

The Networked Readiness Index 2013: Benchmarking ICT Uptake and Support for Growth and Jobs in a Hyperconnected World

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When *The Global Information Technology Report* (GITR) and the Networked Readiness Index (NRI) were created some 12 years ago, the attention of decision makers and investors was on adopting business and financial strategies that would allow them to develop in the context of a fast-moving but nascent Internet economy. Over more than a decade, the NRI has provided decision makers with a useful conceptual framework to evaluate the impact of information and communication technologies (ICTs) at a global level, and to benchmark the ICT readiness and the usage of their economies.

Today, the world has undergone massive changes: the Internet bubble has come and gone, and emerging countries such as China and India have become prominent global providers and users of ICT equipment and services. Struggling to emerge from the financial crisis, developed economies are striving to return to higher levels of growth and competitiveness while fighting stubbornly high unemployment rates, especially among their youth. Both emerging and developed economies are focusing on innovation, competing globally for talent, resources, and market shares. Information flows and networks have spread across borders in ways that could not be imagined before the onset of the Internet, the global adoption of mobile telephony and social networks, and the rapid growth of broadband. Business models have been redefined, the workplace has been redesigned, small startups have evolved into large companies, and entire functions of society (education, health, security, privacy) are being rethought.

ICTs, COMPETITIVENESS, GROWTH, AND JOBS: A COMPLEX RELATIONSHIP

The links between ICTs (their tools, services, and models) on the one hand and the unwavering importance of competitiveness, growth, and jobs on the other have never before been the subject of so much attention and concern. This is hardly surprising when one considers the “pull” of technology: developed economies need to reinvent themselves to maintain or restore their competitiveness, retain or regain market shares, and create jobs; emerging and developing economies are seeking ways to improve productivity and find new sources of growth through new technologies. Finally, the world needs to collectively address environmental and social challenges to ensure a more sustainable development path and a better quality of life for its people.

On the “push” side, technological progress continues at a relentless speed. The growing availability of technology has empowered citizens of both developed and emerging economies with fairly good access to the digital world. The rise of cloud computing has reduced the competitive differentials in technology availability across larger and smaller firms. Low entry barriers in the

digital space have sparked creativity and given rise to a class of young entrepreneurs around the world. It is clear that ICTs offer higher benefit-to-cost ratios in all sectors of production, while simultaneously offering new ways to create value by better and more efficiently organizing the use of natural, financial, and human resources.

Numerous studies have been presented in the literature on the connections between ICTs on the one hand, and development and growth on the other. Although the first analyses of the economic impact of fixed telephone density on economic growth were conducted more than three decades ago,¹ such studies have proliferated in recent years. Despite the ubiquity of ICTs in society and business, such research has not been easy. For one thing, the pace of adoption of many technologies (broadband, mobile, etc.) has been fast and recent—thus limiting the validity of longitudinal studies and making it difficult for data collection agencies to keep pace with the definition and collection of appropriate metrics. Also, it remains challenging to isolate the impact of ICT as its economic impacts have often occurred when combined with other broad social and business changes.

A recent ITU report summarizes the overall findings from current research on the economic impact of broadband:

First, broadband exhibits a higher contribution to economic growth in countries that have a higher adoption of the technology (this could be labelled the “critical mass” or “return to scale” theory). Second, broadband has a stronger productivity impact in sectors with high transaction costs, such as financial services, or high labor intensity, such as tourism and lodging. Third, in less-developed regions, as postulated in economic theory, broadband enables the adoption of more efficient business processes and leads to capital-labour substitution and, therefore, loss of jobs (this could be labelled the “productivity shock theory”). Fourth, the impact of broadband on small and medium enterprises takes longer to materialize due to the need to restructure the firms’ processes and labor organization in order to gain from adopting the technology (this is called “accumulation of intangible capital”). Finally, the economic impact of broadband is higher when promotion of the technology is combined with stimulus of innovative businesses that are tied to new applications. In other words, the impact of broadband is neither automatic nor homogeneous across the economic system.²

The concluding sentence above is important and generally valid for most other analyses of the economic impact of ICTs on development and growth. This in no way negates either the economic impact of ICTs or

the studies thereof. Rather, it highlights the valuable contribution of comprehensive models of ICT usage and impact such as the Networked Readiness Index (NRI). The ITU report concludes that “this emphasizes the importance of implementing public policies not only in the areas of telecommunications regulation, but also in education, economic development and planning, science and technology and others.”³

For more than a decade, the NRI has included aspects of the ways ICTs are transforming the economy and society. Among the expressions of transformation is the development of new skills that are important in knowledge-based, information-rich societies and that are crucial for employment. Despite the fact that ICTs are becoming increasingly universal, the question of access and usage remains important—especially for developing countries, given their need to narrow the digital divide. The NRI includes features related to access and usage that cover not only affordable ICT infrastructure but also digital resources, including software and skills. In addition, the NRI includes proxies for assessing some of the economic and social impacts accruing from ICTs. Thus, the Index facilitates the identification of areas where policy intervention—through investment, smart regulation, and/or incentives—could boost the impact of ICTs on development and growth.

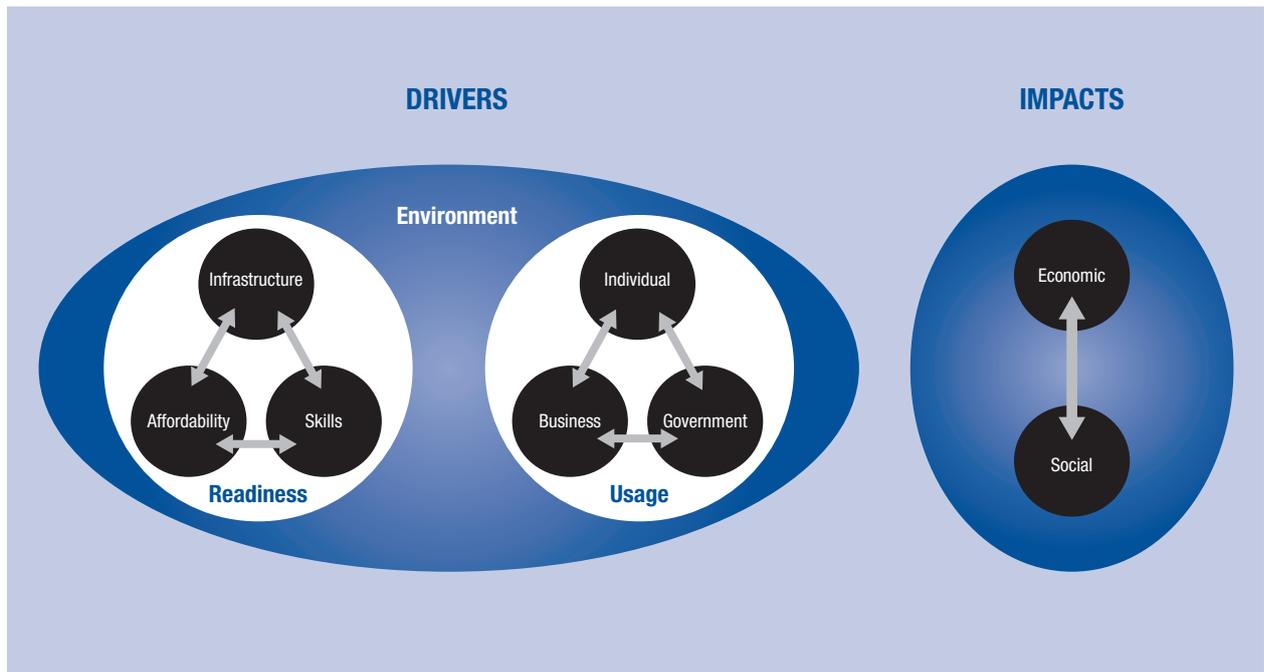
THE NETWORKED READINESS FRAMEWORK: A HOLISTIC APPROACH TO MEASURE ICT ACCESS AND IMPACTS

Given the potential high returns that ICTs can provide in transforming a nation’s economy and its citizens’ well-being, assessing ICT developments has been the object of much academic and policy attention in the past decade. Several organizations have made significant efforts to measure and benchmark ICT deployment and uptake, but few have aimed at equally assessing the returns that ICTs can actually provide to both the economy and society. Although data availability is still scarce in terms of ICT impacts, policy interest in measuring ICTs has shifted from measuring ICT access to measuring ICT impacts.

Last year, after two years of research and consultations with ICT practitioners, policy and industry experts, and academia, the NRI introduced a new subindex on ICT impacts that aimed at holistically assessing the way that countries go about leveraging ICTs and benefiting from them in terms of enhanced competitiveness and well-being. This evolution ensures that the NRI framework remains at the forefront of ICT measurement. As one of the most authoritative assessments of its kind, it has been adopted by several governments as a valuable tool for informing their competitiveness and policy agendas.

