

The Networked Readiness Index 2010–2011: Celebrating 10 Years of Assessing Networked Readiness

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This year marks the 10th anniversary of the *Global Information Technology Report* (GITR) series produced by the World Economic Forum (Forum) in collaboration with INSEAD. The initial idea with this project was to explore the impact of innovation and new technologies on productivity and development, as a component of the Forum's research on competitiveness. To this end, over the past decade the Networked Readiness Index (NRI), featured in the series, has been measuring the degree to which developed and developing countries across the world leverage information and communication technologies (ICT) for enhanced competitiveness. It has been helping policymakers and relevant societal stakeholders to track their economies' strengths and weaknesses as well as their progress over time, to identify best practices in networked readiness worldwide, and to design roadmaps and strategies toward optimal ICT diffusion. The *Report* series and the NRI are among the most comprehensive and internationally respected assessments of countries' preparedness to effectively benefit from ICT advances.

While the NRI has accompanied and measured ICT evolution in the last 10 years, every edition of the *Report* has gathered the insights of industry experts and academics around a theme of networked readiness of particular relevance for the industry together with a number of case studies exploring and showcasing best practices in ICT usage around the world. This year, to celebrate its first 10 years, the *Report* will take a look at the coming transformations enabled by ICT—transformations 2.0—with a focus on the impact they will have over the next few years on the key societal actors: individuals, businesses, and governments.

Over the last decade, ICT in its many manifestations has become truly ubiquitous. The mobile phone is now for many the omnipresent symbol of ICT in our lives. Today we live in a world where more people have access to ICT (usually a mobile phone) than to toilets or clean water or the electric grid. Although researchers and industry observers have documented the positive impact of ICT diffusion on an economy's GDP—estimates show that a 10 percent increase in mobile phone penetration is associated with a 1 percent growth in GDP¹—we continue to be challenged by questions that were raised by John Gage of Sun Microsystems in the first edition of the GITR: “Can we apply ICT to improve the condition of each individual? Can ICT, designed for one-to-one links in telephone networks, or for one-to-many links in radio and television networks, serve to bond us all? And how can new forms of ICT—peer-to-peer, edge-to-edge, many-to-many networks—change the relationship between each one of us and all of us?”²

These questions become particularly relevant given the important role played by ICT (in particular social media) during the recent political upheavals in countries such as Tunisia and Egypt. Governments and public organizations are slowly realizing the power of ICT for

redefining governance and providing new modes of engagement with citizens. However, institutional change remains slow and hard. For ICT to be used effectively, technology needs to be matched to the local context and be sensitive to people's needs. Doing all this is not easy. The first law of technological change mentioned by John Gage in the first edition of the GITR remains true today: "Technology is easy. People are hard."³

This chapter presents the methodology and framework underpinning the NRI and the highlights of its 2010–11 rankings for a record 138 economies. An analysis of country and regional trends in networked readiness using a five-year time series, along with an overview of future dissemination efforts, is also included.

The networked readiness framework: Preparing for the next decade

When the networked readiness framework was created, it represented one of the first attempts to make conceptual sense of the complex ICT reality, identifying the common factors enabling countries to effectively use technology. The framework was intended to provide guidance to policymakers and civil society on the factors that they needed to take into account to fully leverage ICT in their competitiveness and growth strategies.

Based on the latest academic research, management literature, and ongoing work by other institutions and multilateral organizations on the subject,⁴ the networked readiness framework has been kept stable since 2002. There have been some minor adjustments at the variable level to better reflect the dynamic trends in the technology landscape and in the methodology employed to compute the rankings.⁵ This has allowed for meaningful comparisons across time with the creation of a valuable database of technology metrics, providing unique insights for researchers as well as for decision makers in the adoption of concrete policy decisions.

However, a comprehensive review process of the framework has been undertaken in the last two years to make sure it continues to effectively capture the main drivers of ICT readiness almost a decade after its creation.⁶ In particular, considering how ICT has become increasingly omnipresent and almost universal in today's world,⁷ the issue seems to have moved from one of access to the question of how to make the best use of ICT in order to improve business innovation, governance, citizens' political participation, and social cohesion. The original framework does capture usage but falls short in looking at the impact of ICT usage on the elements above.

At the same time, rigorous and quantitative measurement of ICT impact is still in its early days. Data definition and availability remain a challenge, especially when the ambition is to cover nearly 140 economies.

As a first step, the 2010–11 framework includes some new indicators gauging the extent of virtual social

networks, as well as ICT impact on business innovation and delivery of basic services to citizens, as detailed later in this chapter. Fully incorporating ICT impact into the networked readiness framework will take more time, which is needed to define appropriate metrics and put in place rigorous processes to collect these data on an international basis. However, the GITR team is committed to stepping up its efforts in this area and to working together with the relevant data organizations, experts, and practitioners on this matter. The *Report's* 10th anniversary will also see the launch of a new platform to share data, collect feedback, and foster dialogue around the societal impact of ICT (see Box 1).

The *Report* also provides a context for diving deeper into specialized topics. For instance, as part of the 10th anniversary celebration and in response to issues raised in discussions with the members of the Forum's information technology and telecommunications community, a special study was undertaken—as a collaboration among the Forum, Comscore, the Oxford Internet Institute, and INSEAD—on the impact of the Internet on global attitudes toward privacy, trust, security, and freedom of expression (see Box 2). It is expected that similar in-depth research on topical issues will accompany future editions of the *Report*.

The networked readiness framework 2010–11 and its methodology

As discussed, the theoretical framework underlying the NRI 2010–2011 was introduced for the first time in 2002, and has remained stable ever since with some adjustments (see Box 4 for details). It assesses the extent to which different economies across the world leverage ICT advances on the basis of the following three underlying principles:

1. *An ICT-conducive environment is a key precondition of networked readiness.* The successful use of ICT is enabled by the country's overall environment for innovation and ICT, including market conditions, regulatory framework, and infrastructure (both physical and human).
2. *Networked readiness requires a society-wide effort.* While the government has a natural leadership role to play in establishing an innovation-friendly environment and in setting the ICT vision for the future, all national stakeholders should be involved in the definition and implementation of the vision: a joint effort of the government, the business sector, and individuals is required to achieve optimal networked readiness. The combination of an ICT-savvy government with a clear ICT vision and an actively engaged private sector has been at the core of networked readiness success stories such as Israel, Estonia, Korea, and Singapore. These economies have

Box 1: Capturing and shaping the digital transformation: Leveraging the GTR

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Digitization is changing our world on an almost daily basis, with profound yet unknown significance for all aspects of our lives—from warfare to global poverty, banking to governance, media to health. These rapid changes bring exceptional challenges.

The GTR series has provided a unique platform for public-private dialogue on innovation and networked readiness and has contributed to raising awareness of the importance of new technologies for overall competitiveness with governments and civil society alike. Moreover, the series has acted as a focal point for collaborative, evidence-based generation of knowledge, leveraging the Forum's competitiveness expertise and the insights of its unique member community. Through a combination of new web-based tools, deeper engagement with its members and constituents, and the creation of a repository for ICT and development data, the Forum hopes to further the understanding of networked readiness enablers and capture ICT impact. In this spirit, on the occasion of the 10th anniversary of the series, the Forum is launching a number of important initiatives, explained below.

1. Dialogue series

The GTR dialogue series consists of multi-stakeholder discussions and workshops aimed at improving private and public capacity to fully use and leverage global ICT benchmarks to inform national strategies, provide a space for dialogue about the implications of the digital transformations, and collect feedback on the networked readiness framework to keep it pertinent. The Forum will host keystone workshops across regions, and offer relevant stakeholders thought leadership opportunities to lead real-world or virtual sessions on more focused topics.

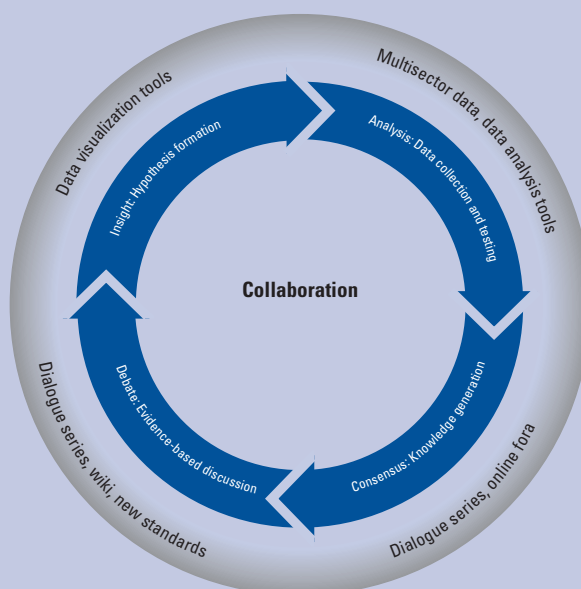
2. New web platform

A new interactive web platform will be launched to make the GTR data more user-friendly, serve as a focal point for development and innovation data from other organizations, and foster dialogue on issues of networked readiness among different stakeholders. The platform will provide tools that allow users to share insights, discuss findings or best practices, and contribute to a shared pool of knowledge. Notably, it will include data visualization and analysis tools, a discussion forum, and a wiki. Materials from the dialogue series sessions will be shared on the website forum to allow broader and continued dialogue on specific topics. The platform is being developed in collaboration with DevInfo and Ruderfinn.

3. Data repository

As the focus of networked readiness moves beyond questions of access, investment decisions, policymaking, and research agendas are pushed beyond baseline metrics and need more nuanced evidence. What sorts of technology inputs have the biggest impact? And conversely, on what sorts of outputs does technology have the biggest impact? Health? Education? Financial inclusion? What are the critical environmental factors that ensure such success? The Forum is working with internal and external partners to allow new datasets to be hosted alongside the NRI data on the new website referenced above. By exposing networked readiness data alongside others' key indicators, with tools that allow for simple graphical analysis and supported by focused real-world and virtual engagements, new insights, hypotheses, discussion points, and knowledge can be generated (see Figure A).

Figure A: The collaborative knowledge creation cycle



Box 2: A global perspective on freedom of expression, privacy, trust, and security online

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Global diffusion of the Internet is centering debate on values and attitudes that often vary across cultures, especially around issues of online freedom of expression, privacy, trust, and security. Leading Internet stakeholders—such as private- and public-sector members, governments, policymakers, and the media—have concentrated their attention on these particular concerns. Yet relatively little is known about the opinion of users on the subject or about the different ways—determined to some extent by which part of the world they inhabit—they may experience the impact of the Internet.

In order to better understand cross-cultural differences in user behaviors and attitudes, the Oxford Internet Institute and INSEAD, in collaboration with Comscore and the Forum, conducted a survey on global user outlook on freedom of expression, privacy, trust, and security online. Over 5,400 adult Internet users from 13 different countries participated in the study.

Findings point to the rise of a new global Internet culture, where users across countries generally share similar opinions and habits related to these vital matters pertaining to the Internet. By and large there is support and desire for freedom of expression, privacy, trust, and security online from users worldwide, without any willingness for trade-offs among these potentially conflicting values and priorities. Users in the newly adopting countries, which are becoming the dominant online population, are however expressing even greater support for the most basic value underpinning the Internet—freedom of expression. In addition, users in nations that are more recently embracing the Internet are also outpacing users in older adopting nations in their innovative uses of the Internet, manifesting more liberal attitudes and behaviors than their counterparts. In conclusion, a new Internet world is emerging today—one that may lead to many changes and consequences for the future of the Internet.

The full study by the same authors will be released in April 2011 as a part of the celebration of the *Global Information Technology Report* series' 10th anniversary.

been able to effectively use ICT as a tool for the structural transformation of their economies and societies, leapfrogging to higher stages of development.

3. *ICT readiness leads to ICT usage and increased impact.* National actors that are more prepared and show a greater interest toward ICT advances will be likely to use it more effectively in their daily activities. This link between enablers and usage/impact comes from prior research in the management literature, where all models of total quality management made an explicit distinction between enablers and results.⁸ Figure 1 provides a graphic representation of the networked readiness framework in its three dimensions: environment, readiness, and usage/impact. The environment component is composed of the market, regulatory, and infrastructure pillars, while the readiness and usage/impact components are composed of three pillars respectively broken down along the lines of individuals, businesses, and the government.

The networked readiness framework translates into the NRI, comprising three subindexes that measure the environment for ICT, together with the main stakeholders' readiness and usage, with a total of nine pillars and 71 variables as follows:

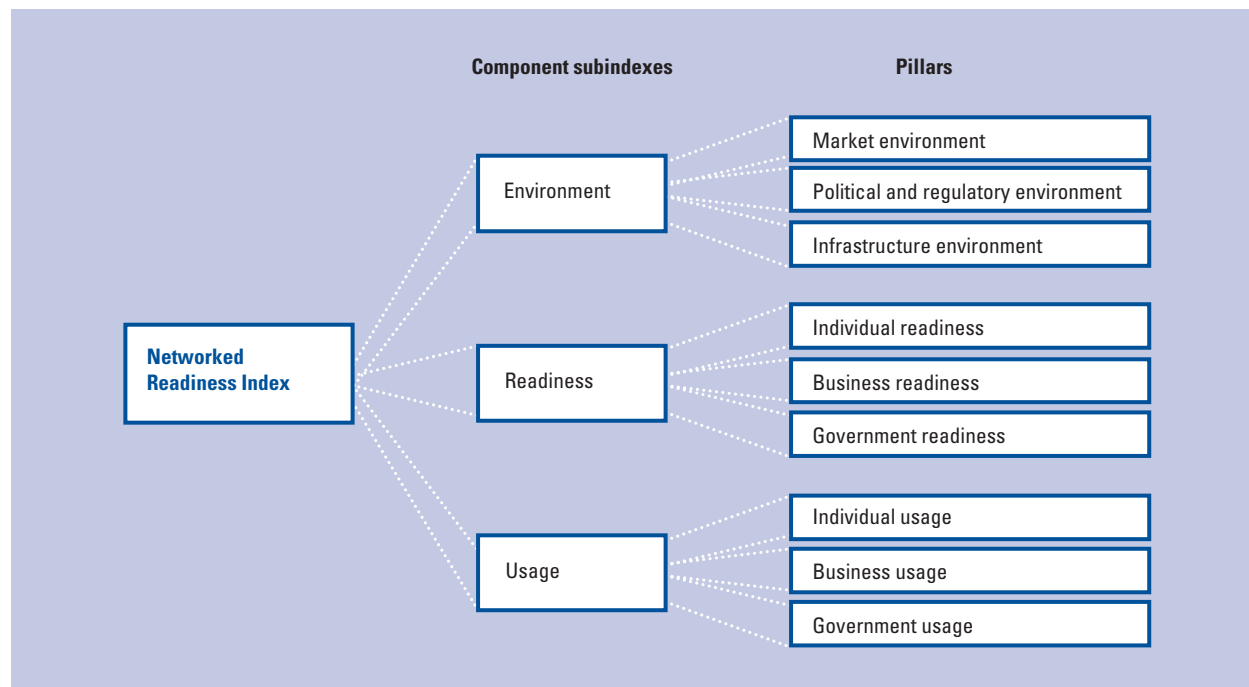
1. *Environment subindex*
 - Market environment
 - Political and regulatory environment
 - Infrastructure environment
2. *Readiness subindex*
 - Individual readiness
 - Business readiness
 - Government readiness
3. *Usage subindex*
 - Individual usage
 - Business usage
 - Government usage

The final NRI score is a simple average of the three composing subindex scores, while each subindex's score is a simple average of those of the composing pillars. In doing this, we assume that all Index components give a similar contribution to national networked readiness. The Technical Appendix at the end of this chapter includes detailed information on the composition and computation of the NRI 2010–2011.

A brief description of the different composing elements (at the subindex and pillar level) follows.

Environment subindex

The environment subindex gauges the friendliness of a country's market, regulatory, and infrastructure

Figure 1: The networked readiness framework

environments to innovation and ICT development. It includes a total of 31 variables grouped into three different pillars.

The *market environment pillar* (10 variables) gauges the quality of the business environment for ICT development and diffusion, including dimensions such as the availability of appropriate financing sources (notably venture capital) and the extent of business sophistication (as captured by cluster development), together with the ease of doing business (including the presence of red tape and excessive fiscal charges) and the freedom of exchanging information over the Internet (proxied by the freedom of the press).

The *political and regulatory environment pillar* (11 variables) assesses the extent to which the national legal framework facilitates innovation and ICT penetration, taking into account general features of the regulatory environment (including the protection afforded to property rights, the independence of the judiciary, and the efficiency of the law-making process) as well as more ICT-specific dimensions (the development of ICT laws and the protection of intellectual property, including the software piracy rate and the level of competition in the Internet and telephony sector).

The *infrastructure environment pillar* (10 variables) captures the development of the national innovation-related infrastructure, both in its physical elements (namely the number of telephone lines and secure Internet servers, electricity production, mobile network coverage rate, Internet bandwidth, and accessibility of digital content) and its human aspects (including the

tertiary enrollment rate, the quality of research institutions, and the availability of scientists and engineers).

