Groups See Success in Stimulus - Feminist Organizations Say Pressure Campaign Paid Off". *The Washington Independent*, 29 January.

Blankfein, L. C. 2009. "Lessons from the Financial Crisis". A transcript of remarks by L. C. Blankfein to the Council of Institutional Investors, Spring Meeting, April 2009. *The Harvard Law School Forum on Corporate Governance and Financial Regulation*.

Brito, J. 2008. "Hack, Mash & Peer: Crowdsourcing Government Transparency". *Columbia Science and Technology Review* 9: 119-157.

Brito, J. and G. Okolski. 2009. *The Cost of State Online Spending-Transparency Initiatives*. Arlington, VA: George Mason University, Mercatus Center.

Casson, M. 2009. *The World's First Railway System: Enterprise, Competition, and Regulation on the Railway Network in Victorian Britain*. Oxford: Oxford University Press.

Clift, S. L. 2004. "E-Government and Democracy: Representation and Citizen Engagement in the Information Age". *Publicus.Net*.

Coglianese, C. 2005. "The Internet and Citizen Participation in Rulemaking". *I/S: A Journal of Law and Policy for the Information Society* 1: 33-57.

Cohen, W. M. and D. A. Levinthal. 1989. "The Two Faces of R&D". *Economic Journal* 99: 569-596.

—— . 1990. "Absorptive Capacity". Administrative Science Quarterly 35: 128-156.

—— 1994. "Fortune Favors the Prepared Firm". *Management Science* 40: 227-251.

Colander, D., H. Follmer, A. Haas, M. Goldberg, K. Juselius, A. Kirman, T. Lux and B. Sloth. 2009. "The Financial Crisis and the Systemic Failure of Academic Economics". *Kiel Working Paper No. 1489*. Kiel, Germany: Kiel Institute for the World Economy.

Cole, A. 2009. "Hard times: Public services and the Financial Crisis - Stronger, Leaner, Fitter…" *Guardian Newspaper*, 10 June.

Crowe, C. and E. E. Meade. 2008. "Central Bank Independence and Transparency: Evolution and Effectiveness". *European Journal of Political Economy* 24: 763-777.

Devanathan, G. K. 2008. "Biometric Smart Card". *Information Technology for Developing Countries – A Newsletter of the IFIP Working Group 9.4 and Center for Electronic Governance, Indian Institute of Management, Ahmedabad*: 18 (3): 20-23. Ahmedabad: Centre for Electronic Governance and Indian Institute of Management.

Dugdale, A., A. Daly, F. Papandrea and M. Maley. 2005. "Accessing e-Government: Challenges for Citizens and Organizations". *International Review of Administrative Sciences* 71 (1): 109-118.

Economist Intelligence Unit. 2009. *E-Readiness Rankings 2009: the Usage Imperative*. EIU and IBM Institute for Business Value.

Environmental Systems Research Institute. 2009. "Algonquin Forestry Authority in Central Ontario, Canada, Moves Toward Paperless Reporting and Analysis: Using GIS Across the Forest". *ESRI ArcNews Online,* Winter 2008/2009.

ePractice.eu. 2009. "IS: Ministry of Education Enhances Use of Free and Open Source Software in Schools". http://www.epractice.eu/en/news/293747/. Accessed October 2009.

Eups20. 2009. *"Phase 2 Results"*. http://eups20.wordpress.com/phase-two-results/. Accessed September 2009.

Fransman, M. (Ed.). 2006. *Global Broadband Battles: Why the U.S. and Europe Lag While Asia Leads*. Palo Alto, CA: Stanford University Press.

Freed, L. 2009. "Online Transparency, Satisfaction and Trust: A Study of the Relationship Between Key Concepts and Goals of the Obama Administration". *Foresee Results*.

Friedman, M. 1953. *Positive Economics*. Chicago: University of Chicago Press.

Gaible, E. 2008. *Survey of ICT and Education in the Caribbean: A Summary Report, Based on 16 Country Surveys*. Washington, D.C.: World Bank, Information and Development Program.

Geithner, T. F. 2008. "Reducing Systemic Risk in a Dynamic Financial System". Speech at the Economic Club of New York, New York City. *Federal Reserve Bank of New York*, 9 June.

Germany, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. 2009. "Your community in the Climate Atlas". http://www.ufz.de/data/flyer_dein_klima8966.pdf.

Global Research. 2009. "UNESCO Study Warns of Extreme Financial Crisis Impact on Africa". http://www.globalresearch.ca/index.php?context=va&aid=12542. Accessed March 2009.

Goh, C. T. 2009. "Good Governance for Effective e-Government". Speech by Mr. Goh Chok Tong, Senior Minister, at the IGOV Global Exchange Opening, June 2009, at the Suntec International Convention Center, Singapore.

Gowan, P. 2009. "Crisis in the Heartland: Consequences of the New Wall Street System". *New Left Review* 55 (Jan-Feb): 5-29.

Greenspan, A. 2008. "We Will Never Have a Perfect Model of Risk". *Financial Times*, 17 October.

Griffiths, I. 1986. *Creative Accounting: How to Make Your Profits What You Want Them to Be?* London: Sidgwick and Jackson Ltd.

Gros, D. and F. Roth. 2009. *The Crisis and Citizens' Trust in Central Banks*. Brussels: Centre for European Policy Studies.

Guida, J. and M. Crow. 2008. "E-Government and e-Governance". In T. Unwin (Ed.), *ICT4D – Information and Communication Technologies for Development*. Cambridge: Cambridge University Press.

Hafkin, N. and H. Hambley. 2002. "Gender, ICTs and Agriculture: A Situation Analysis for the 5th Consultative Expert Meeting of CTA's ICT Observatory meeting on Gender and Agriculture in the Information Society". http://www.agricta.org/observatory2002/background_paper.pdf. Accessed December 2009.

Hameed, F. 2005. "Fiscal Transparency and Economic Outcomes". Working *Paper No. 05/225*. Washington, D.C.: International Monetary Fund.

Haque, M. S. 2001. "The Diminishing Publicness of Public Service Under the Current Mode of Governance". *Public Administration Review* 61 (1): 65-78.

Hannah, L. 1979. *Electricity before Nationalisation*. Hampshire: Palgrave Macmillan.

Hinsberg, H. 2009. "My better Estonia". *Increasing Citizen Engagement in Government., The Intergovernmental Solutions Newsletter*, Fall 2009: 20-21. Washington, D.C.: Center for Intergovernmental Solutions, U.S. General Services Administration Office of Citizens Services and Communications.

Hodgson, G. M. 2009. "The Financial Crisis: How Economists Went Astray". http://emmarogan.wordpress.com/2009/10/23/the-financial-crisis-how-economists-went-astray/. Accessed October 2009.

Hooghe, L. and G. Marks. 2003. "Unraveling the Central State, But How?: Types of Multi-Level Governance". *Political Science Series No. 87*. Vienna: Institute for Advanced Studies.

Hordosch, S. (2009). "ICT and Gender Equality: New Opportunities and Challenges for Public Administration to Implement the MDGs". Paper prepared for the 2010 Committee of Experts for Public Administration meeting, 19-23 April 2010, New York.

Howell, C. 2009. "Stimulus Package Contains $19 Billion for Health Care Technology Spending and Adoption of Electronic Health Records". Guest Column on Wisconsin Technology Network, 15 February.

Hughes, T. P. 1983. *Networks of Power: Electrification in Western Society, 1800-1930*. Baltimore: Johns Hopkins University Press.

Huyer, S., N. Hafkin et al. 2005, Gurumurthy 2006 and Huyer, 2009. "We are no longer ignorant: e-Governance strategies to overcome the gender divide." Unpublished paper.

India, Ministry of Communications and Information Technology. 2009. "Core & Support Infrastructure, Common Services Centre". http://www.mit.gov.in/default.aspx?id=825. Accessed December 2009.

Information Society Commission. 2003. *E-Government: More Than an Automation of Government Services*. Dublin: Information Society Commission.

International Labour Organization. 2009a. *Global Employment Trends*. Geneva: ILO.

——. 2009b. Recovering From the Crisis: A Global Jobs Pact. Geneva: ILO.

International Monetary Fund. 2009a. *Initial Lessons of the Crisis for the Global Architecture and the IMF*. Washington, D. C.: IMF, Strategy, Policy, and Review Department.

——. 2009b. "Standards and Codes". http://www.imf.org/external/standards/index.htm. Accessed July 2009.

——. 2009c. "General Data Dissemination System". http://dsbb.imf.org/Applications/web/getpage/?pagename=gddshome. Accessed December 2009.

International Telecommunication Union. 2009. *Measuring the Information Society: The ICT Development Index*. Geneva: ITU.

James, T. 2009. *"Calling Open Data Developers: We Need Your Help"*. Cabinet Office, *Digital Engagement Blog, 30 September*.

Jose, S. and G. Accra. 2009. "Ghana Leads the World in ICT for Health". http://africanliberty.org/node/776. Accessed September 2009.

Kaplan, S., P. Morillas, E. Rusch and P. Baxandall. 2009. *California Budget Transparency 2.0: Online Tools for Better Government*. Sacramento: Calpirg Education Fund.

Kashyapb, S. 2009. "Microfinance: Leveraging ICTs". *ICTs and Microfinance* 7 (6): 6-8.

Kim, D-C. 2009. "Korean Experience of Overcoming Economic Crisis through ICT Development". ESCAP technical paper no. IDD/TP-09-01. Bangkok: United Nations, Economic and Social Commission for Asia and the Pacific.

Knight, F. H. 1921. *Risk, Uncertainty, and Profit*. Boston: Houghton-Mifflin.

Krugman, P. R. 2008. *The Return of Depression Economics and the Crisis of 2008*. New York: W.W. Norton.

Lawson, T. 2009. "The Current Economic Crisis: Its Nature and the Course of Academic Economics". *Cambridge Journal of Economics* 33: 759-777.

Lazer, D., M. Neblo, K. Esterling and K. Goldschmidt. 2009. *Online Town Hall Meetings: Exploring Democracy in the 21st Century*. Washington, D.C.: Congressional Management Foundation.

Lianyungang City Women's Federation. 2009. "Lianyungang City Women's Federation on the Financial Crisis the Situation of Women's Employment, Entrepreneurship Research". http://www.women.org.cn/allnews/02/2524.html. Accessed June 2009.

Lo, A. W. 2008. "Hedge Funds, Systemic Risk, and the Financial Crisis of 2007-2008: Written Testimony for the House Oversight Committee Hearing on Hedge Funds". *Working Paper*. Cambridge, MA: MIT Sloan School of Management and National Bureau of Economic Research.

——. 2009. "Regulatory Reform in the Wake of the Financial Crisis of 2007-2008". *Working Paper*. Cambridge, MA: MIT Sloan School of Management and National Bureau of Economic Research.

Looking Local. 2009. "Looking Local Launches on Nintendo Wii". http://www.digitv.gov.uk/site/news/2009-02-12-wii.html. Accessed February 2009.

Mattera, P., L. McIlvaine, C. Laicy, M. Lee and T. Cafcas. 2009. *Show Us the Stimulus: an Evaluation of State Government Recovery Act Websites*. Washington, D.C.: Good Jobs First.

Melvin, M., L. Menkhoff and M. Schmeling. 2009. "Exchange Rate Management in Emerging Markets: Intervention via An Electronic Limit Order Book". *Journal of International Economics* 79: 54-63.

mHealth Alliance. 2009. "mHealth Spotlight: Rwanda's Forward-Looking mHealth Activities". *mPulse: eNewsletter of the mHealth Alliance* 1 (5).

Montanez, L. 2009. "Your Input Wanted on Recovery.gov Data". *Sunlight Labs*, 24 September.

Montgomery Investment Technology. 2002. "Warren Buffet on Derivatives". Camden, NJ: Montgomery Investment Technology.

Nath, 2006, "Empowerment of Women through ICT-empowered Networks" in *Cinderella or Cyberella: Empowering Women in the Knowledge Society*. Hafkin and Huyer. Bloomfield: Kumarian Press.

New York State Department of Labor. 2009. "Governor Paterson Announces State-of-the-Art, Web-Based System in Albany that Electronically Connects the Unemployed with Potential Job Openings". http://www.labor.state.ny.us/pressreleases/2009/October16_2009.htm. Accessed October 2009.

New Zealand State Services Commission. 2002. *A New Zealand E-Government Interoperability Framework (e-GIF)*. Canberra: New Zealand State Services Commission, E-Government Unit.

Norris, P. 2001. *Digital Divide: Civic Engagement, Information Poverty and the Internet*. Cambridge: Cambridge University Press.

Obama, B. 2008. "Connecting and Empowering All Americans through Technology and Innovation". http:// www.barackobama.com/.

Organization for Economic Co-operation and Development. 2009a. *Focus on Citizens: Public Engagement for Better Policy and Services*. Paris: OECD.

——. 2009b. "The Financial and Economic Crisis: Impact on e-Government in OECD Countries". Prepared for the 5th Ministerial eGovernment Conference, 19-20 November 2009, Malmo, Sweden.

——. 2009c. *Rethinking e-Government Services: User-centred approaches*. Paris: OECD.