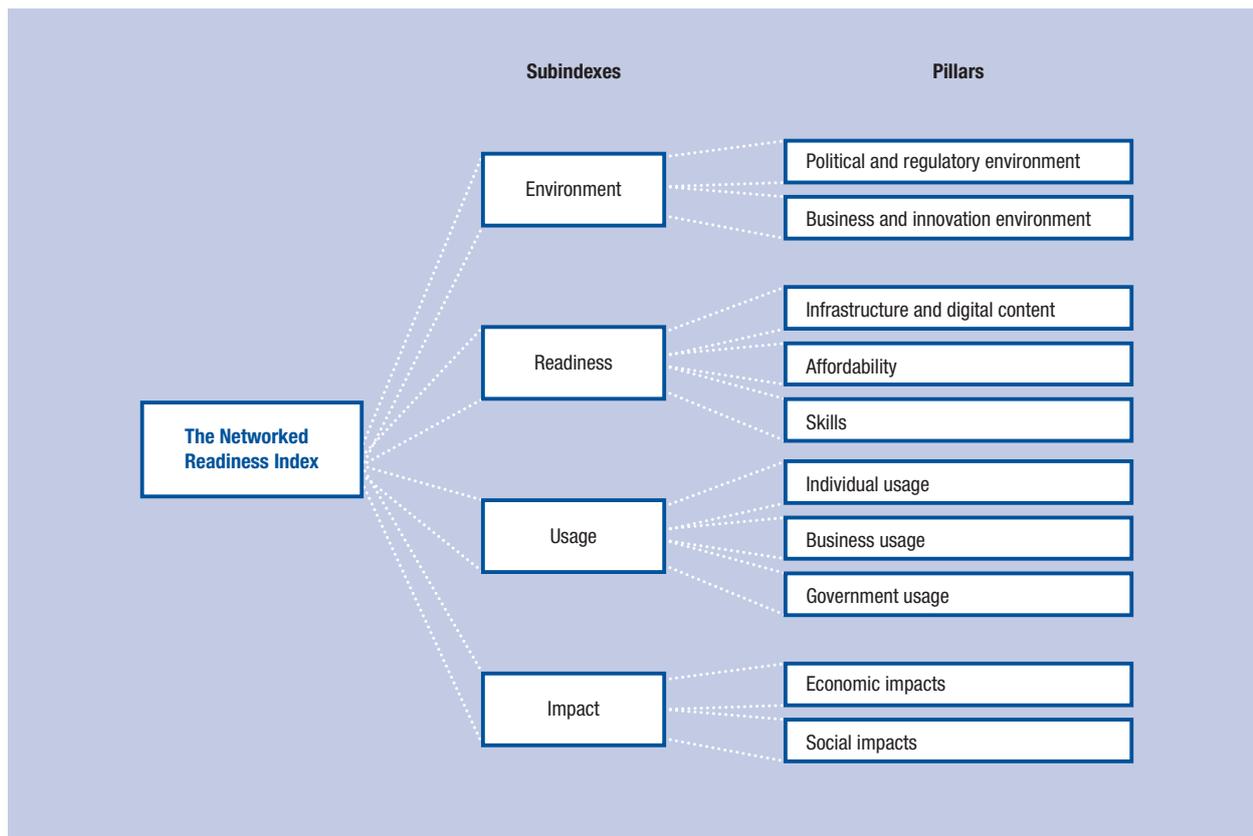
The design of the framework for the calculation of the NRI (Figure 1) has been guided by five principles:

Figure 1: The Networked Readiness Index framework



- 1. Measuring the economic and social impacts of ICTs is crucial.** The NRI must include aspects of the way ICTs are transforming both the economy and society. In the economy of several countries, the ICT industry has become increasingly important and now accounts for a significant share of value-added and employment. In addition, ICTs interact closely with many other sectors, thus enabling innovations to accrue and affecting productivity. Moreover, the impacts of ICTs are also evident in the development of new skills that are important in knowledge-based, information-rich societies and that are crucial for employment. In society, ICTs allow citizens to participate more actively and steadily in social and political debates and make the government more accountable. They improve access to better and faster services, which, in turn, yield important benefits.
- 2. An enabling environment determines the capacity of an economy and society to benefit from the use of ICTs.** The success of a country in leveraging ICTs and achieving the desired economic and social benefits will depend on its overall environment—including market conditions, the regulatory framework, and innovation-prone conditions—to boost innovation and entrepreneurship.
- 3. ICT readiness and usage remain key drivers and preconditions for obtaining any impacts.** Despite the increasing availability of ICTs, the question of access and usage remains important especially for developing countries, given their need to narrow the digital divide. Even within developed nations, the need to provide high-speed broadband to all segments of the population has acquired importance in recent years. Some features of the NRI are related to access and usage; these cover not only affordable ICT infrastructure but also digital resources, including software and skills. Moreover, ICT impacts can arise only if ICTs are widely used by all key actors—individuals, businesses, and governments. It is a society-wide effort. Those actors demonstrating better preparedness and greater interest are likely to use ICT more and more effectively, contributing to a greater impact on competitiveness and development.
- 4. All factors interact and co-evolve within an ICT ecosystem.** Those societies that can count on better-prepared actors and an enabling environment are more likely to benefit from higher rates of ICT use and impacts. At the same time, those societies that benefit from higher rates of ICT use and positive impacts will, in turn, be more likely to benefit from a push on the part of the different stakeholders to be better prepared and keep improving the framework conditions that will allow for more and stronger benefits to accrue. As a result, a virtuous circle starts, where improvements in one area affect and drive improvements in other areas. Conversely, lags in one particular factor also affect the evolution of the other factors.

Figure 2: The Networked Readiness Index structure



5. **The framework should provide clear policy orientations and identify opportunities for public-private collaboration.** The NRI facilitates the identification of areas where policy intervention—through investment including public-private partnerships, smart regulation, or the provision of incentives—could boost the impacts of ICTs. This is important because the development and general uptake of ICTs depend on the capacity of a country to provide an institutional framework with reliable and efficient rules and regulations; favorable business conditions for the founding and growth of new (social and commercial) enterprises; an innovation-prone environment, capable of developing and absorbing new knowledge; and an ICT-friendly government policy.

ELEMENTS OF THE NETWORKED READINESS INDEX

The networked readiness framework translates into the NRI, comprising four subindexes that measure the environment for ICTs; the readiness of a society to use ICTs; the actual usage of all main stakeholders; and, finally, the impacts that ICTs generate in the economy and in society. The three first subindexes can be regarded as the drivers that establish the conditions for

the results of the fourth subindex, ICT impacts. These four subindexes are divided into 10 pillars composed of 54 individual indicators in total, according to the following structure (see also Figure 2):

- A. Environment subindex**
 - 1. Political and regulatory environment
 - 2. Business and innovation environment
- B. Readiness subindex**
 - 3. Infrastructure and digital content
 - 4. Affordability
 - 5. Skills
- C. Usage subindex**
 - 6. Individual usage
 - 7. Business usage
 - 8. Government usage
- D. Impact subindex**
 - 9. Economic impacts
 - 10. Social impacts

The final NRI score is a simple average of the four 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 NRI subindexes

make a similar contribution to networked readiness. Appendix A includes detailed information on the composition and computation of the NRI 2013, while we briefly describe the different subindexes below.

Environment subindex

The environment subindex gauges the friendliness of a country's market and regulatory framework in supporting high levels of ICT uptake and the emergence of entrepreneurship and innovation-prone conditions. A supportive environment is necessary to maximize the potential impacts of ICTs in boosting competitiveness and well-being. It includes a total of 18 variables distributed into two pillars.

The *political and regulatory environment pillar* (composed of nine variables) assesses the extent to which the national legal framework facilitates ICT penetration and the safe development of business activities, 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 passing of laws related to ICTs and software piracy rates).

The *business and innovation environment pillar* (nine variables) gauges the quality of the business framework conditions to boost entrepreneurship, taking into account dimensions related to the ease of doing business (including the presence of red tape and excessive fiscal charges). This pillar also measures the presence of conditions that allow innovation to flourish by including variables on the overall availability of technology, the demand conditions for innovative products (as proxied by the development of government procurement of advanced technology products), the availability of venture capital for financing innovation-related projects, and the presence of a skilled labor force.

Readiness subindex

The readiness subindex, with a total of 12 variables, measures the degree to which a society is prepared to make good use of an affordable ICT infrastructure and digital content.

The *infrastructure and digital content pillar* (five variables) captures the development of ICT infrastructure (including mobile network coverage, international Internet bandwidth, secure Internet servers, and electricity production) as well as the accessibility of digital content.

The *affordability pillar* (three variables) assesses the cost of accessing ICTs, either via mobile telephony or fixed broadband Internet, as well as the level of competition in the Internet and telephony sectors that determine this cost.

The *skills pillar* (four variables) gauges the ability of a society to make effective use of ICTs thanks to the existence of basic educational skills captured by

the quality of the educational system, the level of adult literacy, and the rate of secondary education enrollment.

Usage subindex

The usage subindex assesses the individual efforts of the main social agents—that is, individuals, business, and government—to increase their capacity to use ICTs as well as their actual use in their day-to-day activities with other agents. It includes 16 variables.