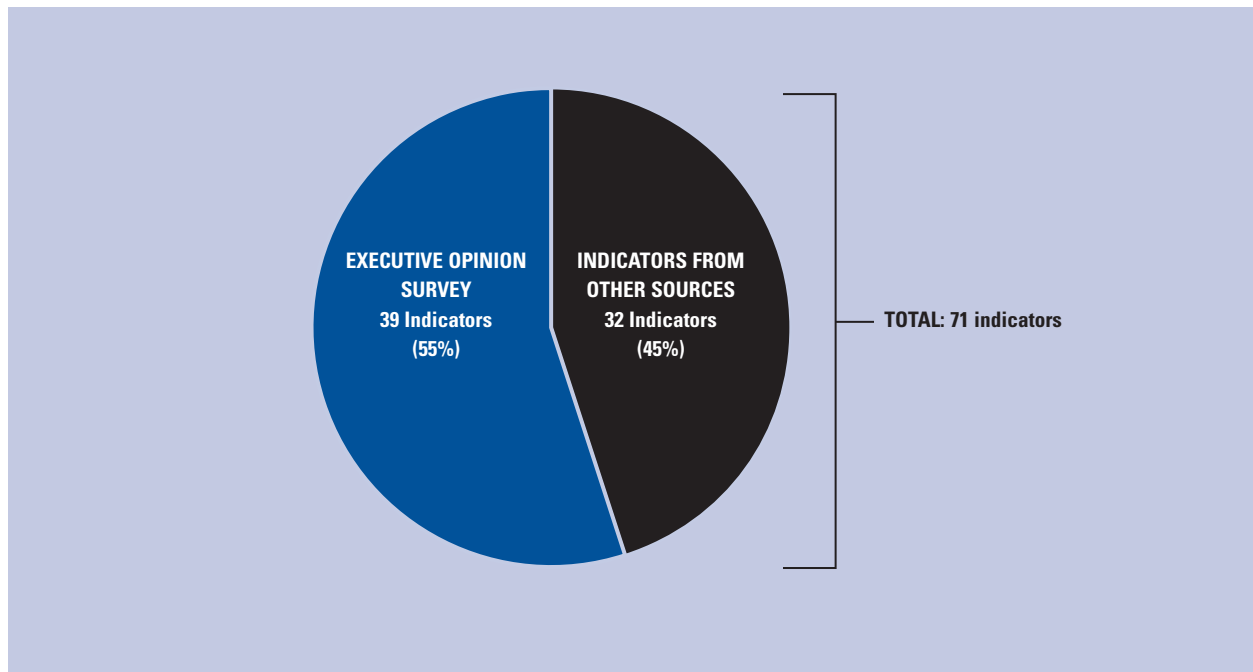
Readiness subindex

The readiness subindex gauges the preparation and willingness of the three stakeholder groups to use technology, particularly ICT, in their day-to-day activities and transactions, with a total of 20 variables.

The *individual readiness pillar* (nine variables) provides insight into citizens' preparedness to use ICT, taking into consideration both basic educational skills and ICT accessibility. The first aspect is captured by the quality of the educational system (notably math and science education) and the literacy rate; the latter by residential telephone connection charges and monthly subscription costs, as well as fixed broadband, mobile cellular, and fixed telephone line tariffs.

The *business readiness pillar* (eight variables) assesses firms' capacity and inclination to incorporate ICT into their operations and processes. Elements taken into consideration are the quality of on-the-job training; spending on research and development (R&D); collaboration between academia and industry, key to fostering applied innovation and intrinsic to effective clusters; the quality of suppliers in the economy; and the affordability of telecommunication for business (i.e., business telephone connection and monthly telephone subscription fees).

The *government readiness pillar* (three variables) in turn attempts to gauge government's vision and prioritization of ICT in the national agenda and competitiveness strategy,

Figure 2: Breakdown of indicators used in the NRI 2010–2011 by data source

including the extent to which public procurement of high-tech products is used as a tool to promote efficiency and innovation.

Usage subindex

The last component of the NRI measures the actual ICT usage by an economy's main social actors and includes a total of 20 variables. As discussed above, this subindex will progressively evolve toward capturing ICT impact in terms of inclusive society, business innovation, and better governance. The transition started last year and continues in this edition with the introduction of a few new variables.

The *individual usage pillar* (eight variables) measures ICT penetration and diffusion at the individual level, using indicators such as the number of mobile and broadband Internet subscribers, Internet users, personal computers (PCs), cellular subscriptions with data access, and Internet access in schools. The use of virtual social networks and ICT impact on basic services are also measured.

The *business usage pillar* (eight variables) assesses businesses' capacity to effectively use technology to generate productivity gains and innovation by capturing firms' technology absorption and capacity for innovation (including the number of utility patents per 100 population and high-tech exports), as well as the extent to which businesses use the Internet in their daily transactions and operations. Moreover, ICT impact

on creating new models and products as well as organizational models is included.

The *government usage pillar* (four variables) provides insight into the implementation of its vision for ICT, including the quality of e-government services provided and the extent of e-participation achieved, as well as ICT impact on government's efficiency.

Computation methodology and data

In order to capture as comprehensively as possible all relevant dimensions of economies' networked readiness, the NRI 2010–2011 is composed of a mixture of quantitative and survey data, as shown in Figure 2.

Thirty-two out of 71—or 45 percent—of the variables composing the NRI are quantitative data, collected by international organizations such as the International Telecommunication Union (ITU), the World Bank, and the United Nations. International sources ensure the validation and comparability of data across countries.

The remaining 39 variables capture aspects that are more qualitative in nature or for which internationally comparable quantitative data are not available for a large enough number of countries, but that are nonetheless crucial to fully measure national networked readiness. These data come from the Executive Opinion Survey (the Survey), which the Forum administers annually to over 15,000 business leaders in all the economies included in the *Report*.⁹ The Survey represents a unique source of insight on important dimensions of ICT readiness, such as the government's vision for ICT, the economy's

quality of education, and ICT impact on access to basic services or on the development of new products and services, among others.

The NRI's coverage every year is determined by the Survey coverage and quantitative data availability. This year the *Report* includes 138 economies, five more than in the 2009–10 edition. Five new countries are included for the first time (Angola, Cape Verde, Lebanon, Iran, and Swaziland) and Moldova was re-instated,¹⁰ while Suriname had to be dropped for lack of Survey data.

In terms of NRI composition, albeit (as previously mentioned) the networked readiness framework has remained stable since 2002, the actual variables included in the Index each year have experienced some variation over time. This has kept the Index current with the rapid changes happening in the dynamic ICT sector so that it continues to be an ever-relevant and cutting-edge explanatory tool. For example, a larger number of variables related to mobile telephony has been included over the last few years to reflect the increased importance of this element in the technology landscape. On a similar note, a new variable on the use of virtual social networks is included this year to capture one of the most interesting trends observed in recent times. Moreover, time-sensitive variables that have not been recently updated by relevant international institutions may need to be dropped in any given year. As detailed below, there have been some modifications to the number and nature of variables included in the NRI this year in preparation of the evolution envisaged for the networked readiness framework over the next decade. The changes made this year are detailed below, by pillar:

1. **Market environment.** The variable on intensity of competition has been dropped because the competition aspect is now covered by the Internet and telephony sectors competition index indicator included in the political and regulatory environment pillar.
2. **Political and regulatory environment.** The variable Software piracy rate (as a percentage of software installed) has been added to give a better sense of the intellectual property protection in a country, complementing the related Survey indicators (variables 2.06 and 2.07).
3. **Infrastructure environment.** Variable 3.02, Mobile network coverage rate, is included for the first time to better capture hard infrastructure. With respect to human resources infrastructure, the variable on education expenditure (as a percentage of GCI) had to be dropped because it was discontinued by the World Bank. Also the variable Local availability of specialized research and training services (3.09) was moved to this pillar from pillar 5 (business readiness) because it pertains more to the soft infrastructure of a country.
4. **Individual readiness.** Variable 4.03, Adult literacy rate, was added as an important indicator of citizens' preparedness to use ICT.
5. **Business readiness.** As mentioned, the variable Local availability of specialized research and training services was moved to pillar 3, while the variable Availability of new telephone lines for businesses was dropped.
6. **Government readiness.** No change was made to this pillar.
7. **Individual usage.** Mirroring the changes in ITU's methodology of collecting ICT penetration data, the variable gauging the number of PCs per 100 population was replaced by the number of Households with a PC. Also Cellular subscriptions with data access (as a percentage of total subscriptions) was added to better assess the degree of sophistication of mobile devices in a country. Last but not least, two new Survey variables capturing aspects related to the impact of ICT on social cohesion have been included: Use of virtual social networks (7.07) and Impact of ICT on access to basic services, including health and education (7.08).
8. **Business usage.** The variable on the prevalence of foreign technology was dropped since this aspect is captured by the variable Capacity for innovation. An important improvement was also made in the patent application measurement: US Patent and Trademark Office (USPTO) data used for granted utility patents have been replaced by World Intellectual Property Organization (WIPO) data on utility patent applications. As discussed in more detail in Box 3, PCT applications (variable 8.05) is combined with National office patent applications (variable 8.04) in a composite indicator that better captures national innovation potential. Moreover, two new Survey variables have been added to capture the Impact of ICT on services and products (8.07) and the Impact of ICT on new organizational models (8.08).
9. **Government usage.** The variable on the presence of ICT in government agencies was removed since it has been dropped in the latest Survey.

More details on the variables included in the Index and their computation can be found in the Technical Appendix at the end of this chapter and in the Technical Notes and Sources section at the end of the *Report*.

Box 3: Capturing innovation: The patent system

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The patent system is designed to encourage innovation by providing innovators with time-limited exclusive legal rights, enabling inventors to appropriate the returns of their innovative activities.

To achieve this objective, a patent confers a set of exclusive rights to applicants by law for inventions that meet standards of novelty, non-obviousness, and industrial applicability. It is valid for a limited period of time (generally 20 years), during which patent holders can commercially exploit their inventions on an exclusive basis. In return, applicants disclose their inventions to the public so that others, skilled in the art, may replicate the invention.

Patents as statistical indicators of innovative activity

Patent indicators, along with other science and technology indicators (e.g., R&D expenditures), are a good and detailed source of information on the inventive activity of countries, regions, and firms, as well as other innovators. Among the available innovation indicators, patent indicators are probably the most frequently used. Griliches (1990) calls patents “a good index of inventive activity” and Eaton and Kortum (1996) approve of patent data as a widely accepted measure of innovation.¹ As opposed to many other related indicators, patent data are also available for most countries in a timely manner.

The *Global Information Technology Report* series has included patent data for a number of years. Previous editions used the number of patents granted by the United States Patent and Trademark Office (USPTO) as a proxy for innovative activity.

This edition of the *Report* relies on a new composite indicator based on two patent measures drawn from the World Intellectual Property Organization (WIPO)'s Statistics Database (www.wipo.int/ipstats/en), as explained below.

1. The number of patent applications filed by residents at their national patent office (resident applications)

When an inventor decides to protect an invention through the patent system, the first step is to file an application with a patent office.

In most cases, applicants tend to file at their national patent office. Data on resident patent applications (2009 or latest available year) capture this patenting activity of residents in a given country. An application is filed with a patent office by an applicant residing in the country in which that office has jurisdiction. For example, a patent application filed with the Japan Patent Office (JPO) by a resident of Japan is considered a resident application for the JPO.

In contrast, patent indicators based on a specific office will introduce a home bias between resident (domestic) and non-resident (foreign) applications, because the propensity to patent at the national patent office is considerably higher than the propensity to patent abroad. For example, only 4.4 percent of total Chinese patent applications in 2008 were filed abroad.² Patents submitted to one single patent office

are also likely to reflect the trade patterns of that particular country. Moreover, data of one single office will capture only a fraction of world innovation.

In addition, the use of statistics on patent applications—instead of data on patents granted—ensures that innovative performance is captured in a more timely and comprehensive manner. In contrast, data on patents granted reflect inventions that obtain patent protection and that are most likely several years old. This is because of lengthy (and increasing) processing and examination periods, which are part of the patenting process.

2. The number of patents filed under the WIPO-administered Patent Cooperation Treaty

To complement national data, the second metric used in the *Report* is the number of Patent Cooperation Treaty (PCT) international applications data by residents of a given country in 2010.³

National patent office data are frequently criticized on the grounds that there is a lack of international comparability. The use of PCT data to some extent alleviates those criticisms.

An inventor of a promising technology with international market potential will wish to protect his or her invention in more than one country. In addition to filing patents directly in other jurisdictions, inventors can file an “international application” through the PCT, which facilitates the acquisition of patent rights in a large number of jurisdictions (142 contracting states) by reducing the requirement to file a separate application in each jurisdiction.

The use of PCT data sheds light on patents that might be the most economically valuable, as these are the ones that inventors are likely to patent abroad and for which inventors are willing to incur the extra costs that the process of patenting abroad requires. It usefully complements data on national patents filed that—depending on the country in question—might have a more limited commercial and global appeal.

In conclusion, this combination of data on national patent office filings and filings under the PCT system makes for a strong and timely indicator of inventive activity and innovation with very good country coverage. It also better achieves the goal of capturing worldwide innovative activity, in particular inventions in medium- or lower-income economies and inventions with a possibly strong international appeal.

Notes

1 See Griliches 1990; Easton and Kortum 1996; and the OECD Patent Statistics Manual.

2 WIPO 2010.

3 See www.wipo.int/pct/en/ for more information on the PCT.

The current networked readiness landscape: Insight from the NRI 2010–2011

This section provides an overview of the networked readiness landscape of the world as assessed by the NRI 2010–2011, highlighting the top 10 performers and main regional trends for Europe and Central Asia, Asia and the Pacific, Latin America and the Caribbean, sub-Saharan Africa, and the Middle East and North Africa (MENA).¹¹ Tables 1 through 4 report the 2010–11 rankings for the overall NRI, its three components, and its nine pillars, also indicating the rankings within each relevant income group to further contextualize the results for each economy covered. In addition, the Country/Economy Profiles and Data Table sections at the end of the *Report* present the detailed results for the 138 economies covered by the study and the 71 indicators composing the NRI. To complement the analysis of the 2010–11 results, Box 4 traces back the history of the NRI and describes its most salient trends since 2006.

Top 10

The composition of the top 10 is fairly stable compared with last year. Eight of the top 10 countries were already members of the club a year ago.

For the second year in a row, **Sweden** tops the NRI thanks to an outstanding performance across the board. The country ranks 1st in 12 of the 71 indicators composing the NRI and within the top 10 in a further 35. Sweden offers one of the best climates for technological adoption and innovation. Penetration of new technologies is among the densest in the world, with over 90 percent of the population using the Internet on a regular basis. Beyond usage, a number of new indicators included in the NRI this year reveal the impact ICT is having on the Swedish economy and society at large. In Sweden more than anywhere else, ICT improves access to basic services and gives rise to new organizational models as well as new business models, products, and services. A true knowledge-based economy, Sweden boasts the 4th highest number of PCT patent applications per million population (338.85).

The runner-up for the second year in a row, **Singapore** trails Sweden by a negligible hundredth of a point and outperforms its Nordic rival on several dimensions of the NRI. In particular, Singapore boasts the most conducive political and regulatory environment in the world, thanks to its efficient and transparent administration and business-friendly policies. It also leads the readiness component for the fifth consecutive year owing to the unparalleled zeal with which the government promotes ICT, the country's excellent educational system, and its businesses' prowess in R&D and staff training. In total, Singapore features in the top 10 of all pillars but one, infrastructure environment, where it ranks a still-excellent 12th.

Finland moves up three positions and completes the NRI podium. Finland's performance is consistently outstanding. The country features in the top 10 of eight pillars; the only area of relative weakness is the government usage pillar, where Finland ranks 24th. Conducive market and regulatory environments, as well as excellent soft and hard infrastructures, constitute a very fertile ground. Businesses are aggressive at harnessing and pioneering new technologies. As a result, the country ranks 3rd for the number of PCT patent applications per million population (388.88). ICT readiness is remarkable within the population (3rd) thanks mainly to the country's excellent educational fundamentals, and ICT usage is therefore pervasive and earns Finland the second spot in this dimension.

For the second year in a row, **Switzerland** ranks 4th overall. The country offers one of the most favorable environments in the world for innovation and new technologies, with a world-class infrastructure (3rd), a business-friendly environment (2nd), and an efficient political and regulatory framework (6th). Its level of business readiness is second to none thanks to intense collaboration with academia (2nd) and heavy R&D spending (2nd). As a result, Switzerland has become one of the world's most prolific innovators. On a per capita basis, it ranks 2nd for the number of international patent applications filed through the PCT (467.07). Over 20 percent of its exports are made up of high-tech products (10th). By contrast, ICT does not seem to be as much of a priority in the government's competitiveness agenda (23rd for government readiness). Also government usage is assessed as the worst area in the country's performance, at 41st.

After dropping two ranks in the last edition, the **United States** retains its 5th overall place despite losing ground on a number of individual indicators. Remarkably enough, the country features in the top 20 of all nine NRI pillars. The United States does best in the usage-related categories, where it ranks 5th. US businesses boast among the highest levels of ICT readiness (6th) and usage (3rd). Its academic excellence contributes a great deal to the outstanding innovative capacity of the economy and more generally to the ICT readiness of the population. Some of the leading universities are among the largest innovators in the country, along with the big corporations. In addition, collaboration between academia and businesses is the most extensive in the world. The United States receives excellent marks for ICT usage by the government (4th). In particular, the country ranks 2nd for the quality of the government's Internet services and 6th for the quality of interaction between the government and citizens using new technologies (e-participation). Chapter 2.3 describes the US National Broadband Plan issued in March 2010 and the country's achievements so far in deploying an extensive broadband infrastructure.