Osimo, D., C. Centeno and J.-C. Burgelman. 2007. "Web 2.0 for eGovernment: Why and How?". Presentation at the 4th Ministerial eGovernment Conference, 19-21 September 2007, Lisbon, Portugal.

Pakistan. 2008. "Inaugurating NADRA e-Sahulat Project". News release from the Government of Pakistan website. http://202.83.164.26/wps/portal/Moi/. Accessed November 2008.

Parent, M., C. A. Vandebeek, and A. C. Gemino. 2005. "Building Citizen Trust through e-Government". *Government Information Quarterly* 22 (4): 720-736.

Pärna, O. and N. von Tunzelmann. 2007. "Innovation in the Public Sector: Key Features Influencing the Development and Implementation of Technologically Innovative Public Services in the UK, Denmark, Finland and Estonia". *Information Polity* 12 (3): 109-126.

Partnership on Measuring ICT for Development. 2009. "Draft list of e-government indicators". http://www.itu.int/ITU-D/ict/conferences/rio09/. Accessed January 2010.

Penrose, E. M. 2009. *The Theory of the Growth of the Firm, [1959]*. 3rd edition. New York: Oxford University Press.

Perez, C. 2002. *Technological Revolutions and Financial Capital*. Northampton, MA: Edward Elgar.

Perez, C. C. and A. M. L. Hernandez. 2007. "E-government and Public Financial Reporting: the Case of Spanish Regional Governments". American Review of Public Administration 37 (2): 142-177.

Porter, M. E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press.

Pouezevara, S. Lucas and R. Khan. 2007. "Innovative Information and Communication Technology in Education and Its Potential for Reducing Poverty in the Asia and Pacific Region: Summary of Findings 'Learning Communities Enabled by Mobile Technology: A Case Study of School-based, In-service Secondary Teacher Training in Rural Bangladesh'". Prepared by RTI International for Developed for the October 2007 International Conference on ICT for Education, under Asian Development Bank, TA No. 6278-REG. Manila: Asian Development Bank.

Pratchett, L., C. Durose, V. Lowndes, G. Smith, G. Stoker and C. Wales. 2009. *Empowering Communities to Influence Local Decision Making: A Systematic Review of the Evidence*. London: Department for Communities and Local Government.

Robinson, D., H. Yu, W., P. Zeller and E. W. Felten. 2009. "Government Data and the Invisible Hand". *Yale Journal of Law and Technology* 11: 160-175.

Ross, V. 2009. "Lessons from the Financial Crisis". Speech at the Chatham House Conference on Global Financial Regulation, 24 March 2009, Bloomberg, London.

Sabhavasu, K. 2009. "Thailand's Policy Orientation under Global Turbulence: Making the Most of the ASEAN Economic Integration". Speech at the 15th Nikkei International Conference on "The Future of Asia" on Friday 22nd May 2009, Tokyo.

Schumpeter, J. A. 1934. *The Theory of Economic Development*. 1st English Edition. Boston: Harvard University Press.

Shiller, R. 2000. *Irrational Exuberance*. Princeton: Princeton University Press.

Shim, D. C. and T. H. Eom. 2008. "E-Government and Anti-Corruption: Empirical Analysis of International Data." *International Journal of Public Administration* 31 (3): 298-316.

Sirimanne, S. 2009. "Emerging issue: The Gender Perspectives of the Financial Crisis". Written statement at the Interactive Expert Panel, Commission on the Status of Women, Fifty-third session, New York, 2-13 March 2009.

Smart Technology. 2007. "Shrinking Australia with ICT". *Interactive Classroom* 2 (2): 1-2.

Stirling, A. C. 2007. "Risk, Precaution and Science: Towards a More Constructive Policy Debate". *Science and Society* 8: 309-315.

Tao, J., A. B. L. Cheung, M. Painter and C. Li (Eds.). 2009. *Governance for Harmony in Asia and Beyond*. Florence: Routledge.

TechCrunch. 2009. "Gov 2.0: It's All About The Platform". http://www.techcrunch.com/2009/09/04/gov-20-its-all-about-the-platform/. Accessed July 2009.

Telecentre Magazine. 2008. "Transforming Rural India: 600,000 Villages: Over 100,000 Telecentres". Interview summery with R. Chandrashekhar, Additional Secretary e-Governance, Government of India, Telecentre Magazine, 6 June, India.

The Australian. 2009. "NBN to cut power bills: Conroy". http://www.theaustralian.com.au/news/nbn-to-cut-power-bills-conroy/story-e6frgal6-1225704763430. Accessed April 2009.

The Daily Mail. 30 May 2006. "Downloads of Net porn hit record high". http://www.dailymail.co.uk/news/article-388134/. Accessed December 2009.

The Guardian Weekly. 2009. "Bangladesh Gets Mobile Lessons". http://www.guardianweekly.co.uk/?page=editorial&id=1342&catID=18. Accessed November 2009.

Third Way. 2005. "The Porn Standard: Children and Pornography on the Internet". http://www.thirdway.org/publications/14/. Accessed December 2009.

Tolbert, C. J. and K. Mossberger. 2006. "The Effects of E-Government on Trust and Confidence in Government". *Public Administration Review* 66 (3): 354-70.

Trucano, M. 2009. "Checking in with BridgeIT in Tanzania: Using Mobile Phones to Support Teachers". http://blogs.worldbank.org/edutech/checking-in-with-bridgeit-in-tanzania/. Accessed September 2009.

United Kingdom Department of Communities and Local Government. 2008. *An e-Government Truth Potential CO2 Efficiencies from Online Provision of Local Government Services*. London: Department of Communities and Local Government.

United Nations. 2003. *UN Global E-Government Survey 2003*. New York: United Nations.

——. 2009a. "Economic Crisis Set to Drive 53 Million More People into Poverty in 2009 – World Bank". http://www.un.org/apps/news/story.asp?NewsID=29897. Accessed February 2009.

——. 2009b. "Government Must Focus on Women as Economic Agents During Global Financial Crisis". Document no. WOM/1721. New York: United Nations, Department of Public Information.

——. 2009c. *Good Practices and Innovations in Public Governance, UN Public Service Awards Winners and Finalists, 2003-2009*. New York: United Nations, Department of Economics and Social Affairs.

——. 2009d. "Outcome of the Conference on the World Financial and Economic Crisis". Resolution adopted by the General Assembly, 9 July 2009. Document no. A/RES/63/303. New York: United Nations.

——. 2009e. "The World Financial and Economic Crisis and Its Impact on Development".

Report of the Secretary-General, Conference on the World Financial and Economic Crisis and Its Impact on Development. Document no. A/CONF.214/4. New York: United Nations.

——. 2009f. *Millennium Development Goals Report 2009*. New York: United Nations, Department of Economics and Social Affairs.

——. 2009g. "New Partnership for Africa's Development: Seventh Consolidated Progress Report on Implementation and International Support". Report of the Secretary-General. Document no. A/64/204. New York: United Nations.

——. 2009h. *MDG Gap Task Force Report 2009: Strengthening the Global Partnership for Development in a Time of Crisis*. New York: United Nations.

——. 2009i. "LINK Global Economic Outlook". Prepared for Expert Group Meeting on the World Economy (Project LINK), 26-28 October 2009, Bangkok, Thailand. New York: United Nations, Department of Economics and Social Affairs.

——. 2009j. *World Survey on the Role of Woman in Development*. New York: United Nations, Department of Economics and Social Affairs.

——. 2009k. "Report of the Expert Group Meeting on the E-Government Survey: Getting to the Next Level". New York: United Nations, Department of Economics and Social Affairs.

United Nations Development Programme. 2009a. "E-gov CoP Report". New York: UNDP.

—— . 2009b. "Gender empowerment measure and its components", pp. 186-190, in *Human Development Report 2009*. New York: UNDP.

United Nations Educational, Scientific and Cultural Organization. 2008. *EFA Global Monitoring Report 2009 - Overcoming Inequality: Why Governance Matters*. Paris and Oxford: UNESCO and Oxford University Press.

—— . 2009. "Financial Crisis: Education Budgets Weather the Storm – So Far". http://www.unesco.org/en/education/dynamic-content-single-view/news/financial_crisis_education_budgets_weather_the_storm_so_far/back/9195/. Accessed October 2009.

United States Department of Treasury. 2009a. *Financial Regulatory Reform – A New Foundation: Rebuilding Financial Supervision and Regulation*. Washington, D.C.: United States Department of Treasury.

—— . 2009b. "Title IV – Registration of Advisers to Private Funds". Press Release Report. Washington, D.C.: United States Department of Treasury.

United States Environmental Protection Agency. 2004. "Buying Green Online Greening Government E-Procurement of Office Supplies". Document no. EPA 742-R-04-001. Washington, D.C.: Environmental Protection Agency.

United States General Services Administration. 2009. *"Recovery.gov Version 2.0 $18 Million Contract Awarded"*. GSA News Releases No. 10607, 8 July. Washington, D.C.: GSA.

Unwin, T. 2004. "Towards a Framework for the Use of ICT in Teacher Training in Africa". Revised Version for special issue of *Open Learning: The Journal of Open and Distance Education* on Open Learning in Less Developed Countries.

Verclas, K. 2009. "Participation Made Easy With SMS: Participatory Budging and Mobile Tech". *Mobile Active.org*, 1 October.

Von Tunzelmann, N. 2009. "Competencies versus Capabilities: A Reassessment". *Economia Politica*. Forthcoming.

Wang, Q. and N. von Tunzelmann. 2000. "Complexity and the Functions of the Firm: Breadth and Depth". *Research Policy* 29: 805-818.

Ward, M. R. 1996. "The Effect of the Internet on Political Institutions". *Industrial and Corporate Change* 5 (4): 1127-1141.

Weil, D. 2008. "The Fix We're In: David Weil on transparency and the economic crisis". CV Unbound, 19 October. http://www.cwunbound.org/2008/10/the-fix-were--3.html. Accessed January 2010.

Welch, E. W., C. C. Hinnant and M. J. Moon. 2005. "Linking Citizen Satisfaction with E-Government and Trust in Government". J*ournal of Public Administration Research and Theory Advance* 15 (3): 371-391.

West, D. M. 2008. *State and Federal Electronic Government in the United States, 2008*. Washington, D.C.: Governance Studies at Brookings.

World Bank. 2009a. "Impact of Financial Crisis on Women and Families". Washington, D.C.: World Bank, PREM Gender and Development.

—— . 2009b. *Averting a Human Crisis During the Global Crisis: Policy Options from the World Bank's Human Development Network*. Washington, D.C.: World Bank.

—— . 2009c. *World Development Indicators*. Washington, D.C.: World Bank.

—— . 2009d. "ICTs for Women's Empowerment". http://go.worldbank.org/G8HGH1UBR0. Accessed December 2009.

World Summit Award. 2009. "Oman Multimedia Product is Best in the World". News brief at the World Summit Award, 19 July 2009, Salzburg/Maskat.

W3C Consortium. 2009. "Improving Access to Government though Better Use of the Web". W3C Interest Group Note 12. W3C Consortium, E-Government Interest Group. http://www.w3.org/TR/egov-improving/. Accessed December 2009.

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The United Nations e-government development index (EGDI) is a comprehensive scoring of the willingness and capacity of national administrations to use online and mobile technology in the execution of government functions. It is based on a comprehensive survey of the online presence of all 192 Member States. The results are tabulated and combined with a set of indicators embodying a country's capacity to participate in the information society, without which e-government development efforts are of limited immediate utility.

The e-government development index is not designed to capture e-government development in an absolute sense. Rather, the index rates the performance of national governments relative to one another. The maximum possible value is one and the minimum is zero. Though the basic model has remained constant, the precise meaning of these values varies from one survey to the next as understanding of the potential of e-government changes and the underlying technology evolves.

Mathematically, the EDGI is a weighted average of three normalized scores on the most important dimensions of e-government, namely: scope and quality of online services, telecommunication connectivity, and human capacity. Each of these sets of indexes is itself a composite measure that can be extracted and analysed independently:

$$EGDI = (0.34 \times \textit{online service index}) + (0.33 \times \textit{telecommunication index}) \overline{(0.33 \times \textit{human capital index})}$$

The United Nations e-government development index

Online service index

To arrive at a set of online service index values, the research team assessed each country's national website as well as the websites of the ministries of education, labour, social services, health and finance. Associated portals and subsidiary websites were considered part and parcel of the parent sites and taken into consideration when assigning values to survey responses. Among other things, the national sites were tested for a minimal level of Web content accessibility as described in the Web Content Accessibility Guidelines of the World Wide Web Consortium.

The survey itself has four sections corresponding to the four stages of e-government development. The first of these includes questions relating to attributes that would be considered typical of an emerging online presence, the second to an enhanced presence, the third to a transactional presence and the fourth to a connected presence. Almost all questions in the survey call for a binary response of yes or no, with "yes" given one point and "no" zero. Exceptions include a small number of questions designed to capture data on the number of forms and e-services available. These are worth up to ten points each.