The *individual usage pillar* (seven variables) measures ICT penetration and diffusion at the individual level, using indicators such as the number of mobile phone subscriptions, individuals using the Internet, households with a personal computer (PC), households with Internet access, both fixed and mobile broadband subscriptions, and the use of social networks.

The *business usage pillar* (six variables) captures the extent of business Internet use as well as the efforts of the firms in an economy to integrate ICTs into an internal, technology-savvy, innovation-conducive environment that generates productivity gains. Consequently, this pillar measures the firm's technology absorption capacity as well as its overall capacity to innovate and the production of technology novelties measured by the number of Patent Cooperation Treaty (PCT) patent applications. It also measures the extent of staff training available, which indicates the extent to which management and employees are more capable of identifying and developing business innovations. New this year, we have split the e-commerce variable from previous editions to distinguish the business-to-business dimension from the business-to-consumer one, as some noticeable differences between the two dimensions exist in several countries.

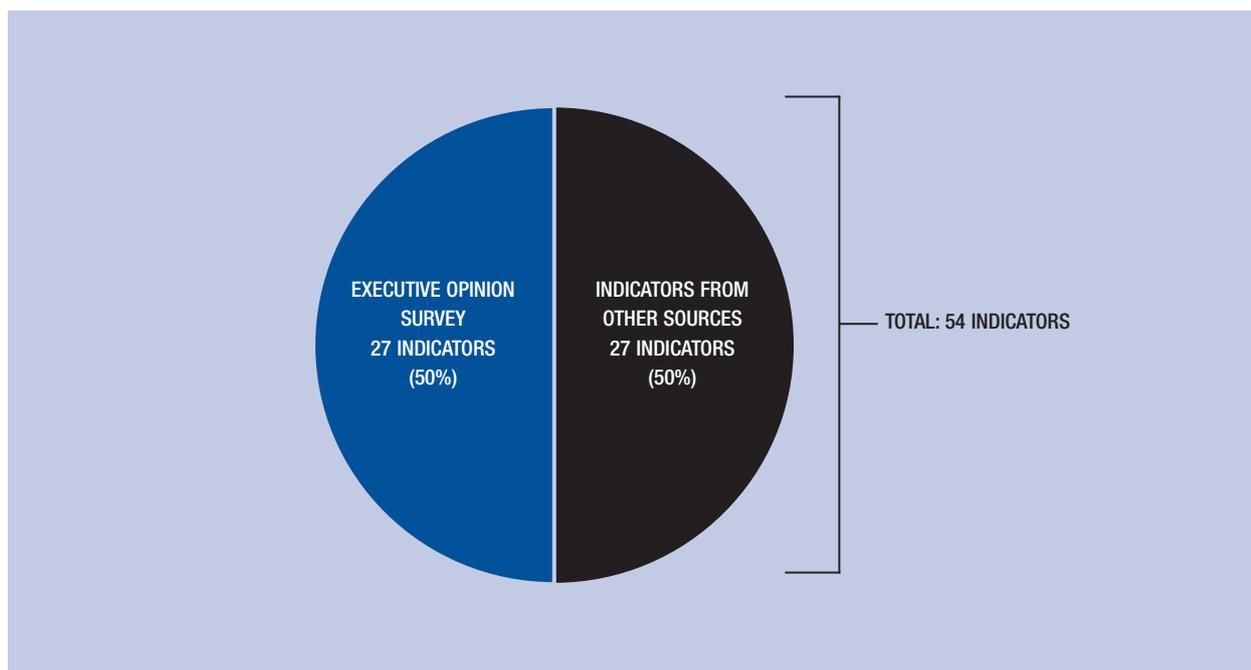
The *government usage pillar* (three variables) provides insights into the importance that governments place on carrying out ICT policies for competitiveness and to enhance the well-being of their citizens, the efforts they make to implement their visions for ICT development, and the number of government services they provide online.

Impact subindex

The impact subindex gauges the broad economic and social impacts accruing from ICTs to boost competitiveness and well-being and that reflect the transformations toward an ICT- and technology-savvy economy and society. It includes a total of eight variables.

The *economic impacts pillar* (four variables) measures the effect of ICTs on competitiveness thanks to the generation of technological and non-technological innovations in the shape of patents, new products or processes, and organizational practices. In addition, it also measures the overall shift of an economy toward more knowledge-intensive activities.

Figure 3: Breakdown of indicators used in the Networked Readiness Index 2013 by data source



The *social impacts pillar* (four variables) aims at assessing the ICT-driven improvements in well-being thanks to their impacts on the environment, education, energy consumption, health progress, or more-active civil participation. At the moment, because of data limitations, this pillar focuses on measuring the extent to which governments are becoming more efficient in the use of ICTs and providing increasing online services to their citizens, and thus improving their e-participation. It also assess the extent to which ICTs are present in education, as a proxy for the potential benefits that are associated with the use of ICTs in education.

In general, measuring the impacts of ICTs is a complex task, and the development of rigorous quantitative data to do so is still in its infancy. As a result, many of the dimensions where ICTs are producing important impacts—especially when these impacts are not translated into commercial activities, as is the case for the environment and for health—cannot be covered yet. Therefore this subindex should be regarded as a work in progress that will evolve to accommodate new data on many of these dimensions as they become available.

COMPUTATION METHODOLOGY AND DATA

In order to capture as comprehensively as possible all relevant dimensions of societies' networked readiness, the NRI 2013 is composed of a mixture of quantitative and survey data, as shown in Figure 3.

Of the 54 variables composing the NRI this year, 27 are quantitative data, collected primarily by international

organizations such as International Telecommunication Union (ITU), the World Bank, and the United Nations. International sources ensure the validation and comparability of data across countries.

The remaining 27 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 nonetheless are 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 economies included in the *Report*.⁴ The Survey represents a unique source of insight on many critical aspects related to the enabling environment, such as the effectiveness of law-making bodies and the intensity of local competition; to ICT readiness, such as the quality of the educational system and the accessibility of digital content; to ICT usage, such as capacity to innovate and the importance of government vision for ICTs; and to impact, such as the impact of ICTs on developing new products and services and improving access to basic services.

The NRI's coverage every year is determined by the Survey coverage and data availability for indicators obtained from other sources, mostly international organizations. This year the *Report* includes 144 economies, two more than in the 2012 edition. Five new countries are included: Gabon, Guinea, Liberia, Seychelles, and Sierra Leone. Libya was re-included after a year of absence. Three previously covered countries had to be excluded from this year's *Report*:

Survey data could not be collected in Belize or Angola; in Syria, the political situation did not allow the Survey to be carried out. In the case of Tunisia, we decided not to report the results this year because an important structural break in the data makes comparisons with past years difficult. We hope to re-include these countries in the future.

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

THE CURRENT NETWORKED READINESS LANDSCAPE: INSIGHTS FROM THE NRI 2013

This section provides an overview of the networked readiness landscape of the world as assessed by the NRI 2013. It presents the results of the top 10 performers and selected countries by region, in the following order: Europe and the Commonwealth of Independent States, Asia and the Pacific, Latin America and the Caribbean, sub-Saharan Africa, and the Middle East and North Africa. Tables 1 through 5 report the 2013 rankings for the overall NRI, its four subindexes, and its ten pillars. In addition, the Country/Economy Profiles and Data Tables sections at the end of the *Report* present the detailed results for the 144 economies covered by the study and the 54 indicators composing the NRI. To complement the analysis of the results, Box 1 discusses the persisting new digital divide across and within regions as revealed by the NRI results, and Box 2 examines increasing returns to ICT, skills, and innovation investment and suggests that an investment threshold in these three areas may exist and that without reaching it, the return may be negligible. Finally, Appendix A of the present chapter details the structure of the NRI and describes the method of calculation.

TOP 10

Two groups of economies dominate the top ranks of the NRI: Northern European economies and the so-called Asian Tigers. Among the Northern European countries, four of the five **Nordic economies** represented in the NRI—Finland, Sweden, Norway, and Denmark (in rank order)—continue to feature in the top 10. Iceland, the last of the Nordics, is not too far behind, at 17th place (see Table 1). The performance of this group in terms of readiness is particularly outstanding. All five Nordics feature in the top 10 of this subindex. Within this subindex, on the infrastructure and digital content pillar, four countries occupy the top positions. Overall, the four Nordic economies, the Netherlands, and the United Kingdom comprise no less than six Northern European countries among the top 10. As highlighted in the previous edition and elsewhere in this *Report*, the gap between those countries and the ones in the Southern and Eastern parts of Europe is profound. A

second group of economies that posts a remarkable performance is the **Asian Tigers**: Singapore, Taiwan (China), the Republic of Korea, and Hong Kong SAR. The latter, the lowest-ranked of the four, comes in at 14th place. All boast outstanding business and innovation environments that are consistently ranked among the most conducive in the world. The Tigers also stand out for their governments' leadership in promoting the digital agenda, and the impact of ICTs on society tends to be larger in these economies.