Table 1: The Networked Readiness Index 2010–2011 and 2009–2010 comparison

Country/Economy	NRI 2010–2011				NRI 2009–2010	
	Rank	Score	Rank within income group*		Rank	Score
Sweden	1	5.60	HI	1	1	5.65
Singapore	2	5.59	HI	2	2	5.64
Finland	3	5.43	HI	3	6	5.44
Switzerland	4	5.33	HI	4	4	5.48
United States	5	5.33	HI	5	5	5.46
Taiwan, China	6	5.30	HI	6	11	5.20
Denmark	7	5.29	HI	7	3	5.54
Canada	8	5.21	HI	8	7	5.36
Norway	9	5.21	HI	9	10	5.22
Korea, Rep.	10	5.19	HI	10	15	5.14
Netherlands	11	5.19	HI	11	9	5.32
Hong Kong SAR	12	5.19	HI	12	8	5.33
Germany	13	5.14	HI	13	14	5.16
Luxembourg	14	5.14	HI	14	17	5.02
United Kingdom	15	5.12	HI	15	13	5.17
Iceland	16	5.07	HI	16	12	5.20
Australia	17	5.06	HI	17	16	5.06
New Zealand	18	5.03	HI	18	19	4.94
Japan	19	4.95	HI	19	21	4.89
France	20	4.92	HI	20	18	4.99
Austria	21	4.90	HI	21	20	4.94
Israel	22	4.81	HI	22	28	4.58
Belgium	23	4.80	HI	23	22	4.86
United Arab Emirates	24	4.80	HI	24	23	4.85
Qatar	25	4.79	HI	25	30	4.53
Estonia	26	4.76	HI	26	25	4.81
Malta	27	4.76	HI	27	26	4.75
Malaysia	28	4.74	UM	1	27	4.65
Ireland	29	4.71	HI	28	24	4.82
Bahrain	30	4.64	HI	29	29	4.58
Cyprus	31	4.50	HI	30	32	4.48
Portugal	32	4.50	HI	31	33	4.41
Saudi Arabia	33	4.44	HI	32	38	4.30
Slovenia	34	4.44	HI	33	31	4.51
Tunisia	35	4.35	LM	1	39	4.22
China	36	4.35	LM	2	37	4.31
Spain	37	4.33	HI	34	34	4.37
Barbados	38	4.32	HI	35	35	4.36
Chile	39	4.28	UM	2	40	4.13
Czech Republic	40	4.27	HI	36	36	4.35
Oman	41	4.25	HI	37	50	3.91
Lithuania	42	4.20	UM	3	41	4.12
Puerto Rico	43	4.10	HI	38	45	4.07
Montenegro	44	4.09	UM	4	42	4.10
Uruguay	45	4.06	UM	5	57	3.81
Costa Rica	46	4.05	UM	6	49	3.95
Mauritius	47	4.03	UM	7	53	3.89
India	48	4.03	LM	3	43	4.09
Hungary	49	4.03	HI	39	46	3.98
Jordan	50	4.00	LM	4	44	4.09
Italy	51	3.97	HI	40	48	3.97
Latvia	52	3.93	HI	41	52	3.90
Indonesia	53	3.92	LM	5	67	3.72
Croatia	54	3.91	HI	42	51	3.91
Vietnam	55	3.90	LM	6	54	3.87
Brazil	56	3.90	UM	8	61	3.80
Brunei Darussalam	57	3.89	HI	43	63	3.77
Colombia	58	3.89	UM	9	60	3.80
Thailand	59	3.89	LM	7	47	3.97
Panama	60	3.89	UM	10	58	3.81
South Africa	61	3.86	UM	11	62	3.78
Poland	62	3.84	HI	44	65	3.74
Trinidad and Tobago	63	3.83	HI	45	79	3.60
Greece	64	3.83	HI	46	56	3.82
Romania	65	3.81	UM	12	59	3.80
Sri Lanka	66	3.81	LM	8	72	3.65
Kazakhstan	67	3.80	UM	13	68	3.68
Bulgaria	68	3.79	UM	14	71	3.66
Slovak Republic	69	3.79	HI	47	55	3.86

(Cont'd.)

Table 1: The Networked Readiness Index 2010–2011 and 2009–2010 comparison (cont'd.)

Country/Economy	NRI 2010–2011				NRI 2009–2010	
	Rank	Score	Rank within income group*		Rank	Score
Azerbaijan	70	3.79	UM	15	64	3.75
Turkey	71	3.79	UM	16	69	3.68
Macedonia, FYR	72	3.79	UM	17	73	3.64
Jamaica	73	3.78	UM	18	66	3.73
Egypt	74	3.76	LM	9	70	3.67
Kuwait	75	3.74	HI	48	76	3.62
Gambia, The	76	3.70	LO	1	77	3.61
Russian Federation	77	3.69	UM	19	80	3.58
Mexico	78	3.69	UM	20	78	3.61
Dominican Republic	79	3.62	UM	21	74	3.64
Senegal	80	3.61	LM	10	75	3.63
Kenya	81	3.60	LO	2	90	3.40
Namibia	82	3.58	UM	22	89	3.40
Morocco	83	3.57	LM	11	88	3.43
Cape Verde	84	3.57	LM	12	n/a	n/a
Mongolia	85	3.57	LM	13	94	3.36
Philippines	86	3.57	LM	14	85	3.51
Albania	87	3.56	UM	23	95	3.27
Pakistan	88	3.54	LM	15	87	3.44
Peru	89	3.54	UM	24	92	3.38
Ukraine	90	3.53	LM	16	82	3.53
Botswana	91	3.53	UM	25	86	3.47
El Salvador	92	3.52	LM	17	81	3.55
Serbia	93	3.52	UM	26	84	3.51
Guatemala	94	3.51	LM	18	83	3.53
Lebanon	95	3.49	UM	27	n/a	n/a
Argentina	96	3.47	UM	28	91	3.38
Moldova	97	3.45	LM	19	n/a	n/a
Georgia	98	3.45	LM	20	93	3.38
Ghana	99	3.44	LO	3	98	3.25
Guyana	100	3.43	LM	21	100	3.22
Iran, Islamic Rep.	101	3.41	UM	29	n/a	n/a
Zambia	102	3.36	LO	4	97	3.26
Honduras	103	3.34	LM	22	106	3.13
Nigeria	104	3.32	LM	23	99	3.25
Malawi	105	3.31	LO	5	119	3.01
Mozambique	106	3.29	LO	6	116	3.03
Uganda	107	3.26	LO	7	115	3.03
Ecuador	108	3.26	LM	24	114	3.04
Armenia	109	3.24	LM	25	101	3.20
Bosnia and Herzegovina	110	3.24	UM	30	110	3.07
Cambodia	111	3.23	LO	8	117	3.03
Tajikistan	112	3.23	LO	9	109	3.09
Côte d'Ivoire	113	3.20	LM	26	104	3.16
Benin	114	3.20	LO	10	111	3.06
Bangladesh	115	3.19	LO	11	118	3.01
Kyrgyz Republic	116	3.18	LO	12	123	2.97
Algeria	117	3.17	UM	31	113	3.05
Tanzania	118	3.16	LO	13	120	3.01
Venezuela	119	3.16	UM	32	112	3.06
Mali	120	3.14	LO	14	96	3.27
Lesotho	121	3.14	LM	27	107	3.12
Burkina Faso	122	3.09	LO	15	108	3.10
Ethiopia	123	3.08	LO	16	122	2.98
Syria	124	3.06	LM	28	105	3.13
Cameroon	125	3.04	LM	29	128	2.86
Libya	126	3.03	UM	33	103	3.16
Paraguay	127	3.00	LM	30	127	2.88
Nicaragua	128	2.99	LM	31	125	2.95
Madagascar	129	2.98	LO	17	121	3.00
Mauritania	130	2.98	LO	18	102	3.19
Nepal	131	2.97	LO	19	124	2.95
Zimbabwe	132	2.93	LO	20	132	2.67
Angola	133	2.93	LM	32	n/a	n/a
Swaziland	134	2.91	LM	33	n/a	n/a
Bolivia	135	2.89	LM	34	131	2.68
Timor-Leste	136	2.72	LM	35	130	2.69
Burundi	137	2.67	LO	21	129	2.80
Chad	138	2.59	LO	22	133	2.57

* Income groups: *HI* = high income; *UM* = upper-middle income; *LM* = lower-middle income; *LO* = low income. The highest-ranked economy of each income group appears in bold typeface. Country classification by income group is from the World Bank (situation as of December 2010).

Table 2: Environment subindex

ENVIRONMENT SUBINDEX		Market environment		Political and regulatory framework		Infrastructure environment		
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Sweden	5.89	7	5.36	2	6.20	2	6.11
2	Switzerland	5.74	2	5.44	6	5.97	3	5.80
3	Finland	5.64	6	5.37	4	6.06	9	5.49
4	Singapore	5.63	5	5.40	1	6.23	12	5.27
5	Canada	5.62	4	5.40	13	5.75	4	5.71
6	Norway	5.58	8	5.29	8	5.91	8	5.55
7	Netherlands	5.52	12	5.11	12	5.79	6	5.66
8	Luxembourg	5.50	3	5.41	5	6.06	18	5.02
9	United Kingdom	5.47	17	5.02	10	5.83	7	5.56
10	Denmark	5.47	11	5.13	11	5.80	10	5.47
11	Iceland	5.44	35	4.64	19	5.41	1	6.25
12	Hong Kong SAR	5.43	1	5.73	15	5.60	20	4.97
13	Australia	5.41	14	5.07	7	5.95	14	5.21
14	United States	5.39	13	5.08	20	5.41	5	5.70
15	New Zealand	5.38	16	5.02	3	6.12	19	4.99
16	Germany	5.33	23	4.83	9	5.87	11	5.28
17	Austria	5.13	27	4.77	14	5.71	21	4.92
18	France	5.12	32	4.72	17	5.56	16	5.08
19	Taiwan, China	5.09	15	5.05	28	4.94	13	5.27
20	Ireland	5.03	34	4.70	16	5.56	22	4.84
21	Japan	5.02	30	4.74	18	5.54	23	4.79
22	Belgium	5.01	24	4.83	21	5.15	17	5.07
23	Estonia	4.81	28	4.76	24	5.06	25	4.62
24	Israel	4.79	21	4.90	36	4.81	24	4.65
25	United Arab Emirates	4.77	18	4.98	34	4.82	28	4.51
26	Qatar	4.73	10	5.14	30	4.89	35	4.15
27	Korea, Rep.	4.69	53	4.27	41	4.61	15	5.18
28	Malta	4.69	42	4.41	22	5.14	27	4.52
29	Cyprus	4.67	22	4.87	29	4.90	32	4.24
30	Bahrain	4.59	9	5.15	38	4.73	41	3.90
31	Barbados	4.55	46	4.37	26	4.97	30	4.31
32	Saudi Arabia	4.53	19	4.95	25	4.97	54	3.68
33	Chile	4.52	20	4.93	32	4.85	46	3.80
34	Slovenia	4.52	40	4.46	44	4.54	26	4.56
35	Portugal	4.50	36	4.53	37	4.80	34	4.18
36	Malaysia	4.47	33	4.72	27	4.97	51	3.72
37	Spain	4.46	49	4.31	40	4.63	29	4.44
38	South Africa	4.40	25	4.80	23	5.14	73	3.25
39	Puerto Rico	4.36	38	4.49	39	4.70	44	3.89
40	Czech Republic	4.33	56	4.23	46	4.48	31	4.29
41	Mauritius	4.28	26	4.79	33	4.85	78	3.20
42	Lithuania	4.18	72	4.04	51	4.29	33	4.21
43	Oman	4.17	31	4.73	45	4.50	71	3.28
44	Hungary	4.17	76	4.02	48	4.34	37	4.15
45	Tunisia	4.15	52	4.29	42	4.58	57	3.59
46	Slovak Republic	4.10	50	4.30	55	4.20	47	3.79
47	Montenegro	4.07	51	4.29	54	4.22	52	3.71
48	Panama	4.07	29	4.75	71	3.94	62	3.50
49	Jordan	4.04	57	4.20	43	4.55	65	3.37
50	Greece	4.03	90	3.89	63	4.06	36	4.15
51	Italy	4.02	82	3.98	69	3.98	38	4.09
52	Kuwait	3.99	44	4.40	78	3.83	49	3.75
53	Latvia	3.99	79	3.99	53	4.23	50	3.75
54	Croatia	3.99	98	3.84	65	4.05	39	4.08
55	Uruguay	3.98	85	3.92	49	4.32	53	3.71
56	Namibia	3.97	43	4.40	35	4.82	108	2.70
57	China	3.97	71	4.04	50	4.31	58	3.54
58	India	3.93	41	4.43	52	4.28	81	3.09
59	Romania	3.91	89	3.89	68	4.00	45	3.84
60	Poland	3.91	74	4.03	81	3.80	43	3.90
61	Trinidad and Tobago	3.89	55	4.25	73	3.93	61	3.51
62	Indonesia	3.89	37	4.49	72	3.94	74	3.22
63	Turkey	3.87	80	3.99	61	4.08	60	3.53
64	Thailand	3.87	39	4.46	58	4.16	85	2.98
65	Jamaica	3.81	58	4.19	57	4.18	83	3.06
66	Brazil	3.80	93	3.86	64	4.06	63	3.49
67	Costa Rica	3.80	68	4.10	86	3.76	59	3.54
68	Gambia, The	3.80	95	3.85	31	4.88	110	2.66
69	Mexico	3.80	63	4.15	70	3.98	72	3.26

(Cont'd.)

ENVIRONMENT SUBINDEX		Market environment		Political and regulatory environment		Infrastructure environment		
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
70	Bulgaria	3.79	99	3.82	103	3.52	40	4.04
71	Egypt	3.79	65	4.13	66	4.03	75	3.20
72	Morocco	3.79	59	4.17	59	4.16	84	3.04
73	Macedonia, FYR	3.73	67	4.10	82	3.79	70	3.31
74	Botswana	3.73	69	4.09	47	4.35	106	2.75
75	Sri Lanka	3.68	62	4.15	90	3.69	76	3.20
76	Peru	3.68	47	4.34	94	3.63	82	3.07
77	Azerbaijan	3.67	78	4.00	79	3.82	79	3.18
78	Vietnam	3.66	84	3.92	60	4.14	92	2.93
79	El Salvador	3.66	48	4.32	88	3.71	90	2.94
80	Colombia	3.65	86	3.91	75	3.92	80	3.13
81	Lebanon	3.62	45	4.37	126	3.12	66	3.37
82	Ghana	3.60	60	4.17	62	4.07	118	2.55
83	Russian Federation	3.60	118	3.48	111	3.41	42	3.90
84	Senegal	3.59	70	4.05	84	3.77	91	2.94
85	Malawi	3.58	91	3.88	56	4.20	109	2.66
86	Georgia	3.58	66	4.13	93	3.64	87	2.96
87	Kazakhstan	3.57	97	3.84	100	3.54	68	3.34
88	Zambia	3.56	64	4.14	76	3.91	111	2.65
89	Brunei Darussalam	3.54	100	3.82	74	3.92	96	2.89
90	Serbia	3.54	113	3.55	108	3.43	56	3.63
91	Iran, Islamic Rep.	3.53	122	3.46	89	3.70	64	3.44
92	Dominican Republic	3.53	73	4.03	80	3.81	107	2.73
93	Guatemala	3.53	54	4.26	114	3.38	93	2.93
94	Philippines	3.52	83	3.97	95	3.62	86	2.98
95	Albania	3.49	92	3.87	83	3.78	98	2.82
96	Pakistan	3.48	61	4.16	104	3.51	104	2.77
97	Moldova	3.47	117	3.51	99	3.56	69	3.33
98	Ukraine	3.44	128	3.36	122	3.20	48	3.76
99	Kenya	3.42	88	3.90	97	3.58	102	2.77
100	Argentina	3.41	130	3.21	115	3.37	55	3.65
101	Cape Verde	3.40	87	3.91	87	3.72	117	2.57
102	Uganda	3.38	114	3.55	67	4.01	116	2.58
103	Mongolia	3.35	111	3.60	102	3.53	94	2.91
104	Tanzania	3.33	107	3.62	77	3.90	120	2.48
105	Nigeria	3.31	94	3.86	107	3.44	112	2.65
106	Bosnia and Herzegovina	3.31	125	3.41	118	3.32	77	3.20
107	Guyana	3.30	103	3.72	109	3.43	105	2.75
108	Honduras	3.29	75	4.02	131	3.02	99	2.82
109	Cambodia	3.28	102	3.72	101	3.53	115	2.59
110	Benin	3.28	104	3.70	105	3.48	113	2.65
111	Burkina Faso	3.24	116	3.52	85	3.76	123	2.43
112	Kyrgyz Republic	3.20	126	3.38	113	3.39	97	2.84
113	Mozambique	3.19	96	3.85	92	3.65	133	2.08
114	Armenia	3.19	119	3.48	125	3.13	88	2.96
115	Bangladesh	3.19	77	4.02	132	3.01	119	2.54
116	Nicaragua	3.18	108	3.61	117	3.32	114	2.62
117	Ecuador	3.18	127	3.38	116	3.36	100	2.81
118	Lesotho	3.18	105	3.68	91	3.69	130	2.16
119	Mali	3.14	101	3.74	96	3.62	134	2.07
120	Côte d'Ivoire	3.12	120	3.47	127	3.11	103	2.77
121	Syria	3.09	129	3.31	130	3.06	95	2.90
122	Paraguay	3.07	81	3.99	135	2.88	124	2.36
123	Tajikistan	3.07	121	3.46	112	3.40	126	2.34
124	Mauritania	3.06	123	3.45	98	3.58	129	2.17
125	Algeria	3.05	131	3.15	123	3.20	101	2.78
126	Cameroon	3.02	124	3.43	121	3.21	122	2.43
127	Swaziland	3.01	115	3.52	119	3.24	127	2.26
128	Venezuela	3.00	138	2.74	133	2.89	67	3.36
129	Ethiopia	2.96	106	3.62	110	3.42	137	1.84
130	Madagascar	2.92	112	3.58	129	3.08	132	2.11
131	Zimbabwe	2.90	132	3.12	120	3.23	125	2.35
132	Timor-Leste	2.90	110	3.61	134	2.89	128	2.19
133	Libya	2.88	135	2.98	138	2.70	89	2.95
134	Nepal	2.86	109	3.61	124	3.20	138	1.79
135	Angola	2.79	134	3.01	106	3.47	136	1.88
136	Bolivia	2.78	133	3.07	137	2.81	121	2.46
137	Burundi	2.70	137	2.87	128	3.09	131	2.16
138	Chad	2.58	136	2.90	136	2.86	135	1.97