The value for a given country is equal to the total number of points scored by that country less the lowest score for any country divided by the range of values for all countries in the survey. For example, if country "x" were to score 233, with the lowest score of any country equal to 20 and the highest equal to 403, then the online services value for country "x" would be:

$$\textit{Online service index (country "x")} = \frac{(233\text{-}20)}{(403\text{-}20)} = 0.5561$$

The research team followed a citizen-centric approach to assessment of online services, among other things by putting themselves in the place of the average user. Thus, responses were generally based on whether the relevant feature(s) could be found and accessed easily, not whether they in fact exist. As the number of national websites grows, this becomes increasingly important. While it is possible, although implausible, to spend hours browsing a government website meticulously for all content and features, this approach misses the key point that for information and services to be "usable" they must be readily discoverable by the intended beneficiaries.

The actual time spent by the survey team on any given country assessment diverged widely depending on how varied the online presence was, the degree of user-friendliness and the amount of content offered. A researcher would typically review one or two countries per day. Once completed, the assessment would be validated by a senior researcher who would further confer with the team leader in cases of doubt. A number of countries were selected at random for a full reassessment, as were anomalous results that appeared to be inconsistent with prior year trends. Each site was reviewed by at least two researchers, one or more of whom had multiple years' experience in assessing online services of the public sector.

Challenges in reviewing a country's online presence

Identification of the national website

All Member States were invited to supply the addresses of their own top-level national and ministerial websites to be used as a starting point by the survey team. Responses could be submitted by postal mail, email, fax or online. Approximately thirty per cent of Member States responded. In cases where no response was received, the survey team used a variety of search engines to locate the most relevant sites.

Where more than one entry point for a national or ministerial site was identified, the research team would evaluate features on all relevant sites provided links were clearly indicated. If no sites were found that could reasonably be classified as the national site, for example emanating from the Head of Government, zero points were accorded for related questions. This has become less and less common since the survey was introduced in 2003.

Some countries do not offer certain public services at the federal level, but rather at the regional level. It should be clearly indicated that no country is penalized for offering a service at the regional as opposed to the federal level per se. In fact, when the issue arises researchers tend to be inclusive in assessing the matter as long as the information and/or service can be found from the national level.

A more difficult problem arises when not only a specific service is located at the local level but when the entire ministerial functions are altogether

missing at the national level. If researchers are unable to locate a ministry as per the above described method, then the final step was to find out whether the country in question actually has such a ministry at the national level or whether the functions might be locally administered.

Identification of ministerial websites

Another dilemma, albeit a minor one, arises in those countries where one or more ministries are combined into a single entity. Most notably, a fair number of countries have a ministry of health and social welfare or similar institutional arrangement. In these cases, the ministry is assessed as usual and its score simply duplicated for each of the covered ministries. Similarly, a very small number of countries have combined three ministries, namely, labour, social and health ministries into one. Here the score would be multiplied by three.

Finding and selecting the appropriate site(s) at the ministerial level has been in the past a typically easier task because most national sites provide links to the ministries, often under a clearly defined header or subsection. However, as the use of the Internet has expanded, so too has the growth of government websites in general and programme sites in particular. This year, researchers have noted a significant increase in the number of programme and subject specific sites. If these separate sites were tightly integrated and easily linked to an official ministry site, they were scored for specific features. However, if they were not tightly integrated, then those separate sites were not scored.

Language limitations

The research team was fully equipped to handle the six official languages of the United Nations, namely Arabic, Chinese, English, French, Russian and Spanish. However, as in previous survey cycles, the team went well beyond this mandate and made every effort to review each country in the official language of the country or, where that was not possible, in another of the languages available on the site. Translators provided assistance as necessary. It is acknowledged that lack of linguistic parity on multilingual sites may have introduced errors in scoring on occasion.

What's new?

The methodological framework for the United Nations e-government development index has remained consistent across survey periods. At the same time, survey questions have been adjusted to reflect evolving knowledge of best practices in e-government, changes in technology and other factors, and data collection practices have been periodically refined.

In the current round, 25 questions were added to the survey instrument, 29 questions were modified and 16 questions were removed. Greater emphasis was given to online services and e-participation than in previous years with more granular questions about the type of services provided. This included availability of mobile applications, Web 2.0 tools, use of online services by citizens, and the extent to which governments are integrating back-office operations. The result was a significantly enhanced survey instrument with a wider range of point distributions that better reflects the relative differences in levels of e-government development among countries.

Extension of the survey window

The survey window in 2003 and 2005 was sixty days. In 2008, this was shortened to thirty days to order to come closer to capturing a snapshot in time. This policy proved to be difficult for two reasons. First, there was little gained in the way of understanding either about the situation in individual countries or about regional and global trends by constricting the study in this way. Indeed, researchers were instructed to try connecting to the relevant government websites on two different dates, but not more than that, in order to get a fuller picture of availability while maintaining the citizen-centric perspective. Second, shortening of the window proved to be very difficult for the team to accommodate the amount of planning, research and validation work required. Therefore, both for quality assurance purposes and as a practical matter, the survey window was extended to a full seventy-five days.

Enhanced citizen-centric approach

The research team was instructed to enforce the citizen-centric approach even more rigorously than

in previous surveys. If features could not be found easily, quickly and intuitively, then a site would score poorly. Researchers were asked not to make extraordinary efforts to seek out information and services wherever they might be. As noted above, the question behind the questions was always, "Can the user find it easily?" as opposed to, "Does it exist somewhere on the site?"

Identification of sites for review

The identification of national and ministry websites for evaluation has always been one of the most difficult issues facing research teams. Over the course of the survey, researchers typically evaluate more than 1,000 top-level web sites as well as their constituent sub-sites. In past years, the team would spend a significant amount of time locating and verifying top-level Web addresses before initiating a country review. This time, the United Nations Department of Economic and Social Affairs invited Member States to supply the addresses of the national and ministry websites that should be included in the survey. Although the response from Member States was incomplete, and additional searching was required, the practice was found to be helpful both to Member States and to the Secretariat, and will be continued in future.

Greater scrutiny of sites

Researchers were instructed and trained to take advantage of the extended survey window to scrutinize sites even more closely than in past years with the caveat that the citizen-centric approach should prevail. There has been a geometric increase in the number of websites to be assessed since the last round as well as in the amount of information and number of services available and degree of sophistication. This undoubtedly reflects both the value of e-government in public administration reform and the rapid evolution of information and communication technology. At the same time, the team had to maintain a careful balance between in-depth research and consideration of usability to ensure the most reliable scores possible, especially for countries with a poorly designed but expanding web presence.

Emphasis on interactive, transactional and integrated services

Greater weight was given to development of participatory and integrated transactional services than in the past as a reflection of the need to promote inclusion and narrow the digital divide. Countries with an Internet penetration rate greater than or equal to 50 percent could receive up to 25 additional points for the use of blogs, discussion forums, online chat features, bulletin boards and social networking tools, online voting and petitioning, and calendars of e-participation events, while countries with an Internet penetration rate below 50 percent but above 30 percent were eligible to receive up to 10 additional points. A further 5 points were awarded to countries having an Internet penetration rate of at least 30 percent if integrated transactional services were provided through the national portal.

International research team

A web-based information management system was used by an international team of researchers for managing the survey effort and tracking results. Team leaders conducted training online, held virtual help sessions, and worked in tandem with country researchers and language specialists as needed to produce high quality results. During recruitment, a premium was also placed on proficiency in multiple languages to promote consistency in scoring. The smaller team and online management enabled senior researchers to follow the process closely and reinforce adherence to common data collection standards. A second quality assurance team within the United Nations Department of Economic and Social Affairs validated the findings through a series of spot checks and verification of values outside the expected range.

Improved quality assurance

Data received from the primary research team were validated by a second-level quality assurance group to ensure that sites were rated with maximum objectivity and accuracy. The quality assurance procedure resulted in adjustment of scores for a number of countries. The United Nations Department of Economic and Social Affairs is committed to ensuring impartiality and rigour in its survey methods and will continue to enhance quality assurance procedures in future.

Telecommunication infrastructure index

The telecommunication infrastructure index is a composite of five indicators: number of personal computers per 100 persons, number of Internet users per 100 persons, number of telephone lines per 100 persons, number of mobile cellular subscriptions per 100 persons and number of fixed broadband subscribers per 100 persons. The International Telecommunication Union was the primary source of data in each case.

Each of these indicators was normalized by taking its value for a given country subtracting the lowest value for any country in the survey and dividing by the range of values for all countries. For example, if country "x" were to have 36.69 Internet users per 100 inhabitants, with the lowest value of any country equal to 0 and the highest equal to 88.87, then the normalized value of this indicator for country "x" would be given by:

$$\textit{Internet penetration index (country "x")} = \frac{(36.69\text{-}0)}{(88.87\text{-}0)} = 0.4129$$

The telecommunication infrastructure index for country "x" is then the simple arithmetic mean of each of the five normalized indicators derived in this way:

$$\begin{aligned}\textit{Telecommunication infrastructure index} = \\ &\textit{Average (personal computer index} \\ +\ &\textit{Internet user index} \\ +\ &\textit{telephone line index} \\ +\ &\textit{mobile subscription index} \\ +\ &\textit{fixed broadband index)}\end{aligned}$$

Human capital index

The human capital index is a composite of two indicators: adult literacy rate and the combined primary, secondary, and tertiary gross enrollment ratio. The United Nations Educational, Scientific and Cultural Organization was the main source of data in both cases. Gaps were completed to the extent possible using data from the 2009 UNDP Human Development Report.

The two indicators were normalized by taking their values for a given country subtracting the lowest value for any country in the survey and dividing by the range of values for all countries. For example, if country "x" were to have an adult literacy rate of 66.8 per 100 inhabitants, with the lowest value of any country equal to 28.7 and the highest equal to 99.5, then the normalized value of this indicator for country "x" would be given by:

$$\textit{Adult literacy index (country "x")} = \frac{(66.8\text{-}28.7)}{(99.5\text{-}28.7)} = 0.5381$$

The human capital index for country "x" is then the weighted arithmetic mean of the two normalized indicators derived in this way with adult literacy assigned a weight of 0.6667 and gross enrollment 0.3333:

$$\begin{aligned}\textit{Human capital index} = &\tfrac{2}{3} \times \textit{adult literacy index} \\ +\ &\tfrac{1}{3} \times \textit{gross enrollment index}\end{aligned}$$

Supplementary e-participation index

The e-participation questions expand the survey by emphasizing quality in the connected presence stage of e-government. These questions focus on the use of the Internet to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation") and engagement in decision-making processes ("e-decision making"). A country's e-participation index value reflects how useful these features are and the extent to which they have been deployed by the government compared to all other countries. The purpose of this measure is not to prescribe any particular practice, but rather to offer insight into how different countries are using online tools to promote interaction between citizen and government, as well as among citizens, for the benefit of all.

The e-participation index calculated in this way is then normalized by taking their values for a given country subtracting the lowest value for any country in the survey and dividing by the range of values for all countries. For example, if country "x" were to have an e-participation s core of 30, with the lowest value of any country equal to 0 and the highest equal to 45, then the normalized index value for country "x" would be given by:

$$\textit{E-participating index (country "x")} = \frac{(30\text{-}0)}{(45\text{-}0)} = 0.6667$$