Overtaking Singapore and neighboring Sweden, **Finland** (1st) reaches the top of the NRI rankings for the first time, thanks to improvements across the board. The country shows progress on two-thirds of the 54 indicators of the NRI and posts a very consistent performance across all categories of the NRI. Finland appears in the top three of each of the four subindexes and in the top 10 of nine of the 10 pillars, topping two (skills and economic impacts). Among the 144 economies, only Sweden achieves as impressive a level of excellence and consistency. Finland's lowest rank among the 10 pillars is its 19th position in the affordability pillar, which can hardly be considered a weakness given that, among high-income countries, ICT services in Finland are among the most affordable (it comes in 5th, with Iceland and Sweden leading the category). As set out in the government's *Digital Agenda for 2011–2020*, Finland has set in motion a virtuous digital circle offering exceptionally conducive institutional (3rd) and business (7th) environments, world-class infrastructure (2nd), and arguably one of the best educational systems in the world. As a result, ICTs are ubiquitous and penetration rates are among the highest globally. Ninety percent of households are equipped with a computer and 90 percent of the population use the Internet, mostly at broadband speeds. Finland is an innovation hub, boasting the world's highest number of PCT applications per capita in the domain of ICTs, and the third highest when considering all domains. But the impact of ICTs extends well beyond innovation, permeating the entire economy and society. For instance, Finland ranks 1st on the indicator capturing the extent to which ICTs create new services and products.

Singapore remains 2nd overall, while slightly improving its score. The city-state ranks 1st in a record four pillars, while Finland leads only two. Singapore shows the way in the environment subindex, earning the top spot in both the political and regulatory environment pillar and the business and innovation environment pillar. The extreme efficiency and business friendliness of its institutional framework, strong intellectual property protection, intense competition, and high university enrollment rate lead to these outstanding outcomes. Singapore's readiness (11th) is also world class, thanks to its excellent digital infrastructure (19th) and skill base (2nd). The affordability of ICTs (55th) is Singapore's

only relative weakness. Within such a conducive environment, it is not surprising to see Singapore in 3rd position in terms of ICT usage. Among other things, the city boasts the world's largest number of mobile broadband subscriptions per capita, above 100 percent. Furthermore, it leads the government usage pillar and outperforms the Nordics, including Finland. Within this pillar, Singapore achieves the maximum possible score on the UN's Government Online Services Index. Finally, it ranks 1st on the indicator capturing the importance of ICTs for government and 4th in assessing the success of latter in promoting ICTs. In this context, it comes as no surprise that Singapore leads the impact subindex, appearing in the top 10 of each of the eight comprising indicators.

Sweden (3rd) maintains its score but declines two positions and abandons the top spot to Finland. Despite this slight decline in rank, the country undeniably remains one of the few truly knowledge-based economies of the world. Aside from Finland, Sweden is the only country to appear in the top 10 of nine pillars. Unlike its neighbor, however, it does not lead in any of them. But such remarkable consistency earns Sweden the top spot in the usage subindex, reflecting the impressive level of ICT adoption by businesses and the population at large. A conducive environment, associated with a high degree of readiness and widespread usage, largely contribute to Sweden's innovation capacity. The country boasts the world's highest number of PCT patent applications per capita, ahead of Switzerland and Finland. Amid such an outstanding assessment, a handful of indicators call for attention: the average corporate tax rate is fairly high—equivalent to 53 percent of profits (114th)—and two indicators point to somewhat lengthy administrative procedures.

The **Netherlands** climbs two ranks to 4th place, thanks to small gains on most of the indicators. Its performance is consistently strong judging by its presence in the top 10 of seven pillars. Like the top three economies discussed above, the Netherlands offers a very conducive environment, placing 6th in the regulatory and political environment pillar and 5th in the business and innovation pillar, even though red tape remains extensive. The country's level of ICT readiness is also very high (13th), thanks to a strong skill base and world-class infrastructure, although it is somewhat undermined by lower marks in the affordability pillar (60th). The Netherlands earns excellent marks in terms of ICT usage (5th, up four). In particular, the country boasts the world's 2nd highest fixed broadband Internet subscription rate, with 39 subscriptions per 100 population; moreover, 92 percent of the population use the Internet, the third-largest proportion. Ninety-four percent of households are equipped with a computer and have Internet access; on both these indicators, the Netherlands ranks 2nd worldwide. Amid these positive results, the country's

5th rank in the government usage pillar comes as a disappointment. Finally, the Netherlands ranks 2nd in the impact subindex, just behind Singapore. In particular, it ranks in the top 10 of the indicator capturing the impact of ICTs on the creation of new business models (5th), on the offering of new products and services (8th), and on access to basic services (5th). The country also earns the maximum score in the UN's E-Participation Index. The high share of knowledge-intensive jobs in the economy—almost 50 percent, the 3rd highest in the world—and the country's capacity for innovation further contribute to its outstanding performance in the impact subindex.

Progressing two ranks, **Norway** enters the top five at 5th place. Overall, Norway's performance is outstanding, as reflected in its 2nd and 3rd place, respectively, in the individual usage pillar (behind Denmark) and in the infrastructure and digital content pillar (behind Iceland and Finland). Yet, despite this strong performance, the country's results are slightly less consistent than those observed in Finland and Sweden. Unlike its neighbors, it ranks in the top 10 of four pillars but does not lead any. Of particular concern is Norway's performance on the skills category, where it places 27th—far below Finland, Iceland, and Sweden.

Despite improving its score slightly, **Switzerland** slips one notch to 6th overall. It features in the top 10 of seven pillars—the second highest total—and leads the business usage pillar. The cost of ICTs is by far the weakest aspect of the country's performance, with Switzerland ranking a mediocre 68th in the affordability pillar. Despite full liberalization of ICT services, its average mobile cellular tariffs are among the highest in the world, even when accounting for differences in costs of living (120th). Another area of relative weakness is the lack of government efforts to promote ICTs. Switzerland ranks 31st in this category, far behind most of the Asian Tigers, the Gulf countries, and the Nordics. This stands at odds with the excellent results in the other two pillars of the usage subindex, namely the business usage pillar (1st) and the individual usage pillar (10th).

Up three notches, the **United Kingdom** (7th) posts the biggest rank improvement among the top 10 economies. The country offers one of the most conducive environments for ICT development, ranking 6th in this subindex. In particular, it offers a sound and conducive political and regulatory environment (7th). The country also boasts high levels of ICT adoption. ICTs are pervasive among the population, businesses, and the government. Yet in all these categories, it is almost systematically outperformed by the Nordics, the Asian Tigers, or both, signaling room for improvement. Finally, the country is among the best when it comes to ICT impacts, ranking 4th and 14th in terms of social and economic impacts, respectively. Most noticeably, the country ranks 1st for the role of ICTs in giving rise to new