Table 3: Readiness subindex

READINESS SUBINDEX			Individual readiness		Business readiness		Government readiness		READINESS SUBINDEX			Individual readiness		Business readiness		Government readiness	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Singapore	5.79	1	6.13	5	5.26	1	5.98	70	Spain	4.17	109	4.24	31	4.56	93	3.71
2	Finland	5.52	3	5.80	3	5.52	10	5.24	71	Namibia	4.16	93	4.49	66	3.96	74	4.02
3	Sweden	5.48	23	5.44	2	5.69	8	5.32	72	Latvia	4.15	49	5.10	75	3.85	110	3.49
4	Qatar	5.47	10	5.70	21	4.84	2	5.88	73	Poland	4.14	83	4.69	54	4.13	103	3.59
5	Switzerland	5.39	12	5.65	1	5.70	23	4.83	74	Egypt	4.13	70	4.85	112	3.43	68	4.12
6	United Arab Emirates	5.37	5	5.77	24	4.75	3	5.57	75	Mongolia	4.12	60	5.02	117	3.38	78	3.95
7	Taiwan, China	5.32	13	5.64	12	4.97	5	5.36	76	Romania	4.10	63	4.93	63	3.98	119	3.40
8	United States	5.30	11	5.66	6	5.23	17	5.02	77	Serbia	4.09	50	5.10	98	3.58	101	3.60
9	Denmark	5.30	9	5.72	9	5.14	16	5.05	78	Iran, Islamic Rep.	4.09	55	5.07	118	3.37	88	3.83
10	Malaysia	5.23	14	5.63	19	4.88	11	5.18	79	South Africa	4.09	113	4.16	40	4.37	92	3.72
11	Hong Kong SAR	5.21	2	6.04	27	4.67	18	4.92	80	Ghana	4.08	90	4.56	80	3.83	83	3.86
12	Luxembourg	5.17	22	5.44	22	4.76	7	5.32	81	Turkey	4.07	94	4.45	93	3.64	64	4.12
13	Iceland	5.17	4	5.77	14	4.91	24	4.82	82	Ukraine	4.06	28	5.38	106	3.52	122	3.27
14	Germany	5.14	25	5.40	4	5.27	29	4.75	83	Dominican Republic	4.05	102	4.40	108	3.50	57	4.24
15	Canada	5.13	6	5.73	20	4.88	27	4.78	84	Hungary	4.03	104	4.36	58	4.05	95	3.68
16	China	5.11	8	5.72	30	4.56	15	5.06	85	Lebanon	4.03	32	5.29	44	4.32	138	2.48
17	Korea, Rep.	5.11	19	5.54	16	4.91	22	4.87	86	Algeria	4.03	72	4.83	82	3.81	116	3.44
18	Tunisia	5.10	17	5.56	37	4.40	6	5.33	87	Mozambique	4.02	128	3.69	72	3.89	44	4.49
19	Netherlands	5.08	24	5.43	7	5.20	35	4.61	88	Tajikistan	4.02	92	4.53	95	3.62	80	3.92
20	Norway	5.08	20	5.52	13	4.94	26	4.78	89	Albania	4.02	78	4.77	127	3.22	72	4.07
21	Malta	5.03	29	5.32	36	4.41	4	5.37	90	Croatia	4.02	88	4.60	71	3.90	106	3.56
22	Belgium	4.93	27	5.38	8	5.17	58	4.24	91	Greece	4.01	69	4.86	94	3.63	108	3.54
23	New Zealand	4.93	26	5.39	29	4.64	28	4.75	92	Moldova	4.01	46	5.14	111	3.44	112	3.45
24	Saudi Arabia	4.91	34	5.26	38	4.39	12	5.09	93	Botswana	4.01	114	4.11	92	3.66	55	4.26
25	Costa Rica	4.91	7	5.72	26	4.71	53	4.30	94	Zambia	3.99	116	4.07	73	3.88	75	4.00
26	Australia	4.91	39	5.21	25	4.73	25	4.79	95	Kuwait	3.95	45	5.15	128	3.13	105	3.57
27	Israel	4.90	43	5.17	11	5.02	41	4.51	96	Ethiopia	3.95	112	4.16	99	3.57	67	4.12
28	Austria	4.90	30	5.31	23	4.76	32	4.63	97	Armenia	3.93	52	5.08	129	3.13	104	3.58
29	France	4.87	48	5.12	18	4.89	38	4.59	98	Argentina	3.91	79	4.75	49	4.21	135	2.75
30	Bahrain	4.86	15	5.59	67	3.94	14	5.07	99	Philippines	3.89	74	4.83	109	3.49	121	3.37
31	United Kingdom	4.85	54	5.08	17	4.91	39	4.57	100	Mexico	3.89	97	4.45	103	3.55	98	3.66
32	Estonia	4.82	47	5.12	34	4.45	19	4.89	101	El Salvador	3.89	85	4.66	97	3.59	118	3.41
33	India	4.82	21	5.50	33	4.47	47	4.48	102	Malawi	3.88	124	3.86	78	3.84	79	3.94
34	Oman	4.81	40	5.19	52	4.16	13	5.08	103	Bulgaria	3.88	95	4.45	107	3.52	96	3.66
35	Vietnam	4.78	33	5.28	51	4.18	20	4.88	104	Bangladesh	3.87	96	4.45	124	3.24	81	3.90
36	Ireland	4.76	51	5.09	10	5.08	63	4.13	105	Uganda	3.86	121	3.91	101	3.57	65	4.12
37	Portugal	4.75	84	4.68	45	4.30	9	5.27	106	Morocco	3.83	125	3.85	96	3.60	73	4.05
38	Japan	4.75	80	4.75	15	4.91	37	4.59	107	Georgia	3.82	86	4.65	132	3.11	94	3.70
39	Indonesia	4.74	18	5.55	42	4.34	51	4.32	108	Nigeria	3.81	119	3.94	77	3.84	97	3.66
40	Cyprus	4.71	16	5.59	53	4.15	48	4.39	109	Guatemala	3.81	99	4.43	74	3.88	128	3.13
41	Montenegro	4.67	37	5.21	43	4.33	46	4.48	110	Honduras	3.81	106	4.32	100	3.57	109	3.53
42	Sri Lanka	4.62	31	5.29	64	3.97	36	4.60	111	Cambodia	3.80	118	4.01	113	3.42	76	3.98
43	Slovenia	4.60	41	5.18	35	4.45	61	4.18	112	Peru	3.80	108	4.26	104	3.54	100	3.61
44	Barbados	4.60	38	5.21	56	4.07	42	4.51	113	Ecuador	3.76	82	4.72	123	3.30	123	3.27
45	Czech Republic	4.58	66	4.89	28	4.65	59	4.21	114	Benin	3.76	133	3.48	105	3.53	54	4.27
46	Mauritius	4.58	36	5.23	60	4.02	45	4.48	115	Slovak Republic	3.76	111	4.18	69	3.92	126	3.17
47	Chile	4.45	100	4.42	39	4.37	40	4.55	116	Côte d'Ivoire	3.75	126	3.85	84	3.76	99	3.65
48	Uruguay	4.45	61	5.00	65	3.96	49	4.38	117	Syria	3.74	81	4.73	133	3.10	120	3.39
49	Azerbaijan	4.44	67	4.89	83	3.81	33	4.62	118	Nepal	3.74	71	4.84	125	3.24	127	3.13
50	Brunei Darussalam	4.41	89	4.59	68	3.93	30	4.71	119	Lesotho	3.73	103	4.37	116	3.39	117	3.41
51	Colombia	4.41	68	4.88	50	4.19	62	4.15	120	Venezuela	3.72	101	4.41	76	3.85	132	2.90
52	Jordan	4.37	35	5.25	119	3.37	43	4.50	121	Zimbabwe	3.72	98	4.45	110	3.48	124	3.22
53	Thailand	4.36	75	4.81	48	4.22	71	4.07	122	Bosnia and Herzegovina	3.71	64	4.92	114	3.42	134	2.78
54	Cape Verde	4.35	58	5.03	120	3.33	31	4.70	123	Mali	3.70	129	3.69	122	3.31	69	4.11
55	Kenya	4.35	73	4.83	55	4.11	70	4.11	124	Tanzania	3.69	130	3.68	102	3.56	87	3.83
56	Kazakhstan	4.34	53	5.08	81	3.83	66	4.12	125	Kyrgyz Republic	3.68	42	5.18	130	3.13	136	2.73
57	Jamaica	4.34	57	5.06	61	3.98	77	3.97	126	Swaziland	3.61	115	4.08	87	3.73	130	3.02
58	Gambia, The	4.34	123	3.87	47	4.26	21	4.88	127	Angola	3.61	135	3.24	88	3.73	85	3.85
59	Brazil	4.28	110	4.24	41	4.36	56	4.24	128	Cameroon	3.60	132	3.49	79	3.83	111	3.48
60	Pakistan	4.28	56	5.07	70	3.92	84	3.86	129	Madagascar	3.53	134	3.25	86	3.75	102	3.60
61	Panama	4.26	76	4.80	91	3.68	52	4.31	130	Libya	3.52	105	4.34	138	2.68	107	3.55
62	Lithuania	4.25	65	4.89	62	3.98	82	3.87	131	Burkina Faso	3.50	137	2.74	115	3.39	50	4.37
63	Trinidad and Tobago	4.24	44	5.16	89	3.71	86	3.85	132	Paraguay	3.46	91	4.54	131	3.13	137	2.71
64	Italy	4.22	62	4.95	46	4.27	113	3.44	133	Mauritania	3.45	131	3.67	126	3.23	115	3.44
65	Guyana	4.20	77	4.79	57	4.05	91	3.76	134	Bolivia	3.33	117	4.01	134	3.05	131	2.92
66	Puerto Rico	4.20	107	4.27	32	4.52	90	3.80	135	Burundi	3.31	127	3.81	136	3.03	129	3.10
67	Macedonia, FYR	4.20	87	4.63	85	3.76	60	4.20	136	Nicaragua	3.26	120	3.92	135	3.04	133	2.83
68	Russian Federation	4.18	59	5.02	90	3.70	89	3.82	137	Chad	3.13	136	2.87	121	3.32	125	3.19
69	Senegal	4.18	122	3.89	59	4.03	34	4.61	138	Timor-Leste	3.04	138	2.68	137	3.01	114	3.44

(Cont'd.)

Table 4: Usage subindex

USAGE SUBINDEX		Individual usage		Business usage		Government usage		
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Korea, Rep.	5.78	4	5.90	2	5.20	1	6.25
2	Taiwan, China	5.49	15	5.40	1	5.29	2	5.76
3	Sweden	5.42	1	6.45	6	4.91	17	4.91
4	Singapore	5.35	7	5.73	10	4.68	3	5.65
5	United States	5.28	19	5.28	3	4.97	4	5.61
6	Finland	5.12	2	6.17	8	4.74	24	4.45
7	Denmark	5.10	5	5.84	14	4.32	9	5.14
8	Japan	5.07	14	5.43	4	4.96	19	4.83
9	United Kingdom	5.04	12	5.55	12	4.43	10	5.13
10	Netherlands	4.97	8	5.73	13	4.33	18	4.84
11	Norway	4.95	10	5.66	16	4.21	14	4.98
12	Germany	4.95	17	5.37	7	4.80	20	4.67
13	Hong Kong SAR	4.92	11	5.61	25	3.80	7	5.35
14	Canada	4.89	23	5.12	22	4.07	5	5.48
15	Switzerland	4.87	9	5.69	5	4.94	41	4.00
16	Australia	4.86	18	5.36	27	3.75	6	5.48
17	France	4.79	25	5.01	11	4.43	16	4.92
18	New Zealand	4.78	13	5.45	24	3.87	13	5.01
19	Israel	4.75	20	5.23	9	4.68	28	4.35
20	Luxembourg	4.74	3	6.05	18	4.16	42	4.00
21	Austria	4.68	16	5.38	20	4.14	22	4.52
22	Estonia	4.66	22	5.20	28	3.74	12	5.04
23	Iceland	4.60	6	5.76	17	4.19	46	3.86
24	Malta	4.56	26	4.95	21	4.14	21	4.59
25	Malaysia	4.53	45	4.26	15	4.24	11	5.10
26	Belgium	4.46	24	5.10	26	3.79	23	4.49
27	Bahrain	4.45	29	4.90	58	3.15	8	5.31
28	Spain	4.35	32	4.78	46	3.33	15	4.95
29	Ireland	4.33	31	4.78	23	4.05	35	4.17
30	United Arab Emirates	4.27	21	5.22	39	3.50	40	4.08
31	Portugal	4.24	27	4.95	40	3.49	30	4.29
32	Slovenia	4.20	30	4.88	41	3.48	32	4.23
33	Lithuania	4.17	34	4.71	38	3.51	29	4.29
34	Qatar	4.16	28	4.91	42	3.47	37	4.11
35	Cyprus	4.12	35	4.71	36	3.52	36	4.14
36	China	3.96	63	3.54	19	4.16	34	4.18
37	Czech Republic	3.91	39	4.57	30	3.69	60	3.46
38	Hungary	3.88	41	4.48	35	3.54	53	3.62
39	Saudi Arabia	3.88	40	4.54	44	3.38	52	3.71
40	Chile	3.87	54	3.91	47	3.29	26	4.42
41	Barbados	3.83	42	4.45	29	3.70	70	3.33
42	Tunisia	3.81	61	3.56	43	3.44	27	4.42
43	Oman	3.76	48	4.20	56	3.16	45	3.91
44	Uruguay	3.75	47	4.22	63	3.08	43	3.97
45	Puerto Rico	3.73	56	3.71	33	3.55	44	3.93
46	Brunei Darussalam	3.73	33	4.73	79	2.88	54	3.59
47	Croatia	3.73	44	4.36	66	3.03	49	3.79
48	Bulgaria	3.70	36	4.67	73	2.96	59	3.46
49	Italy	3.67	38	4.58	51	3.21	80	3.22
50	Latvia	3.65	43	4.45	62	3.09	64	3.41
51	Colombia	3.61	70	3.36	65	3.04	25	4.43
52	Brazil	3.61	64	3.51	37	3.52	48	3.80
53	Jordan	3.57	62	3.55	71	2.96	33	4.20
54	Slovak Republic	3.51	37	4.64	64	3.07	107	2.84
55	Montenegro	3.51	53	3.97	54	3.18	66	3.38
56	Kazakhstan	3.49	73	3.28	75	2.91	31	4.28
57	Poland	3.48	46	4.23	60	3.11	93	3.11
58	Costa Rica	3.45	77	3.25	31	3.68	61	3.43
59	Greece	3.45	50	4.11	88	2.81	62	3.42
60	Macedonia, FYR	3.42	51	4.11	98	2.70	58	3.47
61	Thailand	3.42	72	3.31	34	3.55	63	3.41
62	Turkey	3.42	58	3.62	61	3.10	55	3.54
63	Romania	3.42	52	4.02	70	2.98	74	3.25
64	Mexico	3.38	78	3.18	48	3.23	50	3.72
65	Egypt	3.37	79	3.16	83	2.85	39	4.09
66	Trinidad and Tobago	3.36	49	4.15	97	2.70	79	3.22
67	India	3.34	98	2.83	45	3.38	47	3.82
68	Panama	3.33	59	3.60	59	3.12	73	3.26
69	Russian Federation	3.31	55	3.91	72	2.96	96	3.05

(Cont'd.)

USAGE SUBINDEX		Individual usage		Business usage		Government usage		
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
70	Dominican Republic	3.29	82	3.14	68	3.01	51	3.72
71	Philippines	3.28	85	3.07	32	3.57	81	3.20
72	Kuwait	3.27	57	3.71	94	2.75	69	3.35
73	Vietnam	3.27	74	3.28	55	3.17	68	3.36
74	Azerbaijan	3.26	69	3.37	76	2.90	56	3.51
75	Mongolia	3.24	97	2.83	92	2.78	38	4.11
76	Mauritius	3.23	68	3.39	69	3.00	72	3.32
77	Jamaica	3.19	60	3.57	85	2.84	88	3.17
78	Guatemala	3.19	86	3.06	53	3.19	71	3.32
79	Albania	3.17	66	3.49	86	2.83	83	3.19
80	Indonesia	3.14	87	3.01	50	3.21	82	3.20
81	Peru	3.14	80	3.15	78	2.90	67	3.37
82	Sri Lanka	3.13	100	2.76	57	3.15	57	3.48
83	South Africa	3.10	95	2.88	52	3.19	76	3.24
84	Morocco	3.10	71	3.35	89	2.80	89	3.14
85	Argentina	3.10	65	3.50	82	2.86	101	2.94
86	Ukraine	3.10	84	3.11	74	2.93	75	3.25
87	Senegal	3.05	99	2.79	49	3.22	91	3.14
88	Kenya	3.03	104	2.66	67	3.02	65	3.40
89	El Salvador	3.01	90	2.94	84	2.85	77	3.24
90	Gambia, The	2.97	96	2.87	80	2.88	86	3.17
91	Cape Verde	2.96	94	2.89	93	2.77	78	3.22
92	Georgia	2.96	81	3.15	103	2.64	94	3.08
93	Honduras	2.94	93	2.90	77	2.90	98	3.02
94	Serbia	2.92	67	3.48	121	2.50	114	2.78
95	Moldova	2.89	76	3.25	116	2.56	105	2.86
96	Pakistan	2.87	106	2.61	87	2.83	87	3.17
97	Botswana	2.85	101	2.76	112	2.59	84	3.19
98	Ecuador	2.83	89	2.94	109	2.61	99	2.94
99	Nigeria	2.83	92	2.93	81	2.87	123	2.67
100	Lebanon	2.82	88	3.01	91	2.79	125	2.65
101	Guyana	2.78	91	2.94	105	2.63	113	2.78
102	Venezuela	2.76	83	3.11	124	2.49	122	2.68
103	Côte d'Ivoire	2.73	116	2.35	100	2.69	90	3.14
104	Bosnia and Herzegovina	2.71	75	3.26	118	2.53	133	2.36
105	Libya	2.70	103	2.68	117	2.54	102	2.89
106	Kyrgyz Republic	2.65	105	2.65	134	2.25	97	3.05
107	Mozambique	2.65	125	2.13	96	2.70	92	3.12
108	Ghana	2.63	112	2.46	102	2.65	116	2.77
109	Namibia	2.62	107	2.59	90	2.80	129	2.47
110	Cambodia	2.62	115	2.35	104	2.63	104	2.86
111	Armenia	2.61	108	2.56	107	2.61	124	2.66
112	Tajikistan	2.60	114	2.40	99	2.70	119	2.70
113	Iran, Islamic Rep.	2.60	110	2.54	114	2.56	120	2.70
114	Bolivia	2.57	109	2.54	123	2.49	121	2.69
115	Mali	2.57	132	2.02	122	2.50	85	3.18
116	Benin	2.55	119	2.28	108	2.61	115	2.77
117	Zambia	2.54	120	2.24	101	2.69	118	2.71
118	Uganda	2.54	121	2.19	111	2.60	109	2.83
119	Nicaragua	2.53	117	2.31	126	2.46	108	2.83
120	Burkina Faso	2.53	135	1.92	110	2.61	95	3.07
121	Lesotho	2.51	126	2.12	106	2.62	110	2.80
122	Bangladesh	2.50	134	2.01	115	2.56	100	2.94
123	Madagascar	2.50	123	2.18	119	2.53	112	2.79
124	Cameroon	2.49	129	2.09	113	2.59	111	2.79
125	Tanzania	2.47	127	2.11	120	2.52	117	2.77
126	Malawi	2.46	124	2.13	95	2.71	127	2.55
127	Paraguay	2.46	111	2.51	125	2.48	131	2.40
128	Mauritania	2.43	128	2.11	130	2.33	106	2.85
129	Algeria	2.42	102	2.74	138	2.11	130	2.42
130	Angola	2.39	122	2.18	129	2.35	126	2.64
131	Syria	2.35	113	2.45	135	2.24	134	2.36
132	Ethiopia	2.34	136	1.83	131	2.31	103	2.87
133	Nepal	2.30	131	2.03	127	2.38	128	2.49
134	Timor-Leste	2.22	130	2.03	133	2.26	132	2.37
135	Zimbabwe	2.17	133	2.01	128	2.38	137	2.12
136	Swaziland	2.10	118	2.31	137	2.16	138	1.84
137	Chad	2.07	137	1.66	132	2.30	135	2.25
138	Burundi	1.99	138	1.56	136	2.17	136	2.24

In 6th position, **Taiwan** makes a remarkable entry into the top 10.¹² Taiwan is an international innovation powerhouse. Its patent office is one of the world's busiest—in 2009 alone, it processed over 78,000 patent applications. That represents a record 3,392 applications per million population, far more than 2nd- and 3rd-ranked Korea (2,611) and Japan (2,315). As with most of the top-ranked countries in the Index, the government has placed ICT at the heart of its competitiveness agenda. Through incentive programs and massive investment in ICT infrastructure, the government has been a catalyst of these positive developments. Taiwan ranks 5th in the government readiness pillar and 2nd in the government usage pillar, and represents an inspiring success story of a resource-poor economy turned into a major high-tech global player in the space of a few decades.