Data tables

E-government development index

Rank	Country	Index value	Of which		
			Online service component	Telecom-munication infrastructure component	Human capital component
1	Republic of Korea	0.8785	0.3400	0.2109	0.3277
2	United States	0.8510	0.3184	0.2128	0.3198
3	Canada	0.8448	0.3001	0.2244	0.3204
4	United Kingdom	0.8147	0.2634	0.2364	0.3149
5	Netherlands	0.8097	0.2310	0.2530	0.3257
6	Norway	0.8020	0.2504	0.2254	0.3262
7	Denmark	0.7872	0.2288	0.2306	0.3278
8	Australia	0.7863	0.2601	0.1983	0.3278
9	Spain	0.7516	0.2601	0.1683	0.3231
10	France	0.7510	0.2321	0.1965	0.3225
11	Singapore	0.7476	0.2331	0.2107	0.3037
12	Sweden	0.7474	0.1792	0.2482	0.3200
13	Bahrain	0.7363	0.2483	0.1932	0.2948
14	New Zealand	0.7311	0.2170	0.1864	0.3278
15	Germany	0.7309	0.1867	0.2295	0.3146
16	Belgium	0.7225	0.2126	0.1880	0.3218
17	Japan	0.7152	0.2288	0.1730	0.3134
18	Switzerland	0.7136	0.1511	0.2537	0.3088
19	Finland	0.6967	0.1630	0.2059	0.3278
20	Estonia	0.6965	0.1705	0.2070	0.3190
21	Ireland	0.6866	0.1695	0.1894	0.3277
22	Iceland	0.6697	0.1349	0.2110	0.3238
23	Liechtenstein	0.6694	0.1781	0.1786	0.3127
24	Austria	0.6679	0.1619	0.1893	0.3167
25	Luxembourg	0.6672	0.1295	0.2355	0.3021
26	Israel	0.6552	0.1986	0.1430	0.3136
27	Hungary	0.6315	0.1716	0.1432	0.3167
28	Lithuania	0.6295	0.1641	0.1456	0.3198
29	Slovenia	0.6243	0.1360	0.1659	0.3224
30	Malta	0.6129	0.1597	0.1605	0.2927
31	Colombia	0.6125	0.2418	0.0799	0.2908
32	Malaysia	0.6101	0.2148	0.1134	0.2819
33	Czech Republic	0.6060	0.1543	0.1405	0.3112
34	Chile	0.6014	0.2072	0.0895	0.3047
35	Croatia	0.5858	0.1436	0.1393	0.3030
36	Uruguay	0.5848	0.1630	0.1050	0.3168
37	Latvia	0.5826	0.1414	0.1241	0.3171
38	Italy	0.5800	0.0982	0.1622	0.3196
39	Portugal	0.5787	0.1317	0.1382	0.3088
40	Barbados	0.5714	0.0680	0.1819	0.3215
41	Greece	0.5708	0.1209	0.1263	0.3235
42	Cyprus	0.5705	0.1263	0.1428	0.3015
43	Slovakia	0.5639	0.1177	0.1390	0.3072
44	Bulgaria	0.5590	0.1392	0.1112	0.3086
45	Poland	0.5582	0.1317	0.1113	0.3152
46	Kazakhstan	0.5578	0.1792	0.0593	0.3194
47	Romania	0.5479	0.1414	0.1021	0.3045
48	Argentina	0.5467	0.1403	0.0928	0.3136
49	United Arab Emirates	0.5349	0.0853	0.1793	0.2703
50	Kuwait	0.5290	0.1565	0.0833	0.2892
51	Jordan	0.5278	0.1813	0.0596	0.2869
52	TFYR Macedonia	0.5261	0.1090	0.1255	0.2916
53	Mongolia	0.5243	0.1889	0.0342	0.3012
54	Ukraine	0.5181	0.1177	0.0821	0.3184
55	Antigua and Barbuda	0.5154	0.0410	0.1730	0.3014
56	Mexico	0.5150	0.1500	0.0713	0.2936
57	Andorra	0.5148	0.0788	0.1457	0.2903
58	Saudi Arabia	0.5142	0.1058	0.1330	0.2754
59	Russian Federation	0.5136	0.1123	0.0913	0.3101
60	Montenegro	0.5101	0.1069	0.1093	0.2940
61	Brazil	0.5006	0.1252	0.0838	0.2916
62	Qatar	0.4928	0.0950	0.1046	0.2932
63	Peru	0.4923	0.1392	0.0590	0.2941
64	Belarus	0.4900	0.1025	0.0687	0.3188
65	Bahamas	0.4871	0.0788	0.1156	0.2927
66	Tunisia	0.4826	0.1641	0.0641	0.2544
67	Trinidad and Tobago	0.4806	0.1155	0.0760	0.2891
68	Brunei Darussalam	0.4796	0.0961	0.0892	0.2943
69	Turkey	0.4780	0.1177	0.0852	0.2752
70	Venezuela	0.4774	0.1036	0.0766	0.2971
71	Costa Rica	0.4749	0.1036	0.0800	0.2913
72	China	0.4700	0.1252	0.0631	0.2817
73	El Salvador	0.4700	0.1446	0.0635	0.2619
74	Bosnia and Herzegovina	0.4698	0.0939	0.0827	0.2932
75	Saint Kitts and Nevis	0.4691	0.0345	0.1417	0.2929
76	Thailand	0.4653	0.1133	0.0576	0.2943
77	Mauritius	0.4645	0.1004	0.0874	0.2768
78	Philippines	0.4637	0.1338	0.0368	0.2931
79	Panama	0.4619	0.0961	0.0727	0.2932
80	Republic of Moldova	0.4611	0.1004	0.0638	0.2970
81	Serbia	0.4585	0.0756	0.0889	0.2940
82	Oman	0.4576	0.1252	0.0690	0.2633
83	Azerbaijan	0.4571	0.1101	0.0439	0.3031
84	Dominican Republic	0.4557	0.1241	0.0547	0.2769
85	Albania	0.4519	0.1058	0.0538	0.2924
86	Egypt	0.4518	0.1803	0.0414	0.2301
87	Uzbekistan	0.4498	0.1284	0.0282	0.2931
88	Saint Lucia	0.4471	0.0378	0.1158	0.2934
89	Jamaica	0.4467	0.0777	0.0930	0.2759
90	Viet Nam	0.4454	0.1036	0.0746	0.2672
91	Kyrgyzstan	0.4417	0.1079	0.0303	0.3035
92	Maldives	0.4392	0.0550	0.0952	0.2889
93	Lebanon	0.4388	0.0907	0.0648	0.2833
94	Saint Vincent and the Grenadines	0.4355	0.0443	0.1216	0.2697
95	Ecuador	0.4322	0.1079	0.0526	0.2716
96	Cuba	0.4321	0.0820	0.0206	0.3296
97	South Africa	0.4306	0.1047	0.0476	0.2783
98	Bolivia	0.4280	0.1036	0.0302	0.2942
99	Grenada	0.4277	0.0637	0.0795	0.2845
100	Georgia	0.4248	0.0842	0.0384	0.3022
101	Paraguay	0.4243	0.0896	0.0473	0.2875
102	Iran (Islamic Republic of)	0.4234	0.0907	0.0712	0.2616
103	Palau	0.4189	0.0183	0.0840	0.3165
104	Seychelles	0.4179	0.0194	0.1002	0.2983
105	Dominica	0.4149	0.0173	0.1177	0.2800
106	Guyana	0.4140	0.0615	0.0424	0.3101
107	Honduras	0.4065	0.1004	0.0419	0.2642

E-government development index (cont.)

Rank	Country	Index value	Of which		
			Online service component	Telecom-munication infrastructure component	Human capital component
108	Cape Verde	0.4054	0.0917	0.0543	0.2593
109	Indonesia	0.4026	0.0831	0.0377	0.2818
110	Armenia	0.4025	0.0594	0.0422	0.3009
111	Sri Lanka	0.3995	0.0885	0.0357	0.2753
112	Guatemala	0.3937	0.1047	0.0504	0.2386
113	Fiji	0.3925	0.0626	0.0461	0.2839
114	Libya	0.3799	0.0464	0.0371	0.2963
115	Samoa	0.3742	0.0486	0.0270	0.2986
116	Tonga	0.3697	0.0237	0.0419	0.3040
117	Botswana	0.3637	0.0680	0.0357	0.2601
118	Nicaragua	0.3630	0.0863	0.0250	0.2516
119	India	0.3567	0.1252	0.0192	0.2123
120	Belize	0.3513	0.0540	0.0462	0.2511
121	Lesotho	0.3512	0.0896	0.0132	0.2484
122	Tajikistan	0.3477	0.0302	0.0203	0.2972
123	Gabon	0.3420	0.0270	0.0366	0.2784
124	Kenya	0.3338	0.0810	0.0210	0.2319
125	Namibia	0.3314	0.0227	0.0402	0.2685
126	Morocco	0.3287	0.0810	0.0584	0.1894
127	Suriname	0.3283	0.0076	0.0400	0.2807
128	São Tomé and Príncipe	0.3258	0.0302	0.0273	0.2683
129	Zimbabwe	0.3230	0.0432	0.0193	0.2605
130	Turkmenistan	0.3226	0.0097	0.0137	0.2992
131	Algeria	0.3181	0.0335	0.0412	0.2435
132	Angola	0.3110	0.1155	0.0149	0.1806
133	Syrian Arab Republic	0.3103	0.0140	0.0399	0.2564
134	Bangladesh	0.3028	0.1209	0.0109	0.1710
135	Congo	0.3019	0.0270	0.0195	0.2555
136	Iraq	0.2996	0.0518	0.0182	0.2295
137	United Republic of Tanzania	0.2926	0.0594	0.0111	0.2221
138	Equatorial Guinea	0.2902	0.0108	0.0198	0.2596
139	Madagascar	0.2890	0.0561	0.0099	0.2230
140	Cambodia	0.2878	0.0464	0.0098	0.2316
141	Myanmar	0.2818	0.0281	0.0015	0.2522
142	Uganda	0.2812	0.0345	0.0158	0.2309
143	Zambia	0.2810	0.0356	0.0141	0.2313
144	Côte d'Ivoire	0.2805	0.1101	0.0205	0.1498
145	Swaziland	0.2757	.....	0.0202	0.2555
146	Pakistan	0.2755	0.0842	0.0254	0.1658
147	Ghana	0.2754	0.0507	0.0195	0.2051
148	Rwanda	0.2749	0.0594	0.0067	0.2089
149	Cameroon	0.2722	0.0518	0.0136	0.2069
150	Nigeria	0.2687	0.0324	0.0196	0.2167
151	Lao People's Democratic Republic	0.2637	0.0270	0.0109	0.2259
152	Bhutan	0.2598	0.0637	0.0204	0.1757
153	Nepal	0.2568	0.0572	0.0075	0.1921
154	Sudan	0.2542	0.0529	0.0235	0.1778
155	Vanuatu	0.2521	0.0043	0.0124	0.2354
156	Solomon Islands	0.2445	0.0151	0.0063	0.2232
157	Mauritania	0.2359	0.0302	0.0263	0.1793
158	Democratic Republic of the Congo	0.2357	0.0302	0.0046	0.2009
159	Malawi	0.2357	0.0054	0.0060	0.2243
160	Comoros	0.2327	0.0097	0.0067	0.2162
161	Mozambique	0.2288	0.0583	0.0083	0.1623
162	Timor-Leste	0.2273	0.0453	0.0022	0.1797
163	Senegal	0.2241	0.0604	0.0235	0.1403
164	Yemen	0.2154	0.0162	0.0098	0.1894
165	Togo	0.2150	0.0237	0.0150	0.1763
166	Liberia	0.2133	0.0216	0.0062	0.1855
167	Gambia	0.2117	0.0281	0.0315	0.1521
168	Afghanistan	0.2098	0.0788	0.0108	0.1202
169	Haiti	0.2074	0.0065	0.0221	0.1789
170	Djibouti	0.2059	0.0162	0.0049	0.1848
171	Papua New Guinea	0.2043	0.0248	0.0075	0.1719
172	Ethiopia	0.2033	0.0680	0.0024	0.1329
173	Benin	0.2017	0.0399	0.0150	0.1468
174	Burundi	0.2014	0.0140	0.0030	0.1844
175	Eritrea	0.1859	0.0076	0.0037	0.1746
176	Mali	0.1815	0.0626	0.0096	0.1093
177	Sierra Leone	0.1697	0.0011	0.0059	0.1627
178	Burkina Faso	0.1587	0.0529	0.0066	0.0992
179	Guinea-Bissau	0.1561	0.0054	0.0118	0.1388
180	Guinea	0.1426	0.0119	0.0094	0.1213
181	Central African Republic	0.1399	0.0000	0.0015	0.1384
182	Chad	0.1235	0.0065	0.0060	0.1110
183	Niger	0.1098	0.0130	0.0038	0.0930
	Other UN Member States				
184	Democratic People's Republic of Korea	.....	0.0065	.....	.....
184	Kiribati	.....	0.0097	0.0049	.....
184	Marshall Islands	.....	0.0086	0.0138	.....
184	Micronesia (Federated States of)	.....	0.0432	0.0268	.....
184	Monaco	.....	0.0464	0.2297	.....
184	Nauru	.....	0.0043	.....	.....
184	San Marino	.....	0.0626	0.1759	.....
184	Somalia	.....	0.0000	0.0040	.....
184	Tuvalu	.....	0.0043	0.0567	.....
	Regional and economic groupings				
	Africa	0.2733	0.0489	0.0221	0.2039
	Americas	0.4790	0.1069	0.0857	0.2864
	Asia	0.4424	0.1085	0.0657	0.2659
	Europe	0.6227	0.1480	0.1598	0.3123
	Oceania	0.4193	0.0532	0.0548	0.2766
	Developed countries	0.6542	0.1369	0.1719	0.3136
	Developing countries other than LDCs	0.4443	0.0960	0.0675	0.2774
	Least developed countries	0.2424	0.0381	0.0147	0.1895
	Small island developing States	0.3924	0.0479	0.0657	0.2685