Table 1: The Networked Readiness Index 2013

Rank	Country/Economy	Score	2012 rank (out of 142)	Group*	Rank	Country/Economy	Score	2012 rank (out of 142)	Group*
1	Finland	5.98	3	ADV	73	Ukraine	3.87	75	CIS
2	Singapore	5.96	2	ADV	74	Thailand	3.86	77	DEVASIA
3	Sweden	5.91	1	ADV	75	Romania	3.86	67	CEE
4	Netherlands	5.81	6	ADV	76	Indonesia	3.84	80	DEVASIA
5	Norway	5.66	7	ADV	77	Moldova	3.84	78	CIS
6	Switzerland	5.66	5	ADV	78	Bosnia and Herzegovina	3.80	84	CEE
7	United Kingdom	5.64	10	ADV	79	Seychelles	3.80	n/a	SSA
8	Denmark	5.58	4	ADV	80	Egypt	3.78	79	MENA
9	United States	5.57	8	ADV	81	Cape Verde	3.78	81	SSA
10	Taiwan, China	5.47	11	ADV	82	Armenia	3.76	94	CIS
11	Korea, Rep.	5.46	12	ADV	83	Albania	3.75	68	CEE
12	Canada	5.44	9	ADV	84	Vietnam	3.74	83	DEVASIA
13	Germany	5.43	16	ADV	85	Jamaica	3.74	74	LATAM
14	Hong Kong SAR	5.40	13	ADV	86	Philippines	3.73	86	DEVASIA
15	Israel	5.39	20	ADV	87	Serbia	3.70	85	CEE
16	Luxembourg	5.37	21	ADV	88	Rwanda	3.68	82	SSA
17	Iceland	5.31	15	ADV	89	Morocco	3.64	91	MENA
18	Australia	5.26	17	ADV	90	Dominican Republic	3.62	87	LATAM
19	Austria	5.25	19	ADV	91	Ecuador	3.58	96	LATAM
20	New Zealand	5.25	14	ADV	92	Kenya	3.54	93	SSA
21	Japan	5.24	18	ADV	93	El Salvador	3.53	103	LATAM
22	Estonia	5.12	24	ADV	94	Lebanon	3.53	95	MENA
23	Qatar	5.10	28	MENA	95	Ghana	3.51	97	SSA
24	Belgium	5.10	22	ADV	96	Botswana	3.50	89	SSA
25	United Arab Emirates	5.07	30	MENA	97	Liberia	3.48	n/a	SSA
26	France	5.06	23	ADV	98	Gambia, The	3.47	101	SSA
27	Ireland	5.05	25	ADV	99	Argentina	3.47	92	LATAM
28	Malta	4.90	26	ADV	100	Guyana	3.45	90	LATAM
29	Bahrain	4.83	27	MENA	101	Iran, Islamic Rep.	3.43	104	MENA
30	Malaysia	4.82	29	DEVASIA	102	Guatemala	3.42	98	LATAM
31	Saudi Arabia	4.82	34	MENA	103	Peru	3.39	106	LATAM
32	Lithuania	4.72	31	CEE	104	Paraguay	3.37	111	LATAM
33	Portugal	4.67	33	ADV	105	Pakistan	3.35	102	DEVASIA
34	Chile	4.59	39	LATAM	106	Cambodia	3.34	108	DEVASIA
35	Cyprus	4.59	32	ADV	107	Senegal	3.33	100	SSA
36	Puerto Rico	4.55	36	ADV	108	Venezuela	3.33	107	LATAM
37	Slovenia	4.53	37	ADV	109	Honduras	3.32	99	LATAM
38	Spain	4.51	38	ADV	110	Uganda	3.30	110	SSA
39	Barbados	4.49	35	LATAM	111	Namibia	3.29	105	SSA
40	Oman	4.48	40	MENA	112	Tajikistan	3.29	114	CIS
41	Latvia	4.43	41	CEE	113	Nigeria	3.27	112	SSA
42	Czech Republic	4.38	42	ADV	114	Bangladesh	3.22	113	DEVASIA
43	Kazakhstan	4.32	55	CIS	115	Zambia	3.19	109	SSA
44	Hungary	4.29	43	CEE	116	Zimbabwe	3.17	124	SSA
45	Turkey	4.22	52	CEE	117	Suriname	3.13	121	LATAM
46	Panama	4.22	57	LATAM	118	Kyrgyz Republic	3.09	115	CIS
47	Jordan	4.20	47	MENA	119	Bolivia	3.01	127	LATAM
48	Montenegro	4.20	46	CEE	120	Côte d'Ivoire	3.00	122	SSA
49	Poland	4.19	49	CEE	121	Gabon	2.97	n/a	SSA
50	Italy	4.18	48	ADV	122	Mali	2.97	126	SSA
51	Croatia	4.17	45	CEE	123	Benin	2.97	117	SSA
52	Uruguay	4.16	44	LATAM	124	Cameroon	2.95	125	SSA
53	Costa Rica	4.15	58	LATAM	125	Nicaragua	2.93	131	LATAM
54	Russian Federation	4.13	56	CIS	126	Nepal	2.93	128	DEVASIA
55	Mauritius	4.12	53	SSA	127	Tanzania	2.92	123	SSA
56	Azerbaijan	4.11	61	CIS	128	Ethiopia	2.85	130	SSA
57	Brunei Darussalam	4.11	54	DEVASIA	129	Malawi	2.83	116	SSA
58	China	4.03	51	DEVASIA	130	Burkina Faso	2.80	135	SSA
59	Mongolia	4.01	63	CIS	131	Algeria	2.78	118	MENA
60	Brazil	3.97	65	LATAM	132	Libya	2.77	n/a	MENA
61	Slovak Republic	3.95	64	ADV	133	Mozambique	2.76	120	SSA
62	Kuwait	3.94	62	MENA	134	Timor-Leste	2.72	132	DEVASIA
63	Mexico	3.93	76	LATAM	135	Mauritania	2.71	139	MENA
64	Greece	3.93	59	ADV	136	Swaziland	2.69	136	SSA
65	Georgia	3.93	88	CIS	137	Madagascar	2.69	134	SSA
66	Colombia	3.91	73	LATAM	138	Lesotho	2.68	133	SSA
67	Macedonia, FYR	3.89	66	CEE	139	Yemen	2.63	141	MENA
68	India	3.88	69	DEVASIA	140	Guinea	2.61	n/a	SSA
69	Sri Lanka	3.88	71	DEVASIA	141	Haiti	2.58	142	LATAM
70	South Africa	3.87	72	SSA	142	Chad	2.53	138	SSA
71	Bulgaria	3.87	70	CEE	143	Sierra Leone	2.53	n/a	SSA
72	Trinidad and Tobago	3.87	60	LATAM	144	Burundi	2.30	137	SSA

Note: Group classification follows the International Monetary Fund's classification (situation as of October 2012).

* Groups: ADV = Advanced economies; CEE = Central and Eastern Europe; CIS = Commonwealth of Independent States and Mongolia; DEVASIA = Developing Asia; LATAM = Latin America and the Caribbean; MENA = Middle East and North Africa; SSA = Sub-Saharan Africa.