Former long-standing best-performer **Denmark** drops to 7th position as a result of slightly lower scores across the board. Yet its performance remains consistently strong. Indeed, Denmark's lowest rank among the nine NRI pillars is a still very positive 16th in the government readiness pillar. Among all countries, only Singapore does better in this regard, 12th being its lowest pillar rank. The country's showing rests on outstanding levels of preparation and use of ICT by all national stakeholders (9th and 7th for readiness and usage, respectively), especially individuals (9th and 5th for individual readiness and usage, respectively). Environmental factors are also very favorable at 11th overall, with an even contribution of market, regulatory, and infrastructure environments.

Canada (8th) slips one position, essentially because of its lower marks in the usage component of the Index (14th, down six places). Nevertheless it displays a strong showing, mainly driven by a very ICT-conducive environment (5th) and high levels of individual readiness (6th) and government usage (5th). Individual and business usage are weaker at 23rd and 22nd, respectively: comparatively low penetration rates for mobile telephony remains a notable problem for the country (70.9 per 100 population, corresponding to 95th place). On a similar note, Canadian businesses appear less prompt than their southern neighbors to harness new technologies or to produce and export innovative products in the international markets—the country ranks 20th for PCT patent applications per million population (80.2) and only 9.2 percent of its goods exports are high-tech products (28th).

At 9th, **Norway** is the fourth Nordic in the top 10. Up one place, the country's performance is virtually unchanged since last year, with small movements in the rankings attributable to variations in the performance of other countries. Norway continues to boast one of the most conducive environments for innovation and ICT development (6th). The area presenting the most room for improvement is the readiness component (20th).

Up five positions, **Korea** re-enters the top 10 for the first time since the 2007–08 edition when it was

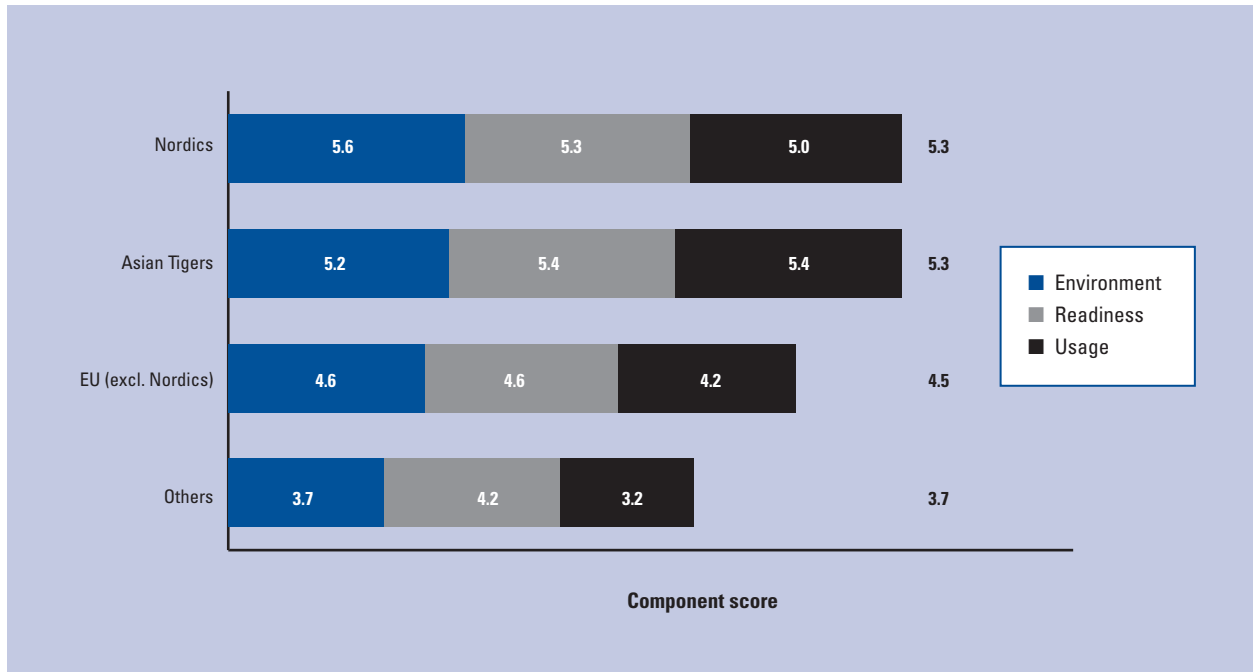
9th. Korea's performance exhibits a peculiar pattern. It tops the ICT usage component, but trails behind other members of the top 10 by a wide margin for the quality of its market environment (53rd). The regulatory framework is also problematic (41st), with very low marks for the effectiveness of law-making bodies (131st) and the efficiency of the legal system to challenge regulations (86th), among other dimensions. These results stand at odds with the country's outstanding performance in terms of usage, which earns Korea the top spot in this category. In this pillar, the country leads both the Government Online Services and E-Participation Indexes.

Before delving into the regional analysis of the NRI results, we highlight a number of general trends in this year's findings, looking at the most successful countries, the relationship between networked readiness and income, and a size and consistency of performance across pillars.

As a group, the five Nordics continue to impress by their capacity to leverage ICT. Four of them appear in the top 10, with Iceland positioning at a still-satisfactory 16th position. The overall performance of the Asian Tigers is just as impressive (see Figure 3). Behind Singapore, Taiwan and Korea, both gaining five ranks, re-enter the top 10, while Hong Kong follows closely at 12th. One remarkable result is the performance of the Tigers in terms of government usage. Korea, Taiwan, and Singapore occupy the first three positions and Hong Kong places 6th in this pillar. More generally, these four economies do significantly better than the Nordics in the usage-related categories but, on the other hand, they present an environment that is slightly less conducive for ICT.

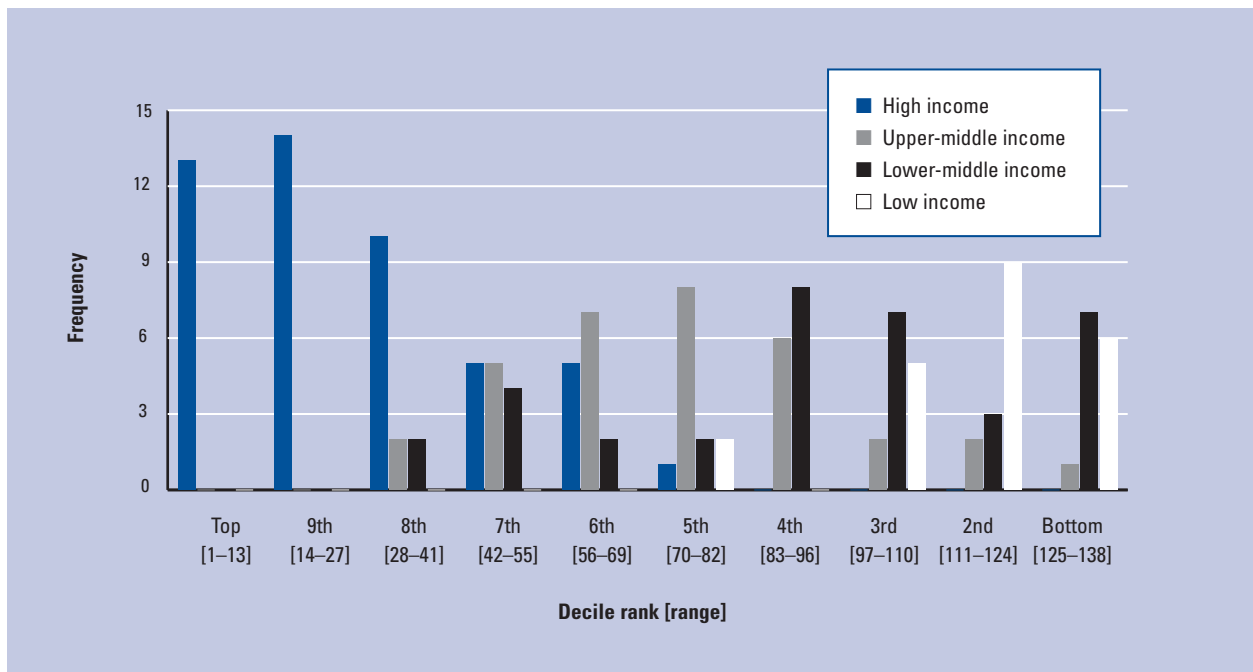
Unsurprisingly, rich countries leverage ICT better on average than least-developed countries (see Figure 4). Indeed, the top two deciles are exclusively populated by high-income economies.¹³ At 28th, Malaysia is the only non-high-income country to feature in the top 30. By contrast, Kuwait (75th) stands out as the only high-income economy outside the first half of the rankings. On the other hand, all low-income economies rank beyond the 97th rank (i.e., 3rd decile and lower) with the two notable exceptions of Gambia (76th) and Kenya (81st). The correlation, however, is not perfect. Sweden and Kuwait boast the same GDP per capita, yet when it comes to their NRI performance the gap is huge—almost 2 points. Another case in point is Malaysia and Libya, which are similarly rich but very much apart in terms of networked readiness (1.7 points). Although the relationship between wealth and networked readiness is clearly positive, country size has little influence on NRI performance, as shown by Figure 5. This finding supports the fact that factors driving networked readiness are similar for all countries, independent from their size, which contradicts the intuitive thinking that small economies have a clear advantage when it comes to

Figure 3: Average NRI score for selected country groups



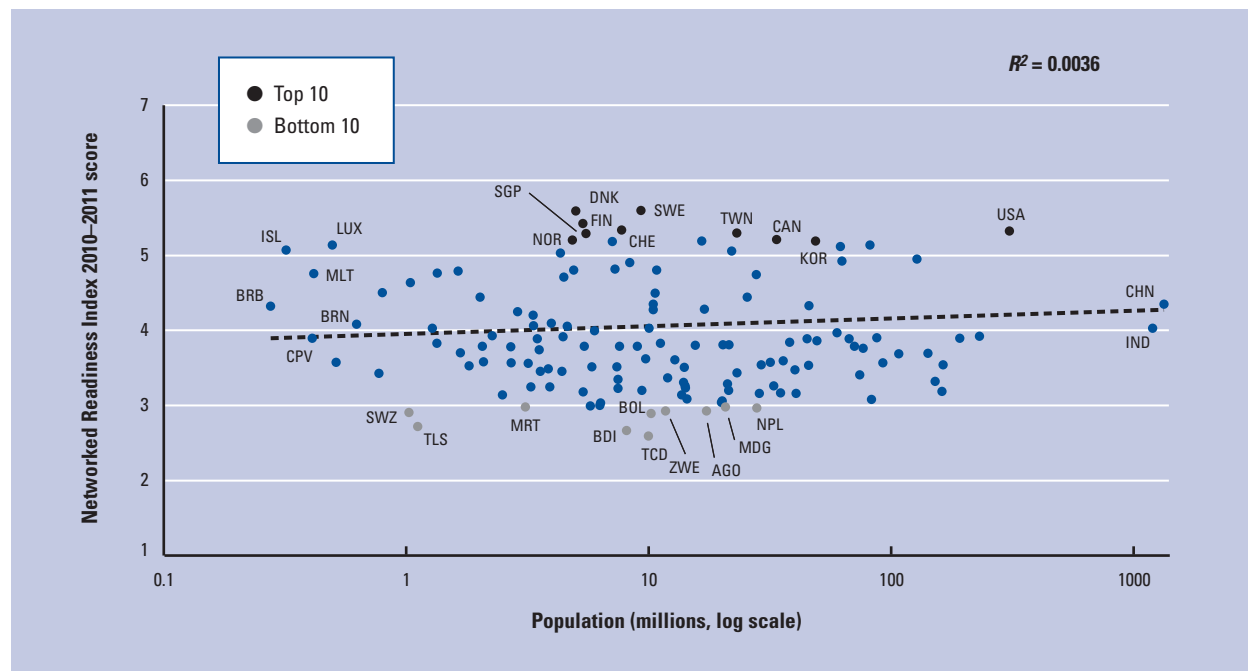
Note: The contribution of each component to the overall NRI is depicted by the length of each respective solid bar. The number at the end of each bar is the overall NRI score. *Nordics* comprise Denmark, Finland, Iceland, Norway, and Sweden; *Asian Tigers* refers to Hong Kong, Korea, Singapore, and Taiwan. *EU (excl. Nordics)* corresponds to the EU27 less Denmark, Finland, and Sweden. *Others* refers to all other economies covered by the study.

Figure 4: NRI 2010–2011 decile rank distribution by income group



Note: See text for details.

Figure 5: NRI 2010–2011 and population



Source: Population data from IMF, 2010.

Note: AGO = Angola, BRB = Barbados, BOL = Bolivia, BDI = Burundi, CAN = Canada, TCD = Chad, CHN = China, DNK = Denmark, FIN = Finland, ISL = Iceland, IND = India, KOR = Korea, Rep., MDG = Madagascar, MRT = Mauritania, NPL = Nepal, NOR = Norway, SGP = Singapore, SWZ = Swaziland, SWE = Sweden, CHE = Switzerland, TWN = Taiwan, China, TLS = Timor-Leste, USA = United States, ZWE = Zimbabwe.

connecting their territories and implementing a digital agenda. Indeed, if it may be easier to do the above in small countries, large market size surely grants other advantages for networked readiness, including economies of scale and increased ease for developing innovation.

Finally, Tables 5 and 6 give an indication of the consistency of a country's performance in the NRI. As Table 5 shows, the 10 best-performing countries do well in most pillars. In seven pillars, the top spot goes to one of them. The two remaining pillars, market environment and infrastructure environment, are led by Hong Kong (12th overall) and Iceland (16th), respectively. Table 6 provides further insight into the factors driving the overall performance of the top 10 countries and selected country groups. On this heat map, lighter shadings indicate a better score performance. The last two pillars, namely business usage and government usage, constitute the weakest aspects in a majority of countries' performance, as reflected by the darker shadings on the heat map. The pattern for the individual usage pillar shows much more contrast and reveals a marked divide between developed and developing economies.¹⁴ While most of the developing world is experiencing exponential growth in mobile telephony adoption, computerization rate and Internet use remain very low and contribute to lowering the score for overall ICT usage. The digital divide between developed and developing economies is still fairly deep and will take many more years to bridge fully. The infrastructure environment

pillar is the other area where the developing world is clearly lagging behind.

Europe and Central Asia

Europe continues to display remarkable levels of ICT readiness, with Sweden leading the rankings for the second year in a row and 10 other economies featuring among the top 20 world's best performers, namely Finland (3rd), Switzerland (4th), Denmark (7th), Norway (9th), the Netherlands (11th), Germany (13th), Luxembourg (14th), the United Kingdom (15th), Iceland (16th), and France (20th).