Online service index and its components

Rank	Country	Index value	Points for emerging information services	Points for enhanced inromation services	Points for transaction services	Points for connected approach
1	Republic of Korea	1.0000	66	106	112	31
2	United States	0.9365	62	97	115	21
3	Canada	0.8825	59	83	104	32
4	United Kingdom	0.7746	61	87	71	25
5	Spain	0.7651	60	88	68	25
5	Australia	0.7651	58	76	69	38
7	Norway	0.7365	61	85	69	17
8	Bahrain	0.7302	63	72	72	23
9	Colombia	0.7111	57	51	89	27
10	Singapore	0.6857	54	82	64	16
11	France	0.6825	54	71	77	13
12	Netherlands	0.6794	60	80	55	19
13	Japan	0.6730	59	78	56	19
13	Denmark	0.6730	54	88	52	18
15	New Zealand	0.6381	59	76	46	20
16	Malaysia	0.6317	51	73	55	20
17	Belgium	0.6254	57	66	54	20
18	Chile	0.6095	57	44	74	17
19	Israel	0.5841	49	45	66	24
20	Mongolia	0.5556	47	49	54	25
21	Germany	0.5492	54	76	23	20
22	Jordan	0.5333	50	44	57	17
23	Egypt	0.5302	55	51	49	12
24	Kazakhstan	0.5270	66	53	24	23
24	Sweden	0.5270	54	67	26	19
26	Liechtenstein	0.5238	49	43	52	21
27	Hungary	0.5048	53	43	40	23
28	Estonia	0.5016	45	54	38	21
29	Ireland	0.4984	48	63	37	9
30	Tunisia	0.4825	52	40	50	10
30	Lithuania	0.4825	54	61	22	15
32	Uruguay	0.4794	51	43	36	21
32	Finland	0.4794	44	55	36	16
34	Austria	0.4762	46	64	28	12
35	Malta	0.4698	53	51	32	12
36	Kuwait	0.4603	41	39	58	7
37	Czech Republic	0.4540	50	42	34	17
38	Switzerland	0.4444	51	44	28	17
39	Mexico	0.4413	45	52	26	16
40	El Salvador	0.4254	48	30	46	10
41	Croatia	0.4222	46	44	29	14
42	Latvia	0.4159	52	37	19	23
42	Romania	0.4159	55	38	25	13
44	Argentina	0.4127	53	42	22	13
45	Peru	0.4095	53	37	26	13
45	Bulgaria	0.4095	47	41	28	13
47	Slovenia	0.4000	55	46	6	19
48	Iceland	0.3968	53	37	23	12
49	Philippines	0.3937	48	25	35	16
50	Poland	0.3873	54	45	10	13
50	Portugal	0.3873	54	37	21	10
52	Luxembourg	0.3810	46	32	30	12
53	Uzbekistan	0.3778	52	39	18	10
54	Cyprus	0.3714	44	39	19	15
55	Brazil	0.3683	53	34	10	19
55	China	0.3683	54	40	4	18
55	India	0.3683	45	41	22	8
55	Oman	0.3683	47	33	26	10
59	Dominican Republic	0.3651	46	30	24	15
60	Bangladesh	0.3556	48	44	5	15
60	Greece	0.3556	46	37	15	14
62	Turkey	0.3460	57	29	9	14
62	Slovakia	0.3460	50	32	14	13
62	Ukraine	0.3460	55	31	7	16
65	Angola	0.3397	52	38	9	8
65	Trinidad and Tobago	0.3397	50	39	12	6
67	Thailand	0.3333	50	31	15	9
68	Russian Federation	0.3302	49	28	15	12
69	Côte d'Ivoire	0.3238	42	31	22	7
69	Azerbaijan	0.3238	47	36	10	9
71	TFYR Macedonia	0.3206	38	41	10	12
72	Ecuador	0.3175	53	27	9	11
72	Kyrgyzstan	0.3175	28	26	33	13
74	Montenegro	0.3143	45	40	6	8
75	Saudi Arabia	0.3111	46	25	22	5
75	Albania	0.3111	44	33	10	11
77	South Africa	0.3079	34	34	27	2
77	Guatemala	0.3079	48	26	12	11
79	Bolivia	0.3048	35	37	12	12
79	Costa Rica	0.3048	45	28	10	13
79	Venezuela	0.3048	43	30	9	14
79	Viet Nam	0.3048	51	26	5	14
83	Belarus	0.3016	43	25	15	12
84	Mauritius	0.2952	46	23	18	6
84	Honduras	0.2952	45	21	12	15
84	Republic of Moldova	0.2952	51	26	6	10
87	Italy	0.2889	43	28	12	8
88	Panama	0.2825	49	18	9	13
88	Brunei Darussalam	0.2825	40	35	3	11
90	Qatar	0.2794	27	21	37	3
91	Bosnia and Herzegovina	0.2762	48	27	1	11
92	Cape Verde	0.2698	40	33	5	7
93	Iran (Islamic Republic of)	0.2667	50	21	4	9
93	Lebanon	0.2667	32	29	16	7
95	Lesotho	0.2635	52	29	1	1
95	Paraguay	0.2635	39	18	16	10
97	Sri Lanka	0.2603	33	30	6	13
98	Nicaragua	0.2540	34	25	16	5
99	United Arab Emirates	0.2508	46	26	2	5
100	Georgia	0.2476	45	17	5	11
100	Pakistan	0.2476	33	36	5	4
102	Indonesia	0.2444	41	25	4	7
103	Cuba	0.2413	36	27	7	6
104	Kenya	0.2381	34	29	8	4
104	Morocco	0.2381	40	22	9	4
106	Bahamas	0.2317	47	18	6	2
106	Afghanistan	0.2317	41	25	5	2
106	Andorra	0.2317	27	26	10	10

Online service index and its components (cont.)

Rank	Country	Index value	Points for emerging information services	Points for enhanced inromation services	Points for transaction services	Points for connected approach
109	Jamaica	0.2286	38	17	8	9
110	Serbia	0.2222	38	26	0	6
111	Botswana	0.2000	31	21	6	5
111	Ethiopia	0.2000	32	23	3	5
111	Barbados	0.2000	25	19	13	6
114	Grenada	0.1873	30	22	2	5
114	Bhutan	0.1873	30	21	6	2
116	Mali	0.1841	29	12	9	8
116	San Marino	0.1841	32	12	8	6
116	Fiji	0.1841	36	21	0	1
119	Guyana	0.1810	34	17	0	6
120	Senegal	0.1778	32	14	3	7
121	Rwanda	0.1746	34	14	2	5
121	United Republic of Tanzania	0.1746	34	21	0	0
121	Armenia	0.1746	38	10	0	7
124	Mozambique	0.1714	32	13	3	6
125	Nepal	0.1683	30	22	0	1
126	Madagascar	0.1651	28	13	4	7
127	Maldives	0.1619	27	24	0	0
128	Belize	0.1587	24	17	3	6
129	Burkina Faso	0.1556	26	13	0	10
129	Sudan	0.1556	23	16	2	8
131	Cameroon	0.1524	16	16	12	4
131	Iraq	0.1524	24	13	5	6
133	Ghana	0.1492	26	18	1	2
134	Samoa	0.1429	24	21	0	0
135	Libya	0.1365	21	19	0	3
135	Cambodia	0.1365	25	13	2	3
135	Monaco	0.1365	14	17	5	7
138	Timor-Leste	0.1333	23	16	0	3
139	Saint Vincent and the Grenadines	0.1302	29	11	0	1
140	Zimbabwe	0.1270	23	11	0	6
140	Micronesia (Federated States of)	0.1270	19	17	2	2
142	Antigua and Barbuda	0.1206	14	19	1	4
143	Benin	0.1175	20	10	4	3
144	Saint Lucia	0.1111	14	16	0	5
145	Zambia	0.1048	21	8	0	4
146	Uganda	0.1016	18	11	0	3
146	Saint Kitts and Nevis	0.1016	15	9	2	6
148	Algeria	0.0984	19	9	1	2
149	Nigeria	0.0952	20	8	0	2
150	Democratic Republic of the Congo	0.0889	17	7	0	4
150	Mauritania	0.0889	11	13	1	3
150	São Tomé and Príncipe	0.0889	21	7	0	0
150	Tajikistan	0.0889	15	7	4	2
154	Gambia	0.0825	16	9	0	1
154	Myanmar	0.0825	19	7	0	0
156	Congo	0.0794	7	8	7	3
156	Gabon	0.0794	13	9	1	2
156	Lao People's Democratic Republic	0.0794	12	9	2	2
159	Papua New Guinea	0.0730	13	7	0	3
160	Togo	0.0698	6	8	3	5
160	Tonga	0.0698	13	9	0	0
162	Namibia	0.0667	14	5	0	2
163	Liberia	0.0635	11	7	0	2
164	Seychelles	0.0571	11	7	0	0
165	Palau	0.0540	8	7	0	2
166	Dominica	0.0508	7	6	1	2
167	Djibouti	0.0476	9	3	0	3
167	Yemen	0.0476	9	4	0	2
169	Solomon Islands	0.0444	7	6	0	1
170	Burundi	0.0413	8	2	0	3
170	Syrian Arab Republic	0.0413	7	5	0	1
172	Niger	0.0381	4	2	3	3
173	Guinea	0.0349	5	2	3	1
174	Equatorial Guinea	0.0317	2	5	0	3
175	Comoros	0.0286	5	3	0	1
175	Turkmenistan	0.0286	4	5	0	0
175	Kiribati	0.0286	4	5	0	0
178	Marshall Islands	0.0254	4	3	0	1
179	Eritrea	0.0222	3	4	0	0
179	Suriname	0.0222	3	2	0	2
181	Chad	0.0190	3	2	1	0
181	Haiti	0.0190	3	2	0	1
181	Democratic People's Republic of Korea	0.0190	3	2	1	0
184	Guinea-Bissau	0.0159	0	3	1	1
184	Malawi	0.0159	3	2	0	0
186	Nauru	0.0127	2	2	0	0
186	Tuvalu	0.0127	1	3	0	0
186	Vanuatu	0.0127	1	2	0	1
189	Sierra Leone	0.0032	0	0	0	1
	Countries without online services					
	Central African Republic					
	Somalia					
	Swaziland					
	Regional and economic groupings					
	Africa	0.1439				
	Americas	0.3143				
	Asia	0.3191				
	Europe	0.4354				
	Oceania	0.1565				
	Developed countries	0.5082				
	Developing countries other than LDCs	0.2823				
	Least developed countries	0.1121				
	Small island developing States	0.1409				

Telecommunication infrastructure index and its components

Rank	Country	Index value	Estimated Internet users per 100 inhabitants	Main fixed telephone lines per 100 inhabitants	Mobile subscribers per 100 inhabitants	Personal computers per 100 inhabitants	Total fixed broadband per 100 inhabitants
1	Switzerland	0.7687	76.10	63.91	116.43	92.24	32.89
2	Netherlands	0.7666	86.36	44.31	120.57	90.91	34.83
3	Sweden	0.7522	79.65	57.83	119.38	87.79	31.56
4	United Kingdom	0.7164	79.62	54.24	123.41	80.23	28.21
5	Luxembourg	0.7138	76.61	54.22	147.11	67.73	29.80
6	Denmark	0.6988	84.82	45.56	120.02	55.09	36.75
7	Monaco	0.6961	61.48	106.38	62.54	49.18	37.71
8	Germany	0.6955	75.97	62.60	130.37	65.54	27.47
9	Norway	0.6830	84.60	42.16	109.98	62.68	33.73
10	Canada	0.6799	72.85	55.37	64.51	94.40	28.96
11	United States	0.6449	74.00	51.33	86.79	78.67	25.35
12	Iceland	0.6395	65.64	60.58	106.33	53.09	31.66
13	Republic of Korea	0.6390	77.83	44.29	94.71	58.14	32.14
14	Singapore	0.6386	69.24	40.24	138.15	76.04	21.74
15	Estonia	0.6273	63.64	37.14	188.20	52.13	23.70
16	Finland	0.6240	78.91	31.11	128.76	50.05	30.48
17	Australia	0.6011	71.98	44.46	104.96	60.29	24.39
18	France	0.5954	51.16	56.42	93.45	65.17	28.52
19	Bahrain	0.5855	51.95	28.37	180.51	74.58	16.12
20	Ireland	0.5739	63.79	49.63	113.77	58.07	20.09
21	Austria	0.5736	59.37	40.08	129.73	60.69	21.49
22	Belgium	0.5698	66.53	42.08	111.63	42.02	27.97
23	New Zealand	0.5648	69.76	41.37	109.22	52.97	21.63
24	Barbados	0.5513	73.86	58.93	132.00	15.79	21.77
25	United Arab Emirates	0.5434	65.15	33.63	208.65	33.08	11.79
26	Liechtenstein	0.5412	65.08	55.40	90.58	.....	39.61
27	San Marino	0.5330	51.37	68.30	56.76	79.00	12.83
28	Japan	0.5242	69.16	40.21	86.73	40.87	23.65
29	Antigua and Barbuda	0.5241	75.03	43.86	157.67	20.68	14.52
30	Spain	0.5100	56.70	45.41	111.68	40.04	20.22
31	Slovenia	0.5026	49.24	50.11	101.97	42.68	21.17
32	Italy	0.4914	48.85	33.61	148.61	36.64	18.93
33	Malta	0.4863	49.14	59.18	94.64	22.99	24.25
34	Andorra	0.4415	70.04	44.28	76.06	.....	24.49
35	Lithuania	0.4413	53.50	23.64	151.24	18.29	17.77
36	Hungary	0.4338	54.93	30.90	122.09	25.63	15.40
37	Israel	0.4334	28.85	41.13	127.38	25.10	22.69
38	Cyprus	0.4327	38.04	47.93	117.89	38.34	12.06
39	Saint Kitts and Nevis	0.4295	29.75	40.56	146.78	22.68	19.04
40	Czech Republic	0.4258	48.61	22.08	133.54	27.47	17.05
41	Croatia	0.4220	50.75	41.85	133.95	17.95	11.86
42	Slovakia	0.4212	51.32	20.33	102.23	51.46	11.46
43	Portugal	0.4189	41.69	38.60	139.64	17.19	15.85
44	Saudi Arabia	0.4031	30.55	16.27	142.85	68.25	4.16
45	Greece	0.3829	32.60	53.65	123.90	9.43	13.53
46	TFYR Macedonia	0.3804	42.90	22.39	122.56	36.76	8.77
47	Latvia	0.3762	55.20	28.39	97.72	32.81	6.44
48	Saint Vincent and the Grenadines	0.3685	60.49	20.87	119.23	15.18	8.58
49	Dominica	0.3566	39.40	26.03	132.76	19.23	9.70
50	Saint Lucia	0.3510	58.68	24.02	99.53	15.89	8.22
51	Bahamas	0.3502	42.05	39.82	106.04	12.29	10.08
52	Malaysia	0.3438	62.57	15.89	100.41	23.15	4.82
[53]	Poland	[0.3374]	[43.9]4	27.11	108.54	16.92	8.99
54	Bulgaria	0.3370	30.99	29.74	140.05	8.91	11.24
55	Montenegro	0.3311	45.09	56.85	103.58	.....	4.16

Telecommunication infrastructure index and its components (cont.)