Table 2: Environment subindex and pillars

ENVIRONMENT SUBINDEX			Political and regulatory environment		Business and innovation environment		ENVIRONMENT SUBINDEX			Political and regulatory environment		Business and innovation environment	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Country/Economy	Score	Rank	Score	Rank	Score
1	Singapore	5.89	1	5.97	1	5.80	73	Georgia	3.86	100	3.34	54	4.39
2	New Zealand	5.65	2	5.92	6	5.38	74	Morocco	3.85	73	3.66	79	4.04
3	Finland	5.59	3	5.84	7	5.34	75	Mexico	3.85	79	3.60	74	4.09
4	Netherlands	5.53	6	5.67	5	5.40	76	Mongolia	3.84	93	3.41	62	4.28
5	Sweden	5.48	5	5.67	11	5.30	77	Azerbaijan	3.84	66	3.72	86	3.96
6	United Kingdom	5.48	7	5.62	8	5.33	78	Indonesia	3.83	82	3.57	73	4.10
7	Switzerland	5.46	8	5.60	9	5.32	79	Cambodia	3.83	65	3.75	91	3.92
8	Hong Kong SAR	5.44	15	5.27	2	5.61	80	Tajikistan	3.80	47	4.06	121	3.54
9	Norway	5.42	9	5.52	10	5.31	81	Guyana	3.79	84	3.55	81	4.02
10	Canada	5.42	12	5.36	3	5.47	82	Costa Rica	3.78	74	3.66	94	3.90
11	Australia	5.29	10	5.39	21	5.19	83	Italy	3.77	95	3.39	69	4.16
12	Denmark	5.27	14	5.30	19	5.23	84	Albania	3.76	102	3.31	66	4.22
13	Luxembourg	5.25	4	5.77	34	4.73	85	India	3.75	75	3.65	99	3.85
14	Qatar	5.19	18	5.10	12	5.29	86	Lebanon	3.74	133	2.76	35	4.73
15	Ireland	5.17	16	5.24	24	5.10	87	Greece	3.73	103	3.29	68	4.16
16	United States	5.11	22	4.94	13	5.29	88	Uganda	3.71	60	3.83	115	3.59
17	Belgium	5.09	23	4.94	18	5.23	89	Romania	3.70	106	3.25	70	4.14
18	Malaysia	5.07	24	4.88	16	5.25	90	Armenia	3.70	104	3.27	72	4.12
19	United Arab Emirates	5.05	26	4.84	17	5.25	91	Peru	3.69	121	3.04	57	4.34
20	Germany	5.05	11	5.38	36	4.71	92	Bosnia and Herzegovina	3.68	97	3.36	83	3.99
21	Iceland	5.02	25	4.88	22	5.15	93	Trinidad and Tobago	3.66	91	3.42	93	3.90
22	Austria	4.99	17	5.21	31	4.78	94	Nigeria	3.66	89	3.48	101	3.83
23	Israel	4.97	28	4.69	15	5.26	95	Dominican Republic	3.65	109	3.22	75	4.08
24	Taiwan, China	4.97	33	4.51	4	5.44	96	Colombia	3.64	92	3.41	95	3.87
25	Saudi Arabia	4.87	29	4.68	25	5.07	97	Vietnam	3.63	85	3.51	108	3.75
26	Japan	4.86	19	5.04	37	4.68	98	Kenya	3.63	87	3.49	106	3.76
27	France	4.84	20	5.02	39	4.66	99	Egypt	3.62	96	3.39	98	3.85
28	Bahrain	4.83	40	4.39	14	5.27	100	Philippines	3.60	98	3.36	100	3.84
29	Rwanda	4.81	13	5.30	59	4.32	101	Senegal	3.60	114	3.11	76	4.08
30	Chile	4.80	38	4.40	20	5.20	102	Russian Federation	3.58	108	3.24	90	3.92
31	Estonia	4.71	27	4.84	45	4.59	103	Malawi	3.58	63	3.80	131	3.36
32	Korea, Rep.	4.70	42	4.25	23	5.14	104	Ethiopia	3.55	83	3.56	119	3.55
33	South Africa	4.69	21	5.00	55	4.38	105	Ukraine	3.54	124	3.01	78	4.07
34	Cyprus	4.67	41	4.35	26	4.99	106	Serbia	3.54	115	3.10	85	3.98
35	Puerto Rico	4.65	35	4.46	30	4.83	107	Brazil	3.53	78	3.63	126	3.42
36	Barbados	4.63	32	4.59	38	4.67	108	Tanzania	3.52	76	3.65	128	3.38
37	Oman	4.61	34	4.47	33	4.75	109	Moldova	3.52	117	3.09	88	3.94
38	Portugal	4.57	43	4.24	27	4.91	110	Burkina Faso	3.49	88	3.49	122	3.49
39	Malta	4.53	31	4.59	50	4.47	111	Mali	3.47	99	3.35	114	3.59
40	Spain	4.49	44	4.14	29	4.85	112	Honduras	3.47	111	3.21	109	3.72
41	Mauritius	4.48	36	4.42	46	4.53	113	Ecuador	3.46	118	3.07	96	3.86
42	Jordan	4.35	48	4.05	40	4.65	114	Sierra Leone	3.44	86	3.50	127	3.39
43	Latvia	4.33	52	4.02	42	4.65	115	Benin	3.44	94	3.41	123	3.47
44	Slovenia	4.33	61	3.81	28	4.85	116	Pakistan	3.42	123	3.03	102	3.81
45	Lithuania	4.31	51	4.02	44	4.60	117	El Salvador	3.41	129	2.86	87	3.95
46	Turkey	4.31	54	3.97	43	4.64	118	Guatemala	3.39	127	2.92	97	3.85
47	Hungary	4.23	49	4.04	51	4.42	119	Cameroon	3.36	126	2.97	107	3.75
48	Panama	4.22	69	3.69	32	4.76	120	Mozambique	3.36	105	3.26	124	3.45
49	Czech Republic	4.21	46	4.06	56	4.36	121	Lesotho	3.32	116	3.09	118	3.55
50	Uruguay	4.20	58	3.91	47	4.50	122	Nepal	3.31	119	3.05	117	3.57
51	Liberia	4.17	53	4.01	58	4.34	123	Gabon	3.31	107	3.25	129	3.37
52	Montenegro	4.16	72	3.67	41	4.65	124	Paraguay	3.29	138	2.65	89	3.93
53	Seychelles	4.14	50	4.03	63	4.25	125	Madagascar	3.26	134	2.73	104	3.79
54	Gambia, The	4.13	30	4.68	116	3.58	126	Argentina	3.25	131	2.82	110	3.68
55	Poland	4.10	62	3.80	53	4.41	127	Côte d'Ivoire	3.23	128	2.87	113	3.60
56	Botswana	4.10	39	4.40	103	3.80	128	Bangladesh	3.19	137	2.71	111	3.68
57	Brunei Darussalam	4.09	45	4.11	77	4.07	129	Bolivia	3.19	110	3.22	137	3.17
58	Namibia	4.04	37	4.41	112	3.67	130	Libya	3.18	130	2.83	120	3.54
59	Macedonia, FYR	4.04	80	3.59	49	4.48	131	Timor-Leste	3.18	125	3.00	130	3.36
60	Thailand	4.00	81	3.59	52	4.42	132	Zimbabwe	3.13	120	3.05	135	3.22
61	Zambia	3.99	64	3.77	65	4.22	133	Swaziland	3.12	112	3.21	138	3.03
62	Slovak Republic	3.99	70	3.68	61	4.30	134	Nicaragua	3.11	122	3.03	136	3.18
63	Sri Lanka	3.95	68	3.70	67	4.21	135	Suriname	3.08	135	2.73	125	3.43
64	Ghana	3.95	57	3.92	84	3.99	136	Mauritania	3.07	113	3.18	140	2.95
65	Cape Verde	3.94	55	3.97	92	3.91	137	Kyrgyz Republic	3.02	136	2.72	132	3.32
66	Kazakhstan	3.93	77	3.63	64	4.23	138	Yemen	2.91	140	2.51	133	3.30
67	Jamaica	3.93	59	3.87	82	4.00	139	Guinea	2.84	132	2.77	141	2.91
68	Bulgaria	3.91	101	3.31	48	4.50	140	Venezuela	2.83	142	2.43	134	3.22
69	Kuwait	3.90	71	3.67	71	4.13	141	Haiti	2.65	143	2.40	142	2.89
70	Croatia	3.90	90	3.48	60	4.32	142	Burundi	2.63	144	2.30	139	2.96
71	China	3.88	56	3.97	105	3.78	143	Algeria	2.60	141	2.46	143	2.74
72	Iran, Islamic Rep.	3.86	67	3.70	80	4.03	144	Chad	2.59	139	2.59	144	2.58