Although some of these countries lose ground with respect to last year,¹⁵ the Nordic countries are still among the most successful in the world in fully integrating new technologies in their competitiveness strategies and using them as a crucial lever for long-term growth, as noted above. Their prowess is based on some common enabling features. In particular, they all display a very innovation-friendly environment, with transparent and conducive regulations and top-class educational and research systems working closely with the industry, together with a strong innovation culture society-wide. Moreover, a consistent focus on innovation and ICT diffusion in the government agenda over the years has resulted in remarkably high ICT penetration rates and in the emergence of global players in high-tech and innovative products. These features represent important competitive strengths going forward, notably

Table 5: Composition of the top 3 by pillar and presence in the top 10

Country/Economy	Overall NRI	Market environment	Political and regulatory environment	Infrastructure environment	Individual readiness	Business readiness	Government readiness	Individual usage	Business usage	Government usage	No. of times in top 10	No. of times in top 3
Sweden	1	7	2	2	—	2	8	1	6	—	7	4
Singapore	2	5	1	—	1	5	1	7	10	3	8	4
Finland	3	6	4	9	3	3	10	2	8	—	8	3
Switzerland	4	2	6	3	—	1	—	9	5	—	6	3
United States	5	—	—	5	—	6	—	—	3	4	4	1
Taiwan, China	6	—	—	—	—	—	5	—	1	2	3	2
Denmark	7	—	—	10	9	9	—	5	—	9	5	—
Canada	8	4	—	4	6	—	—	—	—	5	4	—
Norway	9	8	8	8	—	—	—	10	—	—	4	—
Korea, Rep.	10	—	—	—	—	—	—	4	2	1	3	2
Hong Kong SAR	12	1	—	—	2	—	—	—	—	7	3	2
Luxembourg	14	3	5	—	—	—	7	3	—	—	4	2
Iceland	16	—	—	1	4	—	—	6	—	—	3	1
New Zealand	18	—	3	—	—	—	—	—	—	—	1	1
United Arab Emirates	24	—	—	—	5	—	3	—	—	—	2	1
Qatar	25	10	—	—	10	—	2	—	—	—	3	1

Notes: The pillar rank is reported only if it is 10th or better. The top three ranks are highlighted in blue typeface.

Table 6: The NRI 2010–2011 heat map for selected economies and country groups

Country/Economy	Networked Readiness Index		Market environment	Political and regulatory environment	Infrastructure environment	Individual readiness	Business readiness	Government readiness	Individual usage	Business usage	Government usage
	Rank	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score
Top 10											
Sweden	1	5.6	5.4	6.2	6.1	5.4	5.7	5.3	6.4	4.9	4.9
Singapore	2	5.6	5.4	6.2	5.3	6.1	5.3	6.0	5.7	4.7	5.6
Finland	3	5.4	5.4	6.1	5.5	5.8	5.5	5.2	6.2	4.7	4.5
Switzerland	4	5.3	5.4	6.0	5.8	5.6	5.7	4.8	5.7	4.9	4.0
United States	5	5.3	5.1	5.4	5.7	5.7	5.2	5.0	5.3	5.0	5.6
Taiwan, China	6	5.3	5.0	4.9	5.3	5.6	5.0	5.4	5.4	5.3	5.8
Denmark	7	5.3	5.1	5.8	5.5	5.7	5.1	5.0	5.8	4.3	5.1
Canada	8	5.2	5.4	5.7	5.7	5.7	4.9	4.8	5.1	4.1	5.5
Norway	9	5.2	5.3	5.9	5.5	5.5	4.9	4.8	5.7	4.2	5.0
Korea, Rep.	10	5.2	4.3	4.6	5.2	5.5	4.9	4.9	5.9	5.2	6.2
Income groups											
High income	—	4.7	4.7	5.1	4.7	5.2	4.6	4.6	5.1	3.9	4.4
Upper middle income	—	3.7	4.0	3.9	3.4	4.8	3.9	3.9	3.5	3.0	3.4
Lower middle income	—	3.5	3.8	3.6	2.9	4.6	3.7	3.8	2.8	2.9	3.1
Low income	—	3.2	3.6	3.6	2.4	4.0	3.6	3.8	2.2	2.5	2.8
Regions (low- and middle-income economies only)											
East Asia & Pacific	—	3.8	4.1	3.9	3.0	4.8	3.9	4.3	3.1	3.3	3.5
Europe & Central Asia	—	3.6	3.8	3.6	3.4	4.9	3.6	3.7	3.5	2.8	3.2
MENA	—	3.5	3.8	3.7	3.2	4.9	3.6	3.9	3.0	2.7	3.2
South Asia	—	3.5	4.1	3.5	2.7	5.0	3.8	4.0	2.4	2.9	3.2
Sub-Saharan Africa	—	3.3	3.7	3.8	2.5	3.9	3.7	3.9	2.3	2.6	2.8
Average (138 econ.)	—	3.9	4.2	4.2	3.5	4.8	4.0	4.1	3.7	3.2	3.6

Note: Lighter shadings indicate better performance.

Box 4: The NRI in a historical context and main trends in networked readiness

The 2010–11 edition of the GITR marks the 10th anniversary of the series. Designed as a tool for policymakers, ever since its inception the *Report* has featured the Networked Readiness Index (NRI) as the analytical framework for assessing countries' levels of networked readiness. Following the inaugural 2001–02 edition, the structure of the NRI was significantly revised.¹ Developed by INSEAD, the current NRI framework described in Figure 1 was introduced in 2002 and has been kept constant ever since.

However, within the NRI framework, the methodology for computing the rankings has evolved. While the computation of the Index has always been based on successive aggregations of scores using an arithmetic mean, from the variables level (i.e., the most disaggregated level) to the overall NRI score, the method of selecting indicators included in the NRI has changed. In earlier editions, the selection was based on a principal component analysis. Since the 2006–07 edition, it has been based on expert opinion, obviously with the benefit of previous experience.²

In light of these methodological changes and to ensure strict comparability, for the following analysis on inter-temporal trends in the NRI we consider only the last five editions of the NRI. As shown in Table A, the composition of the top 10 has remained fairly stable, with 7 of the current 10 best-performing countries already present in the 2006–07 edition. Denmark topped the rankings at the time, a position it held until the 2008–09 edition. Sweden was 2nd, followed by Singapore, Finland, and Switzerland. The United States (then 7th) and Norway (10th) also ranked within the top 10. So did the Netherlands (6th), Iceland (8th), and the United Kingdom (9th). But these three countries were then replaced by Taiwan, Canada, and Korea. Over the five-year period, the top three spots have been shared among six countries only, namely Sweden, Singapore, Finland, Switzerland, the United States, and Denmark. Sweden is the only country to have featured on the podium of each edition.

Table A: Performance of the top 10 countries since 2006

Country/Economy	NRI EDITION				
	2010–11	2009–10	2008–09	2007–08	2006–07
Coverage	138	133	134	127	122
Sweden	1	1	2	2	2
Singapore	2	2	4	5	3
Finland	3	6	6	6	4
Switzerland	4	4	5	3	5
United States	5	5	3	4	7
Taiwan, China	6	11	13	17	13
Denmark	7	3	1	1	1
Canada	8	7	10	13	11
Norway	9	10	8	10	10
Korea, Rep.	10	15	11	9	19

Note: The top three ranks in each edition are in blue bold typeface.

The top 20 group is characterized by a similar stability. Seventeen countries of the current top 20 were already members of the club back in 2006. Luxembourg (now 14th), New Zealand (18th), and France (20th) have joined this year, replacing then-members Austria (now 21st), Israel (22nd), and Estonia (26th).

Looking beyond the top 20, the rankings have proven more unstable. The analysis points to many stories of economies dramatically improving their networked readiness over time, while others have been losing considerable ground.

Extending the historical analysis to the entire sample requires taking into account the fact that the number of countries studied has increased. The 72-country sample of the first edition has expanded to a record 138 economies in the current one. In order to deal with this ever-increasing country coverage, we resort to percentile ranking. A percentile is the value of a variable below which a certain percent of observations fall. Through this approach, we recognize that it is not exactly the same for a country to rank 90th among 122 economies—the 2006–07 sample—as it is to rank 90th among 138. That the second case is more flattering is not reflected in the country's *absolute* rank—90th in both cases. Yet it shows in the country's *percentile* rank—35th against 26th.

Based on this approach, we identified the most dynamic countries by looking at the difference between the latest percentile rank (2010–11) and the 2006–07 percentile rank (or earliest edition of inclusion): the larger the difference, the bigger the improvement. Figure A.1 plots the trajectories of the 10 countries that have progressed the most over the period under consideration. These are (in descending order of improvement) Vietnam, Albania, Gambia, China, Sri Lanka, Montenegro, Bahrain, Kenya, Zambia, and Mozambique. Vietnam's spectacular progression spans an impressive three deciles. This group of 10 is geographically very diverse, with four representatives from sub-Saharan Africa, three from Developing Asia, two from Eastern Europe, and one from the Middle East. Although most of the countries started from a low base, China and Bahrain were already in the first half of the rankings but still managed to make remarkable strides. All these economies have generally upped their game across the board, but the readiness component of the NRI clearly stands out as the main driving force behind their improvements.

On the other hand, the analysis reveals several cases of countries that have failed to keep up with their peers. Figure A.2 illustrates the rank evolution of the 10 countries having fallen the most since the 2006–07 edition, namely Mauritania, Algeria, Venezuela, Argentina, El Salvador, the Slovak Republic, Mexico, Jamaica, Thailand, and Bolivia. Latin America and the Caribbean hosts six of these laggards.

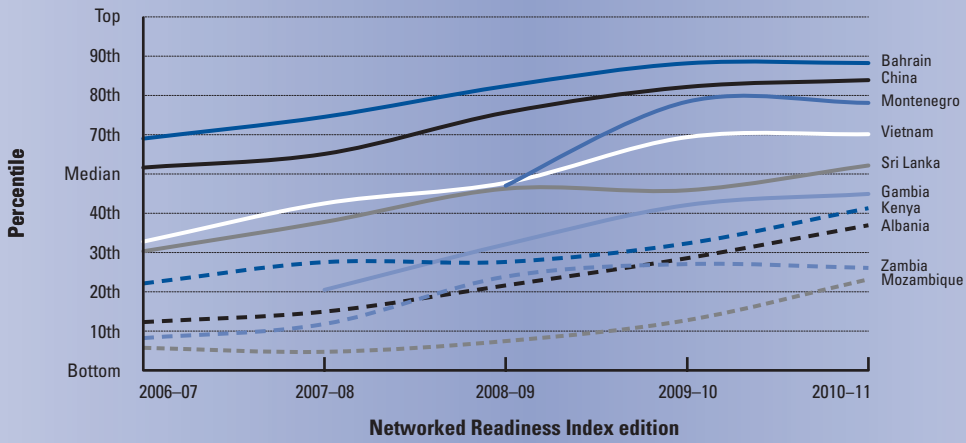
Figure A.3 depicts the evolution in ranking of selected countries that were at similar levels of networked readiness in the 2006–07 edition, revealing striking differences in trajectories. For instance, three neighboring countries that were in the bottom decile then have embarked on very distinct paths:

(Cont'd.)

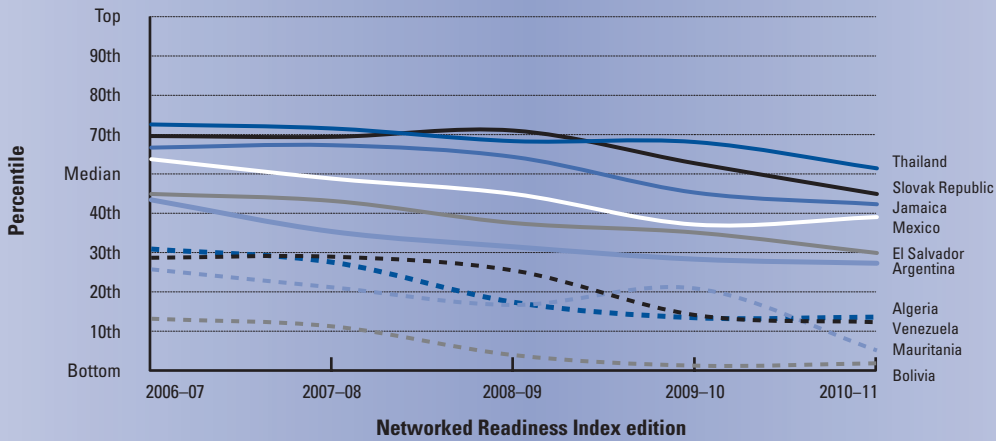
Box 4: The NRI in a historical context and main trends in networked readiness (cont'd.)

Figure A: Evolution in the NRI rankings of selected countries since 2006

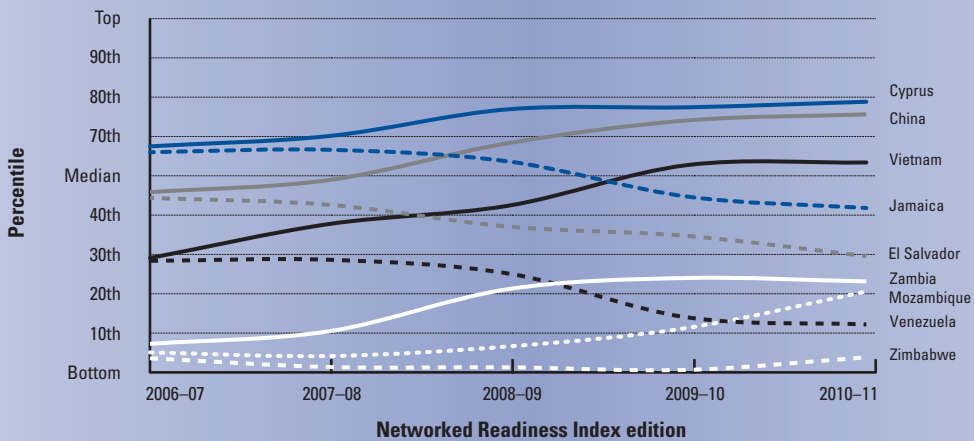
A.1: Ten most improved countries in the NRI



A.2: Ten most declining countries in the NRI



A.3: Evolution in the NRI for countries with similar starting points



(Cont'd.)

Box 4: The NRI in a historical context and main trends in networked readiness (cont'd.)

Zambia and Mozambique have significantly improved their showings, though each at its own pace, whereas Zimbabwe has remained among the worst performers throughout the period. Vietnam and Venezuela were initially both ranked in the second-lowest decile, and now Vietnam ranks almost five deciles higher. The gap is almost as wide between China and El Salvador, which once belonged to the same decile. Higher in the rankings, Cyprus and Jamaica provide another remarkable example. Three deciles now part Cyprus from Jamaica, which has dropped below the median rank.

Notes

- 1 For more information on the 2001–02 theoretical framework, see Kirkman et al. 2002.
- 2 The treatment of missing variables has also changed: whereas until 2005 they were estimated using analytical techniques such as regression and clustering, beginning in 2006 they are indicated with “n/a” and not taken in consideration in the calculation of the specific pillar to which they belong. Moreover, the scale used to compute the NRI and the variables that compose it have been aligned to the Forum’s (increasing) 1–7 scale, changing with respect to the scale used previously for a couple of years (i.e., positive and negative scores around a standardized mean of 0). For more information, see Dutta and Jain 2006 and Mia and Dutta 2007. For more information regarding the computation of the Index, refer to the Appendix of this chapter.

for countries such as Iceland, which are still recovering from the recent global economic crisis.

The picture for the EU15 group is more nuanced,¹⁶ with different degrees of success in leveraging ICT across the region. Sweden, Finland, Denmark, Norway, the Netherlands, Germany (13th), the United Kingdom (15th), France (20th), **Austria** (21st), and **Belgium** (22nd), among other countries, feature once again among the best performers worldwide, fully exploiting the latest technologies in their national strategies and daily activities. At the other extreme, countries such as **Greece** (64th) and, to a lesser extent, **Italy** (51st) remain less networked, even losing some ground from last year (down three and eight places, respectively). Both countries need to reinforce their market environment (90th and 82nd, respectively) and improve their stakeholders’ overall readiness to use new technologies (91st and 64th, respectively), while increasingly moving ICT usage and diffusion to the center of the national agenda (108th and 113th for government readiness and 62nd and 89th for government usage for Greece and Italy, respectively).

Among the EU accession 12,¹⁷ **Estonia** (26th) continues to display a solid ICT performance, in line with European and international best practices. ICT has been used by Estonian leadership as a key lever for societal and economic structural transformation since the country regained independence in the early 1990s. ICT diffusion and access have ranked high on the national agenda, with the development of first-class and widespread e-government services and high e-participation.¹⁸

Slovenia (34th), the **Czech Republic** (40th), and **Lithuania** (42nd) follow, with fairly high levels of networked readiness. **Poland** (62nd), **Romania** (65th), and **Bulgaria** (68th) close the rankings for the region. While Romania has lost six places since last year, Poland and Bulgaria each post a three-place improvement. This upward trend is particularly marked for Poland, since the country had already climbed four positions from 2008 to 2009.

While the three countries display similar strengths in their individual usage (46th, 52nd, and 36th for Poland, Romania, and Bulgaria, respectively) and infrastructure quality (43rd, 45th, and 40th, respectively), their market and regulatory environments remain, to different extents, elements of weakness. So too is the lack of a coherent government vision on ICT development and diffusion (103rd, 119th, and 96th, respectively).

Turkey does not manage to reverse the downward trend observed in recent years, and drops another two places to 71st. The country’s competitive advantages, including its fairly ICT-conducive environment (63rd) and high usage levels (62nd), do not seem to fully compensate for important hindrances in individual and business readiness (94th and 93rd, respectively). On a more positive note, the government readiness and usage pillars have improved 19 and 2 places, respectively, highlighting a stronger government vision and leadership in ICT diffusion for increased competitiveness.

Kazakhstan overtakes **Azerbaijan** as the best performer of the Commonwealth of Independent States (CIS), as the former climbs to 67th position and the latter drops six places to 70th. Kazakhstan is now the only CIS representative in the upper part of the rankings. The country continues to deliver a convincing performance in its government usage pillar, progressing a further eight places to 31st. The quality of the government’s online presence (24th) and its degree of interaction with its citizens (18th) are remarkable.

Russia moves up three positions and places 77th this year, with improvements across the board. The country can count on a fairly ICT-conducive infrastructure (42nd), built on the country’s satisfactory educational and research base together with rather high levels of individual readiness and usage (59th and 55th). At the same time, a number of problematic features continue to prevent Russia from better leveraging ICT in its competitiveness landscape. Among these are its extremely poor market (118th) and regulatory (111th)

environments and low levels of ICT readiness (90th) and use (72nd) by the business sector. Moreover, the lack of prioritization of the sector in the government agenda remains a reason for concern, with little government readiness (89th) and usage (96th).