Rank	Country	Index value	Estimated Internet users per 100 inhabitants	Main fixed telephone lines per 100 inhabitants	Mobile subscribers per 100 inhabitants	Personal computers per 100 inhabitants	Total fixed broadband per 100 inhabitants
56	Uruguay	0.3183	40.01	28.64	104.73	13.53	8.59
57	Qatar	0.3168	34.04	20.56	131.39	15.69	8.07
58	Romania	0.3093	23.99	23.58	114.54	19.32	11.75
59	Seychelles	0.3037	38.17	27.70	101.78	21.59	4.08
60	Maldives	0.2886	23.52	15.38	142.82	20.24	5.15
61	Jamaica	0.2820	56.88	11.69	100.58	6.71	3.61
62	Argentina	0.2812	28.11	24.15	116.61	9.04	7.99
63	Russian Federation	0.2765	21.14	31.14	132.61	13.33	2.82
64	Chile	0.2711	32.47	20.99	88.05	14.11	8.49
65	Brunei Darussalam	0.2703	48.82	19.91	90.66	8.92	2.91
66	Serbia	0.2695	23.99	31.35	97.76	18.31	4.59
67	Mauritius	0.2647	29.69	28.48	80.74	17.43	5.71
68	Turkey	0.2581	33.12	23.68	89.05	6.10	7.78
69	Palau	0.2546	26.97	36.71	52.65	33.58	0.48
70	Brazil	0.2538	33.83	21.43	78.47	16.12	5.26
71	Kuwait	0.2524	31.57	18.61	97.28	22.22	0.93
72	Bosnia and Herzegovina	0.2505	34.66	27.33	84.26	6.40	4.99
73	Ukraine	0.2487	22.51	28.65	121.09	4.55	3.48
74	Costa Rica	0.2424	32.31	31.81	41.75	23.10	3.90
75	Colombia	0.2421	38.03	15.15	91.90	7.92	4.23
76	Grenada	0.2408	22.29	27.60	57.97	15.66	9.79
77	Venezuela	0.2321	25.49	22.42	96.31	9.26	3.90
78	Trinidad and Tobago	0.2304	16.02	23.14	113.67	13.21	2.67
79	Viet Nam	0.2261	23.92	33.13	80.37	9.54	2.35
80	Panama	0.2202	22.91	14.59	111.94	4.56	4.63
81	Mexico	0.2161	21.43	18.92	69.37	14.10	7.01
82	Iran (Islamic Republic of)	0.2157	31.37	33.83	58.65	10.37	0.41
83	Oman	0.2092	16.84	9.84	115.58	16.88	1.15
84	Belarus	0.2081	28.89	37.76	71.57	0.80	0.12
85	Lebanon	0.1965	37.72	16.76	34.10	10.18	4.80
86	Tunisia	0.1942	27.53	12.18	84.27	7.62	2.24
87	Republic of Moldova	0.1933	19.09	29.44	66.60	11.43	1.29
88	El Salvador	0.1923	12.49	17.56	113.32	5.78	2.01
89	China	0.1913	22.28	27.51	47.41	5.61	6.23
90	Jordan	0.1806	24.46	8.46	86.60	7.20	2.09
91	Kazakhstan	0.1797	12.34	21.97	96.06	……	3.64
92	Peru	0.1789	24.72	9.98	72.66	10.06	2.52
93	Morocco	0.1769	32.59	9.46	72.19	3.52	1.53
94	Thailand	0.1746	20.03	10.49	92.01	6.68	1.36
95	Tuvalu	0.1717	40.63	13.20	18.28	8.60	3.56
96	Dominican Republic	0.1658	25.75	9.90	72.45	3.49	2.27
97	Cape Verde	0.1646	20.61	14.44	55.68	14.03	1.48
98	Albania	0.1629	15.10	10.07	99.93	3.84	1.15
99	Ecuador	0.1595	9.71	14.17	86.01	12.95	0.26
100	Guatemala	0.1528	10.13	10.59	109.22	2.06	0.21
101	South Africa	0.1443	8.43	9.22	90.60	8.25	0.77
102	Paraguay	0.1433	8.66	5.82	92.83	7.79	1.50
103	Belize	0.1400	10.86	10.35	53.23	15.28	2.56
104	Fiji	0.1396	10.90	14.53	71.09	6.04	1.37
105	Azerbaijan	0.1329	10.74	15.10	75.00	2.39	0.69
106	Guyana	0.1285	24.87	14.42	36.84	3.80	0.26
107	Armenia	0.1280	5.63	19.39	61.07	9.69	0.06
108	Tonga	0.1270	8.11	24.66	48.73	5.89	0.70
109	Honduras	0.1268	9.00	11.28	84.86	1.98	0.00
110	Egypt	0.1256	15.42	14.73	50.62	4.60	0.94

Telecommunication infrastructure index and its components

Rank	Country	Index value	Estimated Internet users per 100 inhabitants	Main fixed telephone lines per 100 inhabitants	Mobile subscribers per 100 inhabitants	Personal computers per 100 inhabitants	Total fixed broadband per 100 inhabitants
111	Algeria	0.1248	10.34	9.06	81.41	1.07	0.85
112	Namibia	0.1219	5.33	6.61	49.39	23.94	0.01
113	Suriname	0.1213	8.62	16.13	63.33	4.00	0.53
114	Syrian Arab Republic	0.1209	16.79	17.12	33.24	8.78	0.05
115	Georgia	0.1164	8.26	12.76	59.66	5.46	1.07
116	Indonesia	0.1143	11.13	13.36	61.83	2.03	0.13
117	Libya	0.1126	4.72	14.39	72.95	2.19	0.16
118	Philippines	0.1115	5.97	4.32	75.38	7.23	0.56
119	Gabon	0.1110	6.21	1.86	89.77	3.37	0.14
120	Sri Lanka	0.1081	5.72	17.18	55.24	3.76	0.50
121	Botswana	0.1081	4.16	7.41	77.34	4.83	0.19
122	Mongolia	0.1036	12.25	6.19	35.08	13.95	0.28
123	Gambia	0.0955	6.88	2.94	70.24	3.53	0.02
124	Kyrgyzstan	0.0918	14.03	9.02	40.56	1.92	0.05
125	Bolivia	0.0915	10.50	7.12	49.82	2.40	0.36
126	Uzbekistan	0.0854	8.89	7.06	46.52	3.12	0.24
127	São Tomé and Príncipe	0.0827	15.48	4.86	30.59	3.93	0.20
128	Samoa	0.0819	4.75	10.90	48.06	2.35	0.04
129	Micronesia (Federated States of)	0.0811	13.62	7.90	24.91	5.48	0.04
130	Mauritania	0.0798	1.43	2.37	65.07	4.54	0.18
131	Pakistan	0.0771	10.45	2.50	49.74	0.44	0.09
132	Nicaragua	0.0757	2.81	4.49	53.62	4.03	0.34
133	Sudan	0.0711	9.19	0.86	27.05	10.71	0.11
134	Senegal	0.0711	8.35	1.95	44.13	2.22	0.39
135	Haiti	0.0669	10.29	1.11	32.40	5.14	0.00
136	Kenya	0.0637	8.67	0.65	41.88	1.37	0.05
137	Cuba	0.0623	12.94	9.85	2.96	5.62	0.02
138	Côte d'Ivoire	0.0622	3.21	1.73	50.74	1.68	0.05
139	Bhutan	0.0619	5.82	4.00	36.55	2.51	0.30
140	Tajikistan	0.0615	7.20	5.05	34.93	1.29	0.00
141	Swaziland	0.0612	4.13	3.87	39.13	3.69	0.00
142	Equatorial Guinea	0.0600	1.82	1.64	52.49	1.48	0.03
143	Nigeria	0.0594	7.27	0.86	41.66	0.85	0.02
144	Ghana	0.0592	4.27	0.62	49.55	0.58	0.07
145	Congo	0.0590	4.29	0.47	49.98	0.56	0.00
146	Zimbabwe	0.0586	11.40	2.77	13.28	6.94	0.12
147	India	0.0583	6.95	3.21	29.36	3.18	0.45
148	Iraq	0.0552	0.93	3.60	47.55	0.77	0.00
149	Uganda	0.0479	7.90	0.53	27.02	1.69	0.02
150	Benin	0.0455	1.85	1.32	39.66	0.71	0.02
151	Togo	0.0453	5.42	2.18	23.95	3.09	0.03
152	Angola	0.0451	3.05	0.63	37.59	0.65	0.07
153	Zambia	0.0427	5.55	0.72	28.04	1.12	0.04
154	Marshall Islands	0.0417	3.71	7.42	1.27	9.00	0.00
155	Turkmenistan	0.0414	1.41	9.20	6.98	7.19	0.00
156	Cameroon	0.0411	2.93	1.04	32.28	1.12	0.00
157	Lesotho	0.0400	3.58	2.64	28.35	0.25	0.00
158	Vanuatu	0.0376	7.46	3.87	11.40	1.39	0.03
159	Guinea-Bissau	0.0359	2.35	0.29	31.75	0.20	0.00
160	United Republic of Tanzania	0.0337	1.22	0.29	30.62	0.91	0.00
161	Bangladesh	0.0330	0.32	0.84	27.90	2.25	0.03
162	Lao People's Democratic Republic	0.0329	1.64	1.56	24.27	1.70	0.06
163	Afghanistan	0.0328	1.90	0.37	29.03	0.39	0.00
164	Madagascar	0.0301	1.65	0.86	25.30	0.58	0.03
165	Yemen	0.0298	1.44	4.48	13.76	2.77	0.00

Telecommunication infrastructure index and its components (cont.)

Rank	Country	Index value	Estimated Internet users per 100 inhabitants	Main fixed telephone lines per 100 inhabitants	Mobile subscribers per 100 inhabitants	Personal computers per 100 inhabitants	Total fixed broadband per 100 inhabitants
166	Cambodia	0.0297	0.49	0.31	29.10	0.36	0.06
167	Mali	0.0291	0.98	0.65	25.71	0.81	0.04
168	Guinea	0.0285	0.92	0.52	26.44	0.49	0.00
169	Mozambique	0.0250	1.56	0.35	19.68	1.36	0.00
170	Papua New Guinea	0.0228	1.79	0.93	4.67	6.39	0.00
171	Nepal	0.0227	1.41	2.79	14.58	0.48	0.04
172	Comoros	0.0204	3.42	3.02	6.20	0.88	0.00
173	Rwanda	0.0203	3.09	0.17	13.61	0.30	0.04
174	Burkina Faso	0.0201	0.92	0.83	16.76	0.63	0.01
175	Solomon Islands	0.0190	1.81	1.56	2.19	4.64	0.20
176	Liberia	0.0189	0.55	0.06	19.30	.....	0.00
177	Chad	0.0182	1.19	0.13	16.58	0.16	0.00
178	Malawi	0.0181	2.13	1.21	12.00	0.18	0.01
179	Sierra Leone	0.0179	0.25	0.49	18.14	.....	0.00
180	Djibouti	0.0149	1.34	1.34	5.47	2.36	0.01
181	Kiribati	0.0148	2.15	4.21	0.79	1.11	.....
182	Democratic Republic of the Congo	0.0140	0.45	0.06	14.42	0.02	0.00
183	Somalia	0.0122	1.12	1.15	6.87	0.90	0.00
184	Niger	0.0117	0.54	0.18	11.40	0.08	0.00
185	Eritrea	0.0113	3.04	0.82	2.20	0.79	0.00
186	Burundi	0.0090	0.81	0.38	5.95	0.85	0.00
187	Ethiopia	0.0073	0.45	1.13	3.93	0.68	0.00
188	Timor-Leste	0.0068	0.14	0.23	7.35	.....	0.00
189	Central African Republic	0.0045	0.44	0.29	3.55	0.29	0.00
190	Myanmar	0.0045	0.08	1.44	0.76	0.92	0.00
	Countries without telecommunication infrastructure data						
	Nauru	.....	.....	.....	.....	.....	.....
	Democratic People's Republic of Korea	.....	.....	4.97	.....	.....	0.00
	Regional and economic groupings						
	Africa	0.0669	6.57	3.86	38.02	3.44	0.58
	Americas	0.2598	30.78	21.83	86.86	15.04	6.94
	Asia	0.1992	21.59	15.62	70.75	14.99	5.15
	Europe	0.4844	53.15	42.31	113.24	38.90	18.86
	Oceania	0.1660	20.28	16.29	38.32	15.21	5.24
	Developed countries	0.5208	57.99	43.75	112.04	46.14	21.08
	Developing countries other than LDCs	0.2046	22.84	17.43	77.74	12.08	4.29
	Least developed countries	0.0445	4.47	2.35	25.70	2.45	0.44
	Small island developing States	0.1991	24.78	17.74	64.07	12.38	5.46