Table 3: Readiness subindex and pillars

READINESS SUBINDEX			Infrastructure and digital content		Affordability		Skills	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Finland	6.51	2	6.87	19	6.22	1	6.45
2	Iceland	6.43	1	6.87	5	6.55	9	5.87
3	Sweden	6.38	4	6.83	7	6.48	10	5.84
4	United States	6.25	7	6.80	15	6.31	20	5.62
5	Canada	6.17	5	6.81	43	5.69	6	6.02
6	Norway	6.15	3	6.84	23	6.09	27	5.52
7	Denmark	6.04	14	6.40	22	6.09	18	5.63
8	Switzerland	6.02	8	6.71	68	5.25	4	6.10
9	Austria	6.01	9	6.60	37	5.89	24	5.55
10	United Kingdom	5.99	13	6.42	35	5.90	15	5.66
11	Singapore	5.96	19	6.20	55	5.50	2	6.18
12	Cyprus	5.92	21	6.08	28	6.02	16	5.66
13	Netherlands	5.92	11	6.48	60	5.39	8	5.89
14	Germany	5.88	10	6.50	53	5.52	19	5.62
15	Belgium	5.84	18	6.20	70	5.20	3	6.11
16	Ireland	5.80	16	6.24	61	5.38	12	5.78
17	Taiwan, China	5.80	22	5.99	54	5.50	7	5.91
18	Luxembourg	5.79	12	6.43	48	5.61	33	5.33
19	Hong Kong SAR	5.70	27	5.78	17	6.28	52	5.05
20	Lithuania	5.67	33	5.23	14	6.32	29	5.46
21	Malta	5.65	15	6.26	72	5.15	26	5.53
22	Israel	5.59	29	5.73	44	5.66	32	5.37
23	Korea, Rep.	5.56	20	6.13	83	4.88	14	5.67
24	Estonia	5.55	26	5.79	56	5.44	30	5.43
25	Australia	5.51	6	6.81	97	4.07	17	5.64
26	France	5.40	28	5.76	86	4.84	21	5.59
27	Latvia	5.38	41	4.83	16	6.30	54	5.01
28	Japan	5.36	24	5.84	92	4.50	13	5.73
29	Ukraine	5.34	74	3.85	2	6.88	35	5.30
30	New Zealand	5.33	17	6.22	100	3.96	11	5.81
31	Slovenia	5.33	25	5.82	85	4.86	36	5.30
32	Russian Federation	5.29	43	4.72	18	6.23	61	4.91
33	Costa Rica	5.28	76	3.77	6	6.52	23	5.56
34	Portugal	5.27	34	5.23	57	5.44	48	5.14
35	Bahrain	5.27	39	4.97	46	5.64	44	5.20
36	Turkey	5.27	48	4.56	4	6.59	81	4.65
37	Poland	5.26	38	5.00	47	5.63	47	5.15
38	Italy	5.25	40	4.94	49	5.61	45	5.18
39	Saudi Arabia	5.23	36	5.07	65	5.35	37	5.29
40	United Arab Emirates	5.23	30	5.46	89	4.70	25	5.54
41	Croatia	5.14	57	4.28	26	6.03	51	5.09
42	Mongolia	5.13	60	4.18	10	6.43	72	4.78
43	Bosnia and Herzegovina	5.08	64	4.13	31	5.99	49	5.11
44	Qatar	5.06	35	5.22	103	3.92	5	6.04
45	Trinidad and Tobago	5.02	53	4.41	58	5.40	39	5.25
46	Moldova	5.02	55	4.31	25	6.06	78	4.69
47	Greece	5.00	46	4.62	73	5.13	41	5.25
48	Georgia	4.99	68	4.03	11	6.39	83	4.56
49	Chile	4.99	61	4.18	33	5.94	66	4.85
50	Kazakhstan	4.98	63	4.14	36	5.90	62	4.91
51	Azerbaijan	4.98	75	3.82	20	6.16	57	4.96
52	Romania	4.98	47	4.62	62	5.36	58	4.95
53	Czech Republic	4.97	23	5.85	99	3.97	50	5.10
54	Mauritius	4.97	77	3.73	12	6.36	67	4.82
55	Jordan	4.97	81	3.55	27	6.03	34	5.33
56	Oman	4.92	66	4.05	34	5.90	68	4.81
57	Malaysia	4.87	73	3.85	50	5.58	43	5.20
58	Kuwait	4.87	45	4.64	71	5.18	71	4.79
59	Hungary	4.87	58	4.25	74	5.10	42	5.24
60	Panama	4.86	51	4.42	32	5.99	99	4.17
61	Spain	4.85	31	5.43	102	3.93	46	5.18
62	Montenegro	4.82	42	4.79	93	4.42	40	5.25
63	Thailand	4.78	71	3.95	45	5.64	76	4.75
64	Sri Lanka	4.78	101	3.05	29	6.02	38	5.26
65	Barbados	4.76	32	5.25	111	3.48	22	5.56
66	China	4.76	83	3.46	40	5.82	53	5.01
67	Serbia	4.71	54	4.39	84	4.87	65	4.86
68	India	4.70	111	2.80	1	7.00	95	4.31
69	Puerto Rico	4.70	52	4.42	n/a	n/a	55	4.97
70	Uruguay	4.66	49	4.50	80	4.94	85	4.53
71	Indonesia	4.66	89	3.26	39	5.82	63	4.88
72	Albania	4.62	79	3.60	66	5.29	56	4.96
73	Armenia	4.60	72	3.88	77	4.97	59	4.94
74	Brazil	4.53	62	4.16	76	5.01	91	4.42
75	Bulgaria	4.53	37	5.03	106	3.76	70	4.79
76	Mexico	4.47	82	3.53	63	5.36	87	4.51
77	Jamaica	4.46	65	4.10	87	4.81	88	4.48
78	Paraguay	4.44	67	4.04	52	5.53	107	3.74
79	Vietnam	4.43	114	2.76	38	5.86	79	4.68
80	Colombia	4.41	96	3.18	67	5.29	74	4.77
81	Venezuela	4.41	85	3.42	51	5.55	96	4.26
82	Egypt	4.41	93	3.19	8	6.47	115	3.56
83	Cape Verde	4.40	103	3.04	42	5.72	90	4.43
84	Macedonia, FYR	4.36	69	3.99	94	4.40	77	4.70
85	Philippines	4.36	84	3.42	82	4.89	73	4.77
86	Lebanon	4.29	88	3.27	95	4.12	28	5.49
87	Zimbabwe	4.28	129	2.18	9	6.47	98	4.18
88	Morocco	4.28	95	3.18	30	6.02	114	3.63
89	Ecuador	4.26	78	3.71	91	4.54	84	4.54
90	El Salvador	4.16	92	3.20	41	5.72	117	3.55
91	Bangladesh	4.14	109	2.84	13	6.34	128	3.24
92	Slovak Republic	4.12	56	4.29	113	3.32	75	4.75
93	Pakistan	4.11	104	3.00	21	6.15	129	3.19
94	Brunei Darussalam	4.06	50	4.47	135	2.33	31	5.38
95	South Africa	4.04	59	4.21	104	3.91	102	4.01
96	Algeria	4.00	119	2.62	64	5.35	101	4.02
97	Argentina	3.98	70	3.99	114	3.29	80	4.66
98	Dominican Republic	3.94	98	3.08	79	4.94	105	3.79
99	Liberia	3.93	142	1.57	3	6.78	122	3.42
100	Suriname	3.92	118	2.66	90	4.64	89	4.46
101	Ghana	3.89	121	2.51	59	5.40	106	3.77
102	Honduras	3.86	107	2.88	78	4.96	108	3.72
103	Kyrgyz Republic	3.78	90	3.26	107	3.67	92	4.40
104	Uganda	3.76	106	2.88	75	5.07	125	3.33
105	Guyana	3.75	94	3.19	110	3.50	82	4.56
106	Seychelles	3.73	44	4.67	139	1.61	60	4.92
107	Botswana	3.72	100	3.06	109	3.57	86	4.52
108	Guatemala	3.72	116	2.69	81	4.92	118	3.53
109	Iran, Islamic Rep.	3.69	97	3.13	115	3.13	69	4.79
110	Kenya	3.68	110	2.84	105	3.81	93	4.39
111	Cambodia	3.49	87	3.31	112	3.47	109	3.68
112	Nepal	3.33	140	1.62	69	5.20	131	3.17
113	Haiti	3.33	144	1.53	24	6.09	143	2.37
114	Gabon	3.33	125	2.32	96	4.11	116	3.55
115	Namibia	3.27	102	3.04	117	3.09	111	3.67
116	Rwanda	3.25	105	2.98	116	3.12	113	3.64
117	Yemen	3.24	123	2.43	88	4.75	138	2.54
118	Tajikistan	3.22	126	2.30	131	2.49	64	4.86
119	Peru	3.08	86	3.31	138	1.86	100	4.07
120	Senegal	3.07	108	2.86	118	3.07	126	3.30
121	Nicaragua	3.07	91	3.25	136	2.31	112	3.64
122	Côte d'Ivoire	3.07	99	3.07	119	2.96	130	3.17
123	Nigeria	3.02	115	2.70	120	2.96	123	3.40
124	Bolivia	3.01	138	1.74	122	2.89	94	4.39
125	Gambia, The	3.00	117	2.68	124	2.81	120	3.50
126	Libya	2.91	80	3.56	141	1.00	97	4.18
127	Chad	2.90	127	2.22	98	4.06	141	2.43
128	Benin	2.85	113	2.79	133	2.39	124	3.39
129	Zambia	2.85	133	2.02	127	2.69	104	3.84
130	Swaziland	2.84	112	2.80	137	2.03	110	3.68
131	Cameroon	2.80	137	1.75	125	2.79	103	3.87
132	Guinea	2.80	132	2.10	108	3.58	135	2.73
133	Mauritania	2.80	134	1.95	101	3.94	139	2.50
134	Timor-Leste	2.71	122	2.48	123	2.82	133	2.82
135	Tanzania	2.70	124	2.36	130	2.58	132	3.16
136	Lesotho	2.68	130	2.16	134	2.35	119	3.53
137	Madagascar	2.57	143	1.56	121	2.90	127	3.26
138	Burundi	2.50	128	2.20	n/a	n/a	134	2.79
139	Malawi	2.41	120	2.58	140	1.17	121	3.47
140	Ethiopia	2.34	141	1.62	126	2.78	137	2.61
141	Mali	2.32	139	1.65	128	2.67	136	2.63
142	Burkina Faso	2.27	136	1.79	129	2.59	142	2.43
143	Mozambique	2.22	135	1.81	132	2.42	140	2.44
144	Sierra Leone	1.74	131	2.11	141	1.00	144	2.10