Ukraine ranks 90th. Despite maintaining its score, the country has lost 15 places in the course of the last two editions, as others have actually improved. Ukraine offers a particularly unattractive market environment (128th) and challenging regulatory framework (122nd) for ICT uptake.

Armenia falls to 109th rank, while the **Kyrgyz Republic** recovers some of the ground it lost last year and ranks 116th, a gain of seven places.

Asia and the Pacific

The networked readiness snapshot sketched by the NRI this year for Asia and the Pacific is by and large positive. The region is home to some of the best performers in the world and to the economies that have proven the most dynamic over time. In particular, seven of them feature among the top 20, namely Singapore (2nd), Taiwan (6th), Korea (10th), Hong Kong (12th), Australia (17th), New Zealand (18th), and Japan (19th).¹⁹ Moreover, as discussed in Box 4, China, Indonesia, Sri Lanka, and Vietnam have been among the fastest-improving economies since 2006. Malaysia is the only upper-middle-income country within the top 30 overall. No doubt all these success stories are a source of inspiration for a number of underperformers in the region, including **Timor-Leste** (136), **Nepal** (131), **Bangladesh** (115th), and **Pakistan** (88th).

After a brief stint in the top 10, and in spite of its consistent and very strong performance, **Hong Kong** falls back to 12th place. The territory obtains the top mark in the market environment pillar. In particular, it boasts one of the world's most developed financial systems (5th) and doing business is made easy by its notably moderate level of taxation and low burden of government regulation. In addition, it ranks second only to Singapore in the individual readiness pillar, thanks to the quality of its education and the affordability of ICT usage costs. As in Singapore, the government of Hong Kong is actively promoting and using ICT in its daily activities (6th) and in providing basic services to its citizens (12th for the impact of ICT on access to basic services). On a more negative note, Hong Kong is not as successful as other economies in the region at generating innovation. Although extremely sophisticated and quick at adopting cutting-edge technology, businesses rank a comparatively low 49 for their capacity to innovate and produce only 21.27 local patent applications per million population (55th).

Australia's performance is fairly stable at 17th overall, with a score unchanged from last year. The country's notable competitive advantage is the quality of the general environment (13th), in particular the political and

regulatory framework (7th). **New Zealand** follows closely at 18th.

Japan gains two places from last year and positions itself at 19th, with an overall performance very much in line with previous years. The readiness dimension of the Index (38th) remains its weakest aspect, partly because of the high access costs to ICT even when taking into account purchasing power differences (for example, Japan ranks 128th for its mobile cellular tariffs), the relatively poor quality of its educational system, and the limited success of the government in promoting ICT. On a more positive note, Japan posts a steady improvement in its ICT usage (from 14th to 8th). The sophisticated business sector appears to be using ICT particularly effectively (4th) in its operations and transactions, as reflected by the impressive number of PCT patent applications per million population (252.09, 6th) and high percentage of high-tech products exported to international markets (19.15 percent of total goods exports, 14th).

Malaysia is ranked 28th, with a slight improvement in its overall score this year, and it places 10th for ICT readiness of the society as a whole. Among the main stakeholders, the government is showing the way. ICT plays a critical role in its *Wawasan 2020* (Vision 2020) plan for Malaysia to become a high-income economy by 2020.

China consolidates its position in the rankings at 36th, after years of vibrant progression. It is by far the country that leverages ICT the most among the four BRICs, leading India, Brazil, and Russia by 12, 22, and 31 positions, respectively. Since 2006, China has leapfrogged 23 positions and features among the 10 most dynamic countries worldwide. Yet, over the years, the country has failed to improve significantly in its environment component (57th), most notably its market environment (71st). Starting a business remains time-consuming and burdensome; corporate taxation is among the highest in the world (120th); and freedom of the press, though improving, is still limited (99th). Also, while Chinese businesses are relatively quick at adopting new technologies and have developed a taste for innovation (21st), the latest technologies are not generally available in the country (93rd). On a more positive note, the country ranks 16th for its overall readiness. In particular, it places 8th and 15th for individual and government readiness, respectively. Usage of ICT is widespread among businesses (19th), but individual usage is also increasing (63rd, up seven), albeit from a low level. Internet and mobile telephony are growing at break-neck pace. China added about a hundred million mobile subscribers between 2008 and 2009. Roughly half of its 1.4 billion population are now equipped with a mobile phone.

Losing ground on most indicators and delivering an uneven performance, **India** is down five positions at 8th. India's placement is dragged down by its poor marks in most education-related variables included in

the NRI, and more generally by the poor quality of its soft and hard infrastructures (81st). On the other hand, notwithstanding widespread red tape and distortive taxes, the market environment is assessed rather positively at 41st, thanks to a sophisticated financial market, well-developed clusters, and widespread availability of new technologies. Also competition and low telephony costs are a boost to India's readiness (33rd). The country ranks an impressive 21st for its level of individual readiness and 33rd for that of businesses. Government readiness is still high (47th), but ICT seems to have become less of a priority since last year. Also individual usage is improving, although from a very low base (98th, 11 places up from last year). While Internet access remains limited (0.65 and 5.12 per 100 population broadband Internet subscribers and Internet users, respectively, corresponding to a 100th and 118th position in the sample), mobile telephony has been growing exponentially as a result of strong demand, increased purchasing power, and also fierce competition and innovation that helped to improve network coverage and drive prices down.²⁰

Indonesia leaps 14 places forward to 53rd, with improvements across the three NRI components, boosting the country's overall score from 3.7 to 3.9 in an area of the NRI rankings that is very densely populated, thus explaining the big rank variation. ICT readiness remains Indonesia's notable relative strength, at 39th. Individual readiness is particularly high (18th), owing to fairly good educational standards and affordable ICT. Going forward, this will certainly help in increasing ICT penetration and usage, which remain rather low (80th). Also encouraging is the fact that the government is giving more importance to ICT in its development agenda, as reflected in the 41-rank improvement in the government readiness pillar (51st) since 2006.

Ranked 55th, **Vietnam** has made impressive strides. This year and for the first time in five editions, the country drops in the rankings by one place despite improving its score slightly. Yet, as explained in Box 4, Vietnam remains the country that has progressed the most since 2006. Like many of the emerging economies in the region, Vietnam's main comparative advantage is its level of preparedness to use ICT (35th, up two positions). Yet, unlike most countries at a similar stage of development, government readiness (20th, up four) is the highest among the three main actors. ICT development is one of the top priorities for the government (18th), which sees the sector as a key driver for national competitiveness (26th).

Against this backdrop, **Thailand** offers a striking contrast. The country is among the 10 economies that have declined the most since 2006. It has fallen from 37th to 59th place in the rankings since then (with a steep 12-place drop just since last year) and been overtaken by much-less-advanced economies in the region, including China, India, Indonesia, and Vietnam. With

respect to 2009, the country's performance sees a deterioration in all NRI components, particularly marked in the environment (64th, down 14 places) and usage (61st, 11 places down).

After last year's remarkable 11-place improvement, **Pakistan** is fairly stable at 88th. Its performance exhibits the same pattern as most emerging economies in the region: the country does much better in terms of readiness (60th) than in the environment and usage components (both ranked 96th), where considerable room for improvement remains.

Latin America and the Caribbean

Although a number of countries in Latin America and the Caribbean region post important improvements or consolidate their achievements in networked readiness, the region as a whole continues to trail behind international best practices in leveraging ICT advances. No Latin American or Caribbean economy appears in the top 20 and only a handful feature in the top 50, namely Barbados (38th), Chile (39th), Puerto Rico (43rd), Uruguay (45th), and Costa Rica (46th).

Although losing some ground since last year, the Caribbean island of **Barbados** continues to lead the region for the third consecutive year. The country boasts a very conducive regulatory environment (26th) and high-quality infrastructure (30th), together with remarkable levels of business (29th) and, to a lesser extent, individual (42nd) usage. Moreover, citizens and the government display a high degree of interest and preparedness in using new technologies (38th and 42nd for individual and government readiness, respectively). At the same time, a number of problematic elements remain in the market environment (46th), especially in terms of financing availability (85th for venture capital availability and 48th for financial market sophistication) and business sophistication (95th for cluster development). Government usage also remains poor at 70th, with inadequate e-government services (104th) and little e-participation (95th).

Chile is up one place this year at 39th, with a notable 0.15 score improvement. The country has consistently led the region in the last 10 years, albeit losing its primacy to Barbados in 2008. ICT diffusion and usage have been continuously prioritized by the government over the last two decades or so, with the adoption of one of the first digital agendas in the region and the establishment of a very conducive regulatory environment (32nd). This is reflected in the good marks the country gets for its government readiness (40th) and usage (26th): notably the world-class Chilean e-government services are assessed very positively at 18th. However, the country's individual readiness remains extremely low at 100th, mainly due to its poor educational system, which is assessed as especially inadequate for math and science education (122nd), and to high tariffs for fixed lines (127th) and fixed broadband Internet (100th).

Puerto Rico is up two places at 43rd, and continues to display competitive strengths in the quality of its environment (39th) for ICT as well as in its preparedness to use, and its actual usage of new technologies by its sophisticated and innovative business sector (32nd and 33rd for business readiness and usage, respectively)—no doubt the most networked social actor on the island. On a less positive note, its citizens and government do not seem to be as inclined to use ICT (107th and 90th for individual and government readiness, respectively). Also, although their usage has improved since last year (six and seven places up, at 56th and 44th, respectively), the government and citizens in general lag behind the business sector when it comes to ICT use.

Uruguay continues its impressive upward trend started last year (when it climbed eight ranks from the 2008–09 edition) with an additional 12-place improvement this year, soaring to 45th position. The country advances in all three NRI components: up 9 places in environment and usage (to 55th and 44th, respectively) and 10 in readiness (to 48th). Although the market environment remains a problematic area at 85th place and the business sector does not leverage as much ICT as it could (65th and 63rd for business readiness and usage), the country benefits from a government with a coherent vision for ICT going forward as a key element for increased competitiveness. Government readiness and usage rank 49th and 43rd, respectively, improving 13 and 4 positions since 2009. Uruguayan authorities have been increasingly using ICT as a tool for better and more widespread provision of basic services to their citizens in recent years: indeed, together with Peru, the country achieved one of the world's largest One Laptop per Child deployment.²¹

Similar to Uruguay, **Costa Rica** has kept climbing in the rankings since 2006, with an additional three-place improvement since last year and notable advances in all three subindexes, particularly in readiness (seven places, up to 25th). The country's solid showing rests on outstanding levels of readiness to use ICT by all national stakeholders, most notably individuals (7th) and businesses (26th). Also the sophisticated business sector effectively incorporates ICT in its production systems, processes, and activities (31st for business usage), successfully exporting high-value-added goods in international markets—10.54 percent of Costa Rica's goods exports are high-tech goods, corresponding to 13th place in the world. Chapter 2.1 provides a compelling overview of Costa Rica's high-tech success story in recent years. On the other hand, the environment (68th)—notably in its regulatory component (86th) and individual ICT usage (77th)—are worrisome features that will need to be reinforced for all Costa Ricans to fully leverage ICT's many and diverse economic, social, and political benefits.

Brazil climbs five places this year to 56th, with an important improvement in its ICT environment (eight places up, to reach 66th). As in previous years, Brazil's

innovative and sophisticated business sector leads the country in ICT usage (41st and 37th for business readiness and usage, respectively), followed by the government (56th and 48th for government readiness and usage). In particular, the business sector is extensively leveraging ICT in its operations and transactions (25th for extent of business usage) to increase its efficiency and innovation capacity (24th and 27th, respectively, for ICT impact on new products and services and on new organizational models). Likewise, ICT is an important component of the government's vision for the future (58th) and is widely used by the government to increase access to basic services (49th). On a related note, Brazil is also home to fairly efficient and advanced e-government services (53rd for the development of government online services).²² However, Brazil's burdensome market environment (93rd) and dismal levels of individual readiness (110th) are important hindrances to a better ICT leveraging. While the market environment could be improved by reducing red tape and inefficiency, the low educational standards—especially in science and math (125th)—coupled with high fixed telephone and mobile cellular tariffs (109th and 126th, respectively) prevent more widespread ICT usage by citizens (the country ranks 64th for individual usage).

Colombia consolidates its networked readiness achievements of last year with another two-place step up to 58th overall, while **Panama** loses two positions to 60th (albeit improving in score). In the Caribbean, **Trinidad and Tobago** posts one of the largest improvements in the whole sample (16 places) and climbs to 63rd, with across-the-board advancement. Especially striking is a 19-place progression in ICT usage, led by major advances in the individual (up 16 places to 49th) and government (up 14 places to 79th) components.

Mexico is stable at 78th place overall, with a slight improvement in score. The country displays fairly high levels of business (48th) and government (50th) usage. In particular, the government provides extensive and well-functioning e-government services to its citizens (38th) and plenty of opportunities for e-participation (32nd). At the same time, a number of long-standing deficiencies affect Mexico's networked readiness landscape, preventing the country from fully exploiting ICT potential for increased growth. Individual and business readiness—at 97th and 103rd, respectively—are extremely low, which is attributable mainly to a combination of poor educational standards and training and high ICT access costs. In particular, telephone installation costs and monthly telephone subscriptions, both for residential and business users—are high, ranked 115th and 112th for residential telephone installation and monthly telephone subscriptions, and 99th and 127th for business telephone installation and monthly telephone subscriptions, respectively. Similarly, the government appears not to adequately prioritize ICT or to have a coherent vision of its importance for the country's long-term competitiveness (98th for

government readiness). However, it does use ICT in its daily activities (50th for government usage), with well-developed e-government services (38th) and satisfactory levels of e-participation (32nd). An enhanced government focus on the sector should go hand in hand with an improvement of the market environment (69th), particularly in its regulatory (70th) and infrastructure (72nd) dimensions, which at the moment are not totally conducive to innovation and ICT development.

Notwithstanding a slight improvement in score, **Argentina** drops five places to 96th, with enduring shortcomings in its market (130th) and regulatory (115th) environments and a worrisome, almost nonexistent government prioritization of ICT diffusion and usage (135th and 101st, respectively, for government readiness and usage). On the other hand, the country boasts a fairly developed infrastructure for ICT (55th), thanks especially to a solid human resource base. Moreover, business readiness remains high at 49th. Likewise, ICT penetration at the individual level (65th) is satisfactory, pointing to the possibility of increasingly leveraging ICT in citizen-government relations, especially for the provision of basic services, for which at the moment Argentina ranks a dismal 135th.

As in previous years, **Honduras** (103rd), **Ecuador** (108th), **Venezuela** (119th), **Paraguay** (127th), **Nicaragua** (128th), and **Bolivia** (135th) trail behind the rest of the region and most of the global sample. These economies share a number of worrisome features that stand in the way of increased networked readiness, including overregulated markets and inefficient political frameworks; poor educational and research systems; scarce penetration rates that are also the result of unaffordable ICT access for most of their populations; and, last but not least, little priority given to ICT in the governments' agendas and competitiveness strategies.

Sub-Saharan Africa

The assessment of sub-Saharan Africa's networked readiness continues to be disappointing, with the majority of the region lagging in the bottom half of the NRI rankings, bar Mauritius (47th) and South Africa (61st). Even though ICT penetration rates have soared in the region over recent years, boosted by mobile telephony, and many countries have started to leverage more and more ICT to improve efficiency and reach out more and more to citizens, sub-Saharan Africa does not seem to have progressed as much and as fast as other areas of the world. Underdeveloped infrastructure, inefficient markets, opaque regulatory environments, inadequate educational standards, and widespread poverty are powerful obstacles against a more extensive and efficient use of new technologies for increased development and prosperity in the region.

Mauritius consolidates its predominance in the region, with a six-place improvement to 47th. The country's remarkable showing rests on its extremely

conducive market (26th) and regulatory (33rd) environments, with little red tape, non-distortive tax rates, good standards of intellectual property protection (53rd for this variable and 45th for software piracy rate), and a high level of competition in Internet and telephony, among other elements.

This is coupled with the country's high level of interest and preparedness in using ICT by all national stakeholders (36th, 60th, and 45th for individual, business, and government readiness, respectively). In particular, there is the perception that the government places a high priority on ICT diffusion in its development strategy (25th), notably using these technologies to provide better access and quality of basic services for its citizens (53rd). On a more negative note, infrastructure, especially in its human resources dimension, shows a margin for improvement at 78th place, and ICT usage is still far below international best practices, especially for the business sector (69th) and the government (72nd).

South Africa follows, fairly stable at 61st place overall, with notable strengths in the first-class quality of its market (25th) and regulatory (23rd) environments, characterized by a well-developed financial market (6th) and venture capital (39th), favorable laws relating to ICT (32nd), strong intellectual property standards (27th), and low software piracy rate (18th), among other advantages. Moreover, the sophisticated business sector is at the forefront of ICT leveraging (40th and 52nd for business readiness and usage, respectively), using it extensively in its activities (52nd for extent of business usage) and to produce innovative products (35th for firm-level technology absorption and 47th for capacity for innovation). On a less positive note, individual preparation and uptake of ICT remain very weak, at 113th and 95th, respectively. This is attributable to its poor educational standards, notably in science and math (136th), as well as to the very high access costs to ICT prevailing in the country—South Africa ranks 129th for residential monthly telephone subscriptions, and 107th, 102nd, and 79th for fixed telephone, mobile cellular, and fixed broadband Internet tariffs, respectively. Also government readiness remains poor at 92nd, with little success in promoting ICT (92nd). The government is not using ICT to improve the efficiency of its operations either (80th), providing inadequate e-services to its citizens (62nd) that have little impact on access to or the quality of basic services (95th).

A second tier of countries includes **Gambia**, **Senegal**, **Kenya**, **Namibia**, and new entrant **Cape Verde**, placed at 76th, 80th, 81st, 82nd, and 84th, respectively. Kenya and Namibia, in particular, strengthen their positions by nine and seven places since last year, with impressive 26- and 33-rank improvements in their ICT readiness (ranked 55th and 71st, respectively). Both countries appear to be on a promising upward trend,

as they had already climbed seven and three positions from 2008 to 2009.