Source: Columns 4-8: ITU

Human capital index and its components

Rank	Country	Index value	Adult literacy rate (%)	Combined gross enrolment ratio for primary, secondary and tertiary schools (%)
1	Cuba	0.9987	99.80	100.00
2	Australia	0.9933	99.00	100.00
2	Denmark	0.9933	99.00	100.00
2	Finland	0.9933	99.00	100.00
2	New Zealand	0.9933	99.00	100.00
6	Ireland	0.9931	99.00	99.93
7	Republic of Korea	0.9929	99.00	99.88
8	Norway	0.9884	99.00	98.53
9	Netherlands	0.9870	99.00	98.11
10	Iceland	0.9811	99.00	96.33
11	Greece	0.9804	97.10	99.91
12	Spain	0.9792	97.90	97.96
13	France	0.9772	99.00	95.17
14	Slovenia	0.9770	99.70	93.70
15	Belgium	0.9751	99.00	94.54
16	Barbados	0.9743	99.70	92.89
17	Canada	0.9708	99.00	93.24
18	Sweden	0.9698	99.00	92.94
19	Lithuania	0.9692	99.70	91.35
20	United States	0.9691	99.00	92.73
21	Italy	0.9684	98.90	92.71
22	Kazakhstan	0.9677	99.60	91.12
23	Estonia	0.9666	99.80	90.39
24	Belarus	0.9659	99.70	90.38
25	Ukraine	0.9647	99.70	90.02
26	Latvia	0.9608	99.80	88.64
27	Uruguay	0.9599	97.90	92.16
28	Austria	0.9598	99.00	89.94
29	Hungary	0.9597	98.90	90.11
30	Palau	0.9591	95.40	96.92
31	Poland	0.9552	99.30	87.95
32	United Kingdom	0.9542	99.00	88.27
33	Germany	0.9533	99.00	88.00
34	Argentina	0.9503	97.60	89.88
35	Israel	0.9502	97.10	90.85
36	Japan	0.9496	99.00	86.88
37	Liechtenstein	0.9476	99.00	86.29
38	Czech Republic	0.9429	99.00	84.87
39	Russian Federation	0.9397	99.50	82.90
40	Guyana	0.9396	99.00	83.87
41	Switzerland	0.9358	99.00	82.74
42	Portugal	0.9357	94.90	90.90
43	Bulgaria	0.9350	98.30	83.91
44	Slovakia	0.9310	99.00	81.30
45	Chile	0.9233	96.50	83.98
46	Romania	0.9226	97.60	81.58
47	Tonga	0.9212	99.20	77.97
48	Singapore	0.9203	94.40	87.30
49	Kyrgyzstan	0.9196	99.30	77.28
50	Azerbaijan	0.9185	99.50	76.55
51	Croatia	0.9181	98.70	78.04
52	Georgia	0.9156	99.00	76.69
53	Luxembourg	0.9156	99.00	76.68
54	Cyprus	0.9135	97.70	78.66
55	Antigua and Barbuda	0.9133	99.00	76.00
56	Mongolia	0.9127	97.30	79.21
57	Armenia	0.9117	99.50	74.52
58	Turkmenistan	0.9067	99.50	73.00
59	Samoa	0.9049	98.70	74.07
60	Seychelles	0.9039	91.80	87.56
61	Tajikistan	0.9005	99.60	70.95
62	Venezuela	0.9004	95.20	79.73
63	Republic of Moldova	0.8999	99.20	71.57
64	Libya	0.8979	86.80	95.76
65	Bahrain	0.8933	88.80	90.38
66	Thailand	0.8919	94.10	79.38
67	Brunei Darussalam	0.8918	94.90	77.73
68	Bolivia	0.8914	90.70	86.02
69	Peru	0.8911	89.60	88.13
70	Montenegro	0.8910	96.40	74.50
70	Serbia	0.8910	96.40	74.50
72	Mexico	0.8898	92.80	81.35
73	Saint Lucia	0.8892	94.80	77.17
74	Qatar	0.8886	93.10	80.38
75	Bosnia and Herzegovina	0.8886	96.70	73.17
76	Panama	0.8884	93.40	79.73
77	Uzbekistan	0.8883	96.90	72.69
78	Philippines	0.8881	93.40	79.64
79	Saint Kitts and Nevis	0.8875	97.80	70.64
80	Malta	0.8870	92.40	81.31
81	Bahamas	0.8870	95.80	74.49
82	Albania	0.8860	99.00	67.80
83	Brazil	0.8837	90.00	85.11
84	TFYR Macedonia	0.8835	97.00	71.05
85	Costa Rica	0.8826	95.90	72.98
86	Colombia	0.8813	92.70	78.99
87	Andorra	0.8797	99.00	65.92
88	Kuwait	0.8764	94.50	73.92
89	Trinidad and Tobago	0.8761	98.70	65.42
90	Maldives	0.8754	97.00	68.63
91	Paraguay	0.8711	94.60	72.13
92	Jordan	0.8694	91.10	78.62
93	Grenada	0.8622	96.00	66.66
94	Fiji	0.8602	94.40	69.25
95	Lebanon	0.8583	89.60	78.30
96	Malaysia	0.8543	91.90	72.48
97	Indonesia	0.8540	92.00	72.20
98	China	0.8535	93.30	69.46
99	Suriname	0.8505	90.40	74.36
100	Dominica	0.8484	88.00	78.52
101	Gabon	0.8437	86.20	80.70
102	South Africa	0.8432	88.00	76.96
103	Dominican Republic	0.8391	89.10	73.53
104	Mauritius	0.8388	87.40	76.85

Human capital index and its components (cont.)

Rank	Country	Index value	Adult literacy rate (%)	Combined gross enrolment ratio for primary, secondary and tertiary schools (%)
105	Jamaica	0.8361	86.00	78.82
106	Saudi Arabia	0.8346	85.00	80.39
107	Sri Lanka	0.8343	90.80	68.68
108	Turkey	0.8339	88.70	72.76
109	Ecuador	0.8231	84.20	78.52
110	United Arab Emirates	0.8192	90.00	65.76
111	Saint Vincent and the Grenadines	0.8172	88.10	68.95
112	Namibia	0.8135	88.00	68.05
113	São Tomé and Príncipe	0.8131	87.90	68.12
114	Viet Nam	0.8098	90.30	62.33
115	Honduras	0.8007	83.60	73.01
116	Oman	0.7980	86.70	66.00
117	El Salvador	0.7935	82.00	74.05
118	Iran (Islamic Republic of)	0.7927	82.30	73.20
119	Zimbabwe	0.7895	91.20	54.44
120	Botswana	0.7881	82.90	70.62
121	Equatorial Guinea	0.7868	87.00	62.04
122	Cape Verde	0.7858	83.80	68.14
123	Syrian Arab Republic	0.7769	83.10	66.86
124	Swaziland	0.7742	83.80	64.67
125	Congo	0.7742	84.70	62.86
126	Tunisia	0.7710	77.70	75.91
127	Myanmar	0.7643	89.90	49.50
128	Nicaragua	0.7626	78.00	72.77
129	Belize	0.7609	75.10	78.07
130	Lesotho	0.7529	82.20	61.46
131	Algeria	0.7377	75.40	70.52
132	Guatemala	0.7229	73.20	70.47
133	Vanuatu	0.7134	78.10	57.81
134	Kenya	0.7027	73.60	63.60
135	Cambodia	0.7019	76.30	57.97
136	Zambia	0.7008	70.60	69.05
137	Uganda	0.6997	73.60	62.70
138	Egypt	0.6973	66.40	76.40
139	Iraq	0.6956	74.10	60.47
140	Lao People's Democratic Republic	0.6845	72.70	59.94
141	Malawi	0.6797	71.80	60.32
142	Solomon Islands	0.6763	76.60	49.68
143	Madagascar	0.6757	70.70	61.32
144	United Republic of Tanzania	0.6731	72.30	57.32
145	Nigeria	0.6567	72.00	53.01
146	Comoros	0.6553	75.10	46.39
147	India	0.6433	66.00	60.98
148	Rwanda	0.6329	64.90	60.08
149	Cameroon	0.6269	67.90	52.26
150	Ghana	0.6215	65.00	56.45
151	Democratic Republic of the Congo	0.6087	67.20	48.20
152	Nepal	0.5821	56.50	61.62
153	Morocco	0.5739	55.60	60.98
153	Yemen	0.5739	58.90	54.38
155	Liberia	0.5621	55.50	57.64
156	Djibouti	0.5599	70.30	27.37
157	Burundi	0.5587	59.30	49.01
158	Angola	0.5473	67.40	29.40
159	Timor-Leste	0.5445	50.10	63.16
160	Mauritania	0.5435	55.80	51.44
161	Haiti	0.5420	54.80	53.00
162	Sudan	0.5389	60.90	39.86
163	Togo	0.5342	53.20	53.85
164	Bhutan	0.5325	52.80	54.14
165	Eritrea	0.5291	64.20	30.32
166	Papua New Guinea	0.5210	57.80	40.70
167	Bangladesh	0.5182	53.50	48.46
168	Pakistan	0.5026	54.20	42.37
169	Sierra Leone	0.4932	38.10	71.75
170	Mozambique	0.4918	44.40	58.75
171	Gambia	0.4609	42.50	53.27
172	Côte d'Ivoire	0.4540	48.70	38.80
173	Benin	0.4448	40.50	52.43
174	Senegal	0.4250	41.90	43.70
175	Guinea-Bissau	0.4207	44.80	36.60
176	Central African Republic	0.4194	48.60	28.62
177	Ethiopia	0.4027	35.90	49.02
178	Guinea	0.3677	29.50	51.30
179	Afghanistan	0.3641	28.00	53.23
180	Chad	0.3363	31.80	37.29
181	Mali	0.3311	26.20	46.94
182	Burkina Faso	0.3006	28.70	32.77
183	Niger	0.2819	28.70	27.16
	Countries without education data			
	Democratic People's Rep. of Korea	.....	.....	.....
	Kiribati	.....	.....	75.79
	Marshall Islands	.....	.....	62.33
	Micronesia (Federated States of)	.....	.....	83.56
	Monaco	.....	99.00	.....
	Nauru	.....	.....	48.49
	San Marino	.....	99.00	.....
	Somalia	.....	.....	.....
	Tuvalu	.....	.....	69.23
	Regional and economic groupings			
	Africa	0.6177	64.39	56.54
	Americas	0.8679	90.80	78.78
	Asia	0.8059	85.24	71.28
	Europe	0.9464	98.53	86.92
	Oceania	0.8381	88.69	71.84
	Developed countries	0.9502	98.49	88.14
	Developing countries other than LDCs	0.8406	88.61	74.64
	Least developed countries	0.5743	59.98	53.15
	Small island developing States	0.8136	86.39	70.84

Source: Columns 4 and 5: UNESCO

E-participation index

Rank	Country	Index value
1	Republic of Korea	1.0000
2	Australia	0.9143
3	Spain	0.8286
4	New Zealand	0.7714
4	United Kingdom	0.7714
6	Japan	0.7571
6	United States	0.7571
8	Canada	0.7286
9	Estonia	0.6857
9	Singapore	0.6857
11	Bahrain	0.6714
12	Malaysia	0.6571
13	Denmark	0.6429
14	Germany	0.6143
15	France	0.6000
15	Netherlands	0.6000
17	Belgium	0.5857
18	Kazakhstan	0.5571
19	Lithuania	0.5286
20	Slovenia	0.5143
21	Austria	0.5000
21	Norway	0.5000
23	Cyprus	0.4857
23	Sweden	0.4857
25	Croatia	0.4571
26	Colombia	0.4429
26	Ireland	0.4429
28	Kyrgyzstan	0.4286
28	Mongolia	0.4286
30	Finland	0.4143
30	Israel	0.4143
32	China	0.3714
32	Mexico	0.3714
34	Chile	0.3429
34	Malta	0.3429
36	Guatemala	0.3143
36	Hungary	0.3143
36	Uzbekistan	0.3143
39	Bulgaria	0.3000
39	Nicaragua	0.3000
39	Tunisia	0.3000
42	Brazil	0.2857
42	Egypt	0.2857
42	Jordan	0.2857
45	Latvia	0.2714
45	Lebanon	0.2714
45	Portugal	0.2714
48	Greece	0.2571
48	Ukraine	0.2571
48	Uruguay	0.2571
51	Belarus	0.2429
51	Poland	0.2429
53	Kenya	0.2286
53	Kuwait	0.2286
55	Italy	0.2143
55	TFYR Macedonia	0.2143
55	Turkey	0.2143
58	Argentina	0.2000
58	Bolivia	0.2000
58	Costa Rica	0.2000
58	India	0.2000
58	Republic of Moldova	0.2000
58	Switzerland	0.2000
64	Dominican Republic	0.1857
64	Philippines	0.1857
64	Romania	0.1857
64	South Africa	0.1857
68	Azerbaijan	0.1714
68	Brunei Darussalam	0.1714
68	Cape Verde	0.1714
68	Côte d'Ivoire	0.1714
68	Libya	0.1714
68	Luxembourg	0.1714
68	Pakistan	0.1714
68	Peru	0.1714
76	Antigua and Barbuda	0.1571
76	Cameroon	0.1571
76	Congo	0.1571
76	Ecuador	0.1571
76	Montenegro	0.1571
76	Oman	0.1571
82	Andorra	0.1429
82	Grenada	0.1429
82	Sri Lanka	0.1429
82	Venezuela	0.1429
86	Albania	0.1286
86	Czech Republic	0.1286
86	Honduras	0.1286
86	Indonesia	0.1286
86	Lao People's Democratic Republic	0.1286
86	Liechtenstein	0.1286
86	Morocco	0.1286
86	Qatar	0.1286
86	Russian Federation	0.1286
86	Trinidad and Tobago	0.1286
86	United Arab Emirates	0.1286
97	Cambodia	0.1143
97	Cuba	0.1143
97	Mali	0.1143
97	Mauritania	0.1143
97	Mozambique	0.1143
102	Bangladesh	0.1000
102	Barbados	0.1000
102	Belize	0.1000
102	Botswana	0.1000
102	Niger	0.1000
102	Saudi Arabia	0.1000
102	Sudan	0.1000
102	Togo	0.1000
110	Equatorial Guinea	0.0857
110	Ghana	0.0857
110	Guyana	0.0857
110	Jamaica	0.0857
110	Lesotho	0.0857
110	Thailand	0.0857
110	Viet Nam	0.0857
117	Angola	0.0714
117	Bahamas	0.0714
117	Benin	0.0714
117	Bhutan	0.0714
117	El Salvador	0.0714
117	Guinea-Bissau	0.0714
117	Iran (Islamic Republic of)	0.0714
117	Maldives	0.0714
117	Slovakia	0.0714
117	Uganda	0.0714
127	Afghanistan	0.0571
127	Burkina Faso	0.0571
127	Chad	0.0571
127	Comoros	0.0571
127	Georgia	0.0571
127	Madagascar	0.0571
127	Mauritius	0.0571
127	Nepal	0.0571
135	Armenia	0.0429
135	Bosnia and Herzegovina	0.0429
135	Ethiopia	0.0429
135	Iceland	0.0429
135	Iraq	0.0429
135	Serbia	0.0429
135	Seychelles	0.0429
135	United Republic of Tanzania	0.0429
135	Yemen	0.0429
144	Djibouti	0.0286
144	Dominica	0.0286
144	Eritrea	0.0286
144	Fiji	0.0286
144	Gabon	0.0286
144	Guinea	0.0286
144	Liberia	0.0286
144	Marshall Islands	0.0286
144	Monaco	0.0286
144	Rwanda	0.0286
144	Saint Lucia	0.0286
144	Tajikistan	0.0286
144	Zimbabwe	0.0286
157	Algeria	0.0143
157	Burundi	0.0143
157	Democratic Republic of the Congo	0.0143
157	Gambia	0.0143
157	Kiribati	0.0143
157	Micronesia (Federated States of)	0.0143
157	Namibia	0.0143
157	Nauru	0.0143
157	Nigeria	0.0143
157	Palau	0.0143
157	Papua New Guinea	0.0143
157	Paraguay	0.0143
157	Saint Kitts and Nevis	0.0143
157	Saint Vincent and the Grenadines	0.0143
157	Samoa	0.0143
157	San Marino	0.0143
157	São Tomé and Príncipe	0.0143
157	Senegal	0.0143
157	Solomon Islands	0.0143
157	Syrian Arab Republic	0.0143
157	Timor-Leste	0.0143
157	Tonga	0.0143
157	Vanuatu	0.0143

Countries without e-participation data

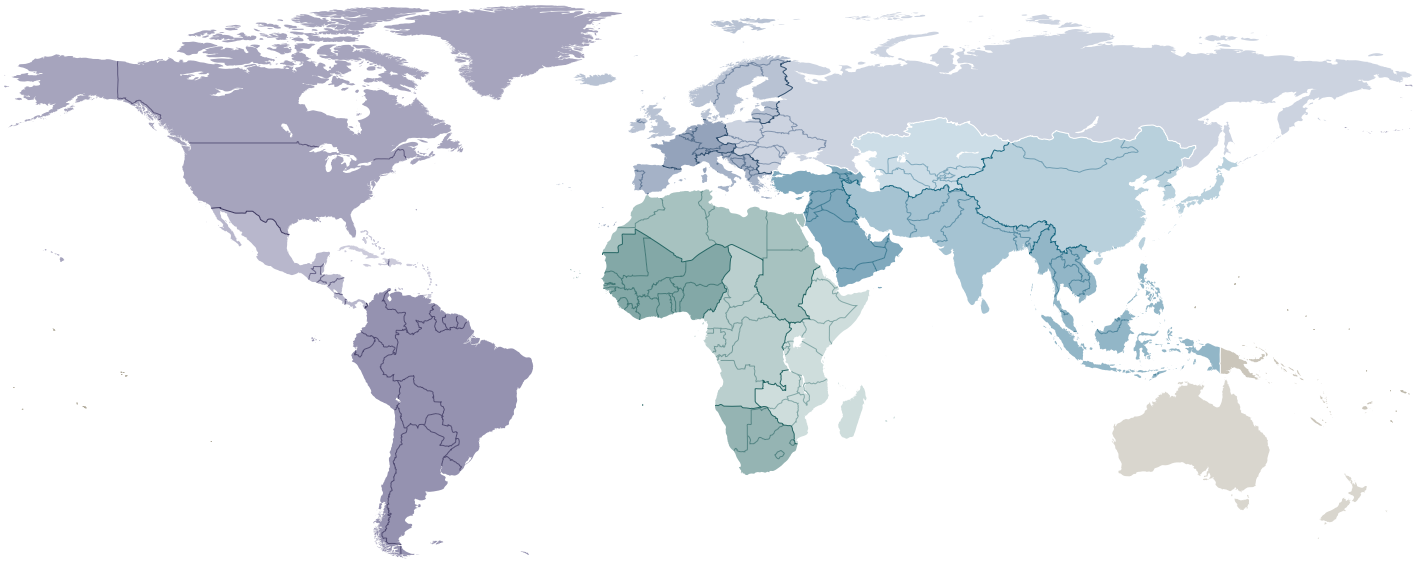
	Central African Republic
	Democratic People's Republic of Korea
	Haiti
	Malawi
	Myanmar
	Panama
	Sierra Leone
	Somalia
	Suriname
	Swaziland
	Turkmenistan
	Tuvalu
	Zambia

Regional and economic groupings

	Africa	0.0845
	Americas	0.1982
	Asia	0.2396
	Europe	0.3236
	Oceania	0.1440
	Developed countries	0.3867
	Developing countries other than LDCs	0.1840
	Least developed countries	0.0599
	Small island developing States	0.0773

Map A.1

Regional groupings



Americas

Caribbean
- Anguilla
- Antigua and Barbuda
- Aruba
- Bahamas
- Barbados
- British Virgin Islands
- Cayman Islands
- Cuba
- Dominica
- Dominican Republic
- Grenada
- Guadeloupe
- Haiti
- Jamaica
- Martinique
- Montserrat
- Netherlands Antilles
- Puerto Rico
- Saint-Barthélemy
- Saint Kitts and Nevis
- Saint Lucia
- Saint Martin (French part)
- Saint Vincent and the Grenadines
- Trinidad and Tobago
- Turks and Caicos Islands
- United States Virgin Islands

Central America
- Belize
- Costa Rica
- El Salvador
- Guatemala
- Honduras
- Mexico
- Nicaragua
- Panama

Northern America
- Bermuda
- Canada
- Greenland
- Saint Pierre and Miquelon
- United States of America

South America
- Argentina
- Bolivia
- Brazil
- Chile
- Colombia
- Ecuador
- Falkland Islands (Malvinas)
- French Guiana
- Guyana
- Paraguay
- Peru
- Suriname
- Uruguay
- Venezuela

Europe

Eastern Europe
- Belarus
- Bulgaria
- Czech Republic
- Hungary
- Poland
- Republic of Moldova
- Romania
- Russian Federation
- Slovakia
- Ukraine

Northern Europe
- Åland Islands
- Channel Islands
- Denmark
- Estonia
- Faeroe Islands
- Finland
- Guernsey
- Iceland
- Ireland
- Isle of Man
- Jersey
- Latvia
- Lithuania
- Norway
- Svalbard and Jan Mayen Islands
- Sweden
- United Kingdom of Great Britain and Northern Ireland

Southern Europe
- Albania
- Andorra
- Bosnia and Herzegovina
- Croatia
- Gibraltar
- Greece
- Holy See
- Italy
- Malta
- Montenegro
- Portugal
- San Marino
- Serbia
- Slovenia
- Spain
- The former Yugoslav Republic of Macedonia

Western Europe
- Austria
- Belgium
- France
- Germany
- Liechtenstein
- Luxembourg
- Monaco
- Netherlands
- Switzerland

Africa

Eastern Africa
- Burundi
- Comoros
- Djibouti
- Eritrea
- Ethiopia
- Kenya
- Madagascar
- Malawi
- Mauritius
- Mayotte
- Mozambique
- Réunion
- Rwanda
- Seychelles
- Somalia
- Uganda
- United Republic of Tanzania
- Zambia
- Zimbabwe

Middle Africa
- Angola
- Cameroon
- Central African Republic
- Chad
- Congo
- Democratic Republic of the Congo
- Equatorial Guinea
- Gabon
- São Tomé and Príncipe

Northern Africa
- Algeria
- Egypt
- Libyan Arab Jamahiriya
- Morocco
- Sudan
- Tunisia
- Western Sahara

Southern Africa
- Botswana
- Lesotho
- Namibia
- South Africa
- Swaziland

Western Africa
- Benin
- Burkina Faso
- Cape Verde
- Côte d'Ivoire
- Gambia
- Ghana
- Guinea
- Guinea-Bissau
- Liberia
- Mali
- Mauritania
- Niger
- Nigeria
- Saint Helena
- Senegal
- Sierra Leone
- Togo

Asia

Central Asia
- Kazakhstan
- Kyrgyzstan
- Tajikistan
- Turkmenistan
- Uzbekistan

Eastern Asia
- China
- Hong Kong Special Administrative Region of China
- Macao Special Administrative Region of China
- Democratic People's Republic of Korea
- Japan
- Mongolia
- Republic of Korea

Southern Asia
- Afghanistan
- Bangladesh
- Bhutan
- India
- Iran (Islamic Republic of)
- Maldives
- Nepal
- Pakistan
- Sri Lanka

South-Eastern Asia
- Brunei Darussalam
- Cambodia
- Indonesia
- Lao People's Democratic Republic
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Timor-Leste
- Viet Nam

Western Asia
- Armenia
- Azerbaijan
- Bahrain
- Cyprus
- Georgia
- Iraq
- Israel
- Jordan
- Kuwait
- Lebanon
- Oman
- Qatar
- Saudi Arabia
- Syrian Arab Republic
- Turkey
- United Arab Emirates
- Yemen

Oceania

Australia and New Zealand
- Australia
- New Zealand
- Norfolk Island

Melanesia
- Fiji
- New Caledonia
- Papua New Guinea
- Solomon Islands
- Vanuatu

Micronesia
- Guam
- Kiribati
- Marshall Islands
- Micronesia (Federated States of)
- Nauru
- Northern Mariana Islands
- Palau

Polynesia
- American Samoa
- Cook Islands
- French Polynesia
- Niue
- Pitcairn
- Samoa
- Tokelau
- Tonga
- Tuvalu
- Wallis and Futuna Islands

United Nations E-Government Survey 2010

Leveraging e-government at a time of financial and economic crisis

The United Nations global survey of e-government presents a systematic assessment of the use and potential of information and communication technology to transform the public sector by enhancing transparency, efficiency, access to public services and citizen participation in all countries and at all levels of development. By studying broad patterns of e-government around the world, the report identifies leading countries in e-government development. It also suggests a way forward for those that have yet to take advantage of its tremendous power.

The 2010 edition of the survey was prepared against a backdrop of financial and economic crisis that is putting tremendous pressure on governments to do more with less. The report examines transparency of stimulus funding and finds that open data – the free sharing of government information based on common standards – could do a great deal to assuage unease and regain the public trust. The authors also argue that e-government technology, while no substitute for good policy, may provide regulators with a much-needed means of grappling with the speed and complexity of financial markets. Similarly, e-government can add agility to public service delivery and help governments respond to an expanded set of demands even as revenues fall short and deficits soar. This report, the fifth in the United Nations e-government series, tells us how.

The United Nations E-Government Survey is a product of the United Nations Department of Economic and Social Affairs. The department, through its Division for Public Administration and Development Management, has published this world report on e-government since 2003 and is regularly called upon to advise national administrations on ways to expand public sector use of ICT to advance on internationally-agreed development goals, including the Millennium Development Goals.

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