The remaining countries are once again confined among the laggards of the world in effectively using ICT. Moreover, although economies such as **Malawi** (105th), **Mozambique** (106th), and **Uganda** (107th) post important improvements in their overall networked readiness since last year (up 14, 10, and 8 positions, respectively), many more remain stable or lose further ground vis-à-vis other parts of the world. **Mauritania** (130th, 28 places down), **Mali** (120, 24 places down), **Lesotho** (121st, 14 places down), and **Burkina Faso** (122, 14 places down) are the most notable examples of this latter category.

Angola and **Swaziland** enter the rankings for the first time at a disappointing 133rd and 134th position, respectively.

Middle East and North Africa (MENA)

Israel is up six places to 22nd overall, regaining its primacy in the region with an especially impressive 23-place improvement in its readiness component (ranked 27th), and also thanks to the inclusion of previously missing data. The country's remarkable ICT prowess rests on a very conducive environment (24th), especially in its market (21st) and infrastructure (24th) components, coupled with high levels of readiness and usage of ICT by all social stakeholders (27th and 19th, respectively). In particular, the country's ICT uptake and leveraging is led by an extremely dynamic and sophisticated business sector (11th and 9th for business readiness and usage), which actively uses new technologies to create new products, services, and organizational models (the country is ranked 22nd and 10th for ICT impact on new products and services and on new organizational models, respectively). Israel firmly maintains its status as one of the innovation powerhouses of the world, as suggested by its numbers of PCT patent applications (199.01 per million population, 10th) as well as by the high percentage of high-tech products exported in international markets (at 23.63 percent of total goods exports, ranked 8th). Israel's successful recent development story of the last three decades or so has been very much based on innovation and ICT. The government played an instrumental role in setting the vision for ICT and in establishing an innovation-enabling environment, simultaneously involving the private sector in the implementation of the vision and intervening in a market-friendly way to compensate for market failures whenever needed.²³

The **United Arab Emirates** follows closely, fairly stable at 24th overall. The country has risen in the rankings in recent years, reflecting the increasingly central role ICT occupies in the government's agenda as an enabling infrastructure for economic diversification and a target sector in itself (ranked a high 3rd for government readiness). The government's focus in the sector has been matched by an equal interest in and capacity

for using the latest technologies by individuals (5th and 21st for individual readiness and usage, respectively), with a stellar increase in ICT penetration rates over the last few years. Other competitive advantages are to be found in the very ICT-friendly market environment (18th) and infrastructure for ICT (28th).

Qatar is up five places to 25th rank overall, with improvements across the board, particularly in the readiness (4th, up eight places) and usage (34th, up six places) components. Similar to the United Arab Emirates, the government has consistently prioritized ICT diffusion and usage in recent years (2nd for government readiness), which has prompted an intense ICT uptake from the citizens (10th and 28th for individual readiness and usage, respectively).²⁴

Bahrain consolidates its position at 30th, displaying notable competitive strengths in the quality of its market environment (9th) and the high degree of preparedness of its citizens to use ICT (15th), an aspect that has already converted to high penetration rates (29th for individual usage). The strong government vision and leadership in ICT diffusion (ranked 14th) has also resulted in first-class e-services (8th), significantly expanding outreach of basic services to citizens (11th), high e-participation (11th), and increased government efficiency (12th).

Saudi Arabia continues to climb in the rankings, with another five-position improvement to 33rd place overall. The country posts advances notably in its environment (32nd) and readiness (24th) components (both up six places). Its solid showing is driven by very ICT-conducive market (19th) and regulatory (25th) environments, as well as by a coherent ICT prioritization in the government's competitiveness agenda (ranked 12th for government readiness). Chapter 2.2 provides an exhaustive account of the Saudi government's vision for ICT and the e-government program, YESSER. **Oman** also realizes an impressive nine-place jump to 41st, with remarkable improvements in all three components: the country is up 14, 12, and 9 positions, respectively, for its environment (43rd), readiness (34th), and usage (43rd). **Jordan** follows at 50th, losing some ground from last year (down six places).

On a more negative note, **Kuwait** remains the laggard among the Gulf countries at 75th overall while **Syria** loses another 19 places and positions itself at a dismal 124th place.

New entrants **Lebanon** and **Iran** position themselves in the bottom part of the rankings, at 95th and 101st, respectively.

Tunisia consolidates its leadership in North Africa with a four-place improvement to 35th rank overall. The country's main competitive advantage when it comes to leveraging ICT advancements is to be found in the notable levels of readiness and preparedness for using ICT of all national stakeholders (18th), led by a public sector that has strongly focused on ICT as a key com-

petitiveness tool over the last 20 years (ranked 6th for government readiness). Individual readiness is also very high, at 17th, resting on good educational standards and low residential telephone installation and monthly subscriptions (22nd and 23rd, respectively) and low fixed telephone and fixed broadband Internet tariffs (28th and 29th, respectively). Government usage is satisfactory at 27th, pointing to a successful implementation of its vision of ICT, notably through well-developed e-services (29th), extensively improving access to basic services for citizens (13th). Tunisia's success story in using ICT as a developmental tool and the achievements made so far are important strengths that will no doubt help the country in its transition to democracy after the recent political turmoil.

All countries in the region, with the exception of **Morocco** (ranked 83rd, five places up), follow a downward trend, with **Libya** dropping a staggering 23 places to 126th. Also **Egypt** (74th) and **Algeria** (117th) lose four places each, although both improve in score. In particular, in the case of **Egypt**, important improvements in the country's individual usage (79th, 21 places up), regulatory environment (66th, five places up), and government usage (39th, up three places) do not manage to compensate for a weakening showing, notably in business usage (where the country is ranked 83rd, a drop of 31 places) and government readiness (68th, 15 places down). The important progress realized by the past administration in promoting ICT (27th) and in improving and expanding the outreach of basic services to citizens (41st)—also through well-designed e-services (ranked 23rd)—should be continued and reinforced by the new government going forward.

The Middle East continues to feature prominently in the rankings, with four countries in the top 30, namely **Israel** (22nd), the **United Arab Emirates** (24th), **Qatar** (25th), and **Bahrain** (30th). This reflects the especially dynamic ICT uptake in most parts of the region in the context of the sector's increasing prioritization in national agendas as a crucial instrument for economic diversification, enhanced efficiency, and modernization.

Conclusion

Few today would go back willingly to a world without the Internet and its many associated developments. For many young adults, conceiving of such a world may even be impossible. ICT, and the Internet in particular, have already changed the world dramatically, and all indications point to an even higher rate of transformation of our lives over the next decade. While the precise nature of these transformations 2.0 are difficult to accurately envisage, evolving technology trends are pointing to the most likely directions they will take over the next few years—what we term as the move toward *SLIM* ICT:

- *S for social*: ICT is becoming more intricately linked to people's behaviors and social networks. The horizons of ICT are expanding from traditional processes and automation themes to include a human and social focus.
- *L for local*: Geography and local context are becoming important. ICT provides an effective medium for linking people and objects (and processes) with local environments. This will allow differentiation across local contexts and the provision of tailored services.
- *I for intelligent*: ICT will become even more intelligent. People's behaviors, individual preferences, and object interactions among other elements will be more easily stored, analyzed, and used to provide intelligent insights for action.
- *M for mobile*: The wide adoption of the mobile phone has already brought ICT to the masses. Advances in hardware (screens, batteries, and so on), software (e.g., natural language interfaces), and communications (e.g., broadband wireless) will continue to make computing more mobile and more accessible.

In this context of continuous technological evolution, we hope that the GITR series will continue to serve as a useful reference and guide for policymakers and decision leaders from both the public and private sectors over the next years, as it has done in its first decade. The impact of ICT is widespread and will affect all key stakeholders of the GITR framework: individuals, businesses, and governments. We will continue to monitor these impacts and include them through appropriate measures within the networked readiness framework.

Notes

- 1 <http://devgateway.blogspot.com/2009/07/world-bank-report-highlights-importance.html>.
- 2 Gage 2002, p. 4.
- 3 Gage 2002, p. 5.
- 4 For a detailed review of the literature and thinking behind the networked readiness framework developed by INSEAD in the 2002–03 edition, see Dutta and Jain 2003.
- 5 To be more precise, the framework used in the first 2001–02 edition is not strictly comparable with the one developed by INSEAD and used since then as the main methodological framework for the *Report* series. For more information on the 2001–02 theoretical framework, see Kirkman et al. 2002.
- 6 See Box 1 in Dutta et al. 2010.
- 7 The almost universal presence of ICT is thanks mainly to recent trends such as the stellar diffusion of mobile telephony across the world, the decreasing cost of Internet access via residential and public connections, and the emergence of lower-cost access devices such as mobile telephones and cheap PCs.
- 8 See EFQM at <http://www.efqm.org/en/tabid/132/default.aspx>.

- 9 The NRI 2009–2010 includes the results of the 2009 and 2010 Surveys. For more details on the Survey methodology, see Browne and Geiger 2010.
- 10 Moldova re-entered the Index in 2010 after being excluded in 2009 for lack of Survey data.
- 11 North America as a region is not covered as such in this chapter, since the United States and Canada's performances are examined in the top-10 section. Mexico is covered in the Latin America and the Caribbean section.
- 12 Note that several indicators, including data on ICT tariffs, were previously not available for Taiwan. Their inclusion this year benefits the economy and explains in part the progression in the overall rankings.
- 13 A *decile* is any of the nine values that divide a sorted sample of observations into ten equal parts. That is, the 1st decile corresponds to the 10th percentile, the 9th decile corresponds to the 90th percentile. The World Bank considers high-income countries to be those that in 2009 had a GNI per capita of US\$12,196 or more. The rest of the income groups are defined as follows: low income, US\$995 or less; lower middle income, US\$996–US\$3,945; and upper middle income, US\$3,946–US\$12,195.
- 14 All economies that do not belong to the high-income group are considered *developing*.
- 15 Including former top performer Denmark and Iceland (both down four places).
- 16 The EU15 comprises the countries that joined the European Union before the last two accession rounds in 2004 and 2007: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.
- 17 The EU accession countries include Bulgaria, the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, the Slovak Republic, and Slovenia.
- 18 For more details on Estonia's recent development story and the role of ICT, see Dutta 2007.
- 19 See the top 10 paragraph above for highlights on the performance of Singapore, Taiwan, and Korea.
- 20 For a full account of India's networked readiness and progress over the last few years, see Mia 2010.
- 21 See http://www.olpcnews.com/countries/peru/olpc_peru_passes_uruguay_for_w.html.
- 22 For more details on Brazil's recent achievements in terms of e-government services and strategy going forward in that area, see Magalhães et al. 2009.
- 23 For an overview of Israel's recent development story, which turned the country from a citrus exporter to a major ICT player in the space of 30 years, see Lopez-Claros and Mia 2006.
- 24 For an account of Qatar's digital strategy in recent times, see Al-Jaber and Dutta 2008.

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This appendix presents the structure of the Networked Readiness Index 2010–2011 (NRI). The NRI separates environmental factors from ICT readiness and usage, and is composed of three subindexes. Each subindex is divided into three pillars. The variables (or *indicators*) used in the computation of the NRI are then distributed among the nine pillars. The number preceding the period indicates to which pillar the variable belongs (e.g., variable 1.01 belongs to the first pillar; variable 9.02 belongs to the ninth pillar). The numbering of the variables matches that of the Data Tables at the end of the *Report*. Note that the numbering of variables in the 2nd, 3rd, 4th, 7th, and 8th pillars has changed to reflect the adjustments made to the structure of the NRI, as discussed in the text.

The computation of the NRI is based on successive aggregations of scores, from the variables level (i.e., the most disaggregated level) to the overall NRI score (i.e., the highest level). For each level, we use an arithmetic mean to aggregate the components of each category.^a As a result, each level's components bear the same weight. For example, the score a country achieves in the 3rd pillar, Infrastructure environment, accounts for one-third of the Environment subindex which in turn accounts for one-third of the overall NRI score.

Variables that are derived from the World Economic Forum's Executive Opinion Survey (the Survey) are identified here by an asterisk (*). All the other indicators come from external sources, as described in the Technical Notes and Sources section at the end of the *Report*. These variables are transformed onto a 1-to-7 scale in order to align them with the Survey's results. We apply a min-max transformation, which preserves the order of, and the relative distance between, country scores.^b

NETWORKED READINESS INDEX

$$\begin{aligned} \text{Networked Readiness Index} &= 1/3 \text{ Environment subindex} \\ &+ 1/3 \text{ Readiness subindex} \\ &+ 1/3 \text{ Usage subindex} \end{aligned}$$

Environment subindex

$$\begin{aligned} \text{Environment subindex} &= 1/3 \text{ Market environment} \\ &+ 1/3 \text{ Political and regulatory environment} \\ &+ 1/3 \text{ Infrastructure environment} \end{aligned}$$

1st pillar: Market environment

- 1.01 Venture capital availability*
- 1.02 Financial market sophistication*
- 1.03 Availability of latest technologies*
- 1.04 State of cluster development*
- 1.05 Burden of government regulation*
- 1.06 Extent and effect of taxation*^c
- 1.07 Total tax rate^c
- 1.08 Time required to start a business^d
- 1.09 Number of procedures required to start a business^d
- 1.10 Freedom of the press*

2nd pillar: Political and regulatory environment

- 2.01 Effectiveness of law-making bodies*
- 2.02 Laws relating to ICT*
- 2.03 Judicial independence*
- 2.04 Efficiency of legal framework in settling disputes*^e
- 2.05 Efficiency of legal framework in challenging regulations*^e
- 2.06 Property rights*
- 2.07 Intellectual property protection*
- 2.08 Software piracy rate
- 2.09 Number of procedures to enforce a contract^f
- 2.10 Time to enforce a contract^f
- 2.11 Internet and telephony sectors competition index

3rd pillar: Infrastructure environment

- 3.01 Number of telephone lines
- 3.02 Mobile network coverage rate
- 3.03 Secure Internet servers
- 3.04 International Internet bandwidth*
- 3.05 Electricity production
- 3.06 Tertiary education enrollment rate
- 3.07 Quality of scientific research institutions*
- 3.08 Availability of scientists and engineers*
- 3.09 Local availability of specialized research and training services*
- 3.10 Accessibility of digital content*

Technical Appendix: Structure and computation of the Network Readiness Index 2010–2011 (cont'd.)

Readiness subindex

$$\begin{aligned} \text{Readiness subindex} &= 1/3 \text{ Individual readiness} \\ &+ 1/3 \text{ Business readiness} \\ &+ 1/3 \text{ Government readiness} \end{aligned}$$

4th pillar: Individual readiness

- 4.01 Quality of math and science education*
- 4.02 Quality of the educational system*
- 4.03 Adult literacy rate
- 4.04 Residential telephone connection fee^g
- 4.05 Residential monthly telephone subscription^g
- 4.06 Fixed telephone lines tariffs
- 4.07 Mobile cellular tariffs
- 4.08 Fixed broadband internet tariffs
- 4.09 Buyer sophistication*

5th pillar: Business readiness

- 5.01 Extent of staff training*
- 5.02 Quality of management schools*
- 5.03 Company spending on R&D*
- 5.04 University-industry collaboration in R&D*
- 5.05 Business telephone connection fee^h
- 5.06 Business monthly telephone subscription^h
- 5.07 Local supplier quality*
- 5.08 Computer, communications, and other services imports

6th pillar: Government readiness

- 6.01 Government prioritization of ICT*
- 6.02 Government procurement of advanced technology products*
- 6.03 Importance of ICT to government vision of the future*

Usage subindex

$$\begin{aligned} \text{Usage subindex} &= 1/3 \text{ Individual usage} \\ &+ 1/3 \text{ Business usage} \\ &+ 1/3 \text{ Government usage} \end{aligned}$$

7th pillar: Individual usage

- 7.01 Mobile telephone subscriptions
- 7.02 Cellular subscriptions with data access
- 7.03 Households with a personal computer
- 7.04 Broadband Internet subscribers
- 7.05 Internet users
- 7.06 Internet access in schools*
- 7.07 Use of virtual social networks*
- 7.08 Impact of ICT on access to basic services*

8th pillar: Business usage

- 8.01 Firm-level technology absorption*
- 8.02 Capacity for innovation*
- 8.03 Extent of business Internet use*
- 8.04 Local office patent applicationsⁱ
- 8.05 Patent Cooperation Treaty applicationsⁱ
- 8.06 High-tech exports
- 8.07 Impact of ICT on new services and products*
- 8.08 Impact of ICT on new organizational models*

9th pillar: Government usage

- 9.01 Government success in ICT promotion*
- 9.02 ICT use and government efficiency*
- 9.03 Government Online Service Index
- 9.04 E-Participation Index

Notes

- a Formally, for a category i composed of K indicators, we have:

$$\text{category}_i = \frac{\sum_{k=1}^K \text{indicator}_k}{K}$$

- b Formally, we have:

$$6 \times \left(\frac{\text{country score} - \text{sample minimum}}{\text{sample maximum} - \text{sample minimum}} \right) + 1$$

where *sample minimum* and *sample maximum* are, respectively, the lowest and highest country scores in the sample of economies covered by the NRI. In some instances, adjustments were made to account for extreme outliers. For those variables for which a higher value indicates a worse outcome (e.g., total tax rate, time to enforce a contract), we apply a normalization formula that, in addition to converting the series onto a 1-to-7 scale, reverses it, so that 1 and 7 still correspond to the worst and best possible outcomes:

$$-6 \times \left(\frac{\text{country score} - \text{sample minimum}}{\text{sample maximum} - \text{sample minimum}} \right) + 7$$

- c Variables 1.06 and 1.07 combine to form one single variable.
- d Variables 1.08 and 1.09 combine to form one single variable.
- e Variables 2.04 and 2.05 combine to form one single variable.
- f Variables 2.09 and 2.10 combine to form one single variable.
- g Variables 4.04 and 4.05 combine to form one single variable.
- h Variables 5.05 and 5.06 combine to form one single variable.
- i Variables 8.04 and 8.05 combine to form one single variable. Wherever PCT data were not available, a 0 is assumed.