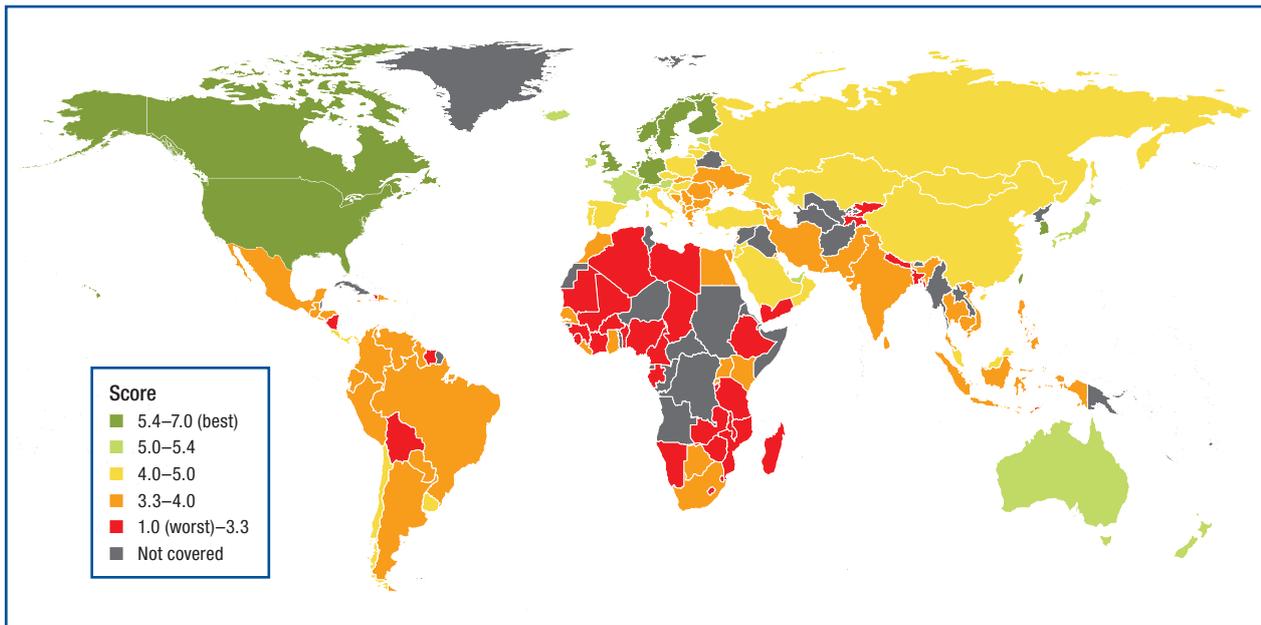
Table 4: Usage subindex and pillars

USAGE SUBINDEX			Individual usage		Business usage		Government usage	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Sweden	6.00	3	6.53	4	5.89	8	5.56
2	Finland	5.97	6	6.40	3	5.97	10	5.55
3	Singapore	5.86	11	6.13	14	5.18	1	6.29
4	Korea, Rep.	5.86	7	6.39	11	5.31	3	5.89
5	Netherlands	5.78	5	6.42	8	5.53	15	5.39
6	Denmark	5.75	1	6.65	7	5.56	24	5.05
7	Norway	5.75	2	6.62	12	5.23	14	5.39
8	Switzerland	5.70	10	6.15	1	6.11	31	4.86
9	Japan	5.62	13	5.88	2	6.01	27	4.98
10	Luxembourg	5.62	4	6.47	16	4.97	13	5.41
11	United Kingdom	5.59	9	6.17	15	5.05	9	5.55
12	Germany	5.57	14	5.88	5	5.81	26	5.01
13	United States	5.51	18	5.66	10	5.37	11	5.49
14	Israel	5.45	28	5.43	6	5.67	20	5.23
15	Taiwan, China	5.45	20	5.66	13	5.19	12	5.49
16	Qatar	5.35	16	5.82	27	4.47	5	5.75
17	Austria	5.23	19	5.66	9	5.39	35	4.65
18	Australia	5.22	15	5.88	25	4.54	19	5.25
19	New Zealand	5.20	17	5.78	23	4.54	18	5.29
20	Hong Kong SAR	5.18	12	5.91	19	4.77	30	4.87
21	Iceland	5.15	8	6.35	20	4.77	50	4.32
22	France	5.13	24	5.52	18	4.86	25	5.02
23	United Arab Emirates	5.07	36	4.90	28	4.31	2	5.99
24	Canada	5.04	27	5.44	24	4.54	22	5.14
25	Estonia	5.01	23	5.53	29	4.13	17	5.36
26	Belgium	4.97	25	5.48	17	4.94	41	4.48
27	Malta	4.92	22	5.59	38	3.81	16	5.37
28	Ireland	4.87	21	5.59	22	4.58	43	4.44
29	Malaysia	4.83	46	4.44	26	4.49	7	5.57
30	Bahrain	4.83	30	5.13	56	3.59	4	5.78
31	Saudi Arabia	4.74	47	4.39	30	4.10	6	5.73
32	Portugal	4.50	41	4.71	36	3.86	28	4.93
33	Spain	4.46	31	5.12	41	3.80	42	4.46
34	Barbados	4.44	26	5.48	43	3.72	64	4.13
35	Slovenia	4.43	32	5.06	32	3.94	52	4.30
36	Lithuania	4.41	37	4.86	42	3.75	36	4.60
37	Oman	4.36	50	4.31	52	3.62	21	5.14
38	Czech Republic	4.35	29	5.18	31	4.08	93	3.79
39	Puerto Rico	4.31	59	3.94	21	4.59	46	4.40
40	Chile	4.24	53	4.12	44	3.71	29	4.90
41	Brunei Darussalam	4.21	49	4.32	59	3.56	33	4.75
42	Kazakhstan	4.18	54	4.06	85	3.34	23	5.13
43	Latvia	4.16	38	4.84	51	3.64	75	3.99
44	Brazil	4.08	58	3.97	34	3.90	48	4.38
45	Italy	4.08	34	4.93	46	3.68	108	3.62
46	Hungary	4.07	42	4.67	61	3.50	69	4.03
47	Croatia	4.06	39	4.83	81	3.36	73	3.99
48	Cyprus	4.05	44	4.52	60	3.51	65	4.13
49	Slovak Republic	4.04	35	4.92	65	3.47	100	3.71
50	Poland	4.01	33	5.00	74	3.41	107	3.62
51	Panama	4.00	65	3.59	39	3.81	37	4.60
52	Azerbaijan	3.99	64	3.68	58	3.57	34	4.71
53	Montenegro	3.95	56	4.01	71	3.43	47	4.39
54	Uruguay	3.94	51	4.17	72	3.43	55	4.22
55	Kuwait	3.94	40	4.83	83	3.35	105	3.63
56	Russian Federation	3.91	45	4.51	95	3.24	74	3.99
57	Seychelles	3.85	62	3.76	64	3.48	51	4.31
58	China	3.80	83	2.96	35	3.86	38	4.58
59	Costa Rica	3.79	71	3.37	37	3.84	61	4.17
60	Jordan	3.79	66	3.55	55	3.59	56	4.22
61	Macedonia, FYR	3.78	52	4.13	123	2.94	54	4.27
62	Turkey	3.78	68	3.51	48	3.65	60	4.18
63	Bulgaria	3.75	48	4.32	101	3.18	98	3.74
64	Colombia	3.75	76	3.09	77	3.39	32	4.77
65	Mauritius	3.71	70	3.38	73	3.42	49	4.34
66	Mexico	3.68	82	2.98	62	3.50	39	4.55
67	Trinidad and Tobago	3.67	61	3.77	97	3.23	70	4.01
68	Greece	3.66	43	4.53	107	3.11	118	3.34
69	Romania	3.66	57	3.97	94	3.24	96	3.76
70	Indonesia	3.58	92	2.74	40	3.81	58	4.20
71	Morocco	3.55	67	3.54	99	3.20	81	3.92
72	South Africa	3.53	81	2.99	33	3.91	102	3.70
73	Vietnam	3.52	78	3.08	88	3.30	62	4.16
74	Argentina	3.51	60	3.92	90	3.28	117	3.35
75	Egypt	3.49	69	3.43	108	3.11	80	3.92
76	Philippines	3.46	95	2.69	47	3.65	67	4.04
77	Georgia	3.46	75	3.16	112	3.07	63	4.14
78	Serbia	3.45	55	4.01	135	2.70	104	3.64
79	Armenia	3.44	77	3.08	89	3.30	78	3.94
80	Mongolia	3.41	90	2.79	78	3.39	66	4.06
81	India	3.41	121	1.97	45	3.70	40	4.55
82	Moldova	3.39	72	3.36	129	2.86	76	3.97
83	Thailand	3.39	88	2.84	63	3.50	86	3.84
84	Kenya	3.38	115	2.08	53	3.62	44	4.43
85	Albania	3.37	84	2.93	79	3.38	95	3.79
86	Dominican Republic	3.36	93	2.73	82	3.36	72	3.99
87	Bosnia and Herzegovina	3.34	73	3.32	104	3.15	111	3.55
88	Ecuador	3.33	85	2.92	92	3.27	94	3.79
89	Jamaica	3.32	86	2.89	86	3.32	97	3.76
90	Sri Lanka	3.32	110	2.19	57	3.57	57	4.20
91	Peru	3.32	87	2.89	93	3.26	90	3.81
92	Gambia, The	3.32	118	2.03	50	3.64	53	4.28
93	Guatemala	3.28	96	2.67	49	3.65	114	3.51
94	El Salvador	3.27	91	2.79	100	3.20	88	3.83
95	Ukraine	3.27	74	3.17	84	3.35	121	3.28
96	Cape Verde	3.25	103	2.37	122	2.96	45	4.41
97	Guyana	3.24	106	2.25	54	3.60	85	3.87
98	Lebanon	3.21	63	3.70	116	3.02	134	2.90
99	Botswana	3.20	98	2.57	96	3.23	91	3.80
100	Senegal	3.16	113	2.09	66	3.47	82	3.91
101	Namibia	3.12	99	2.53	76	3.40	116	3.43
102	Ghana	3.12	102	2.40	103	3.15	89	3.81
103	Tajikistan	3.12	107	2.20	87	3.32	87	3.83
104	Cambodia	3.09	112	2.14	70	3.44	103	3.69
105	Venezuela	3.07	80	3.02	120	2.97	126	3.21
106	Iran, Islamic Rep.	3.06	108	2.20	119	2.99	71	4.00
107	Rwanda	3.05	139	1.50	67	3.46	59	4.20
108	Nigeria	3.04	111	2.16	68	3.45	113	3.52
109	Zambia	3.04	122	1.84	80	3.36	79	3.92
110	Paraguay	3.01	97	2.66	110	3.09	123	3.27
111	Honduras	3.01	101	2.45	75	3.40	127	3.17
112	Suriname	2.97	79	3.07	113	3.06	138	2.78
113	Bolivia	2.96	104	2.34	109	3.09	115	3.45
114	Liberia	2.93	126	1.74	69	3.45	109	3.59
115	Mali	2.93	125	1.76	114	3.06	77	3.96
116	Côte d'Ivoire	2.92	117	2.07	105	3.14	112	3.54
117	Uganda	2.89	131	1.65	106	3.13	84	3.90
118	Pakistan	2.89	123	1.83	91	3.27	110	3.56
119	Cameroon	2.86	130	1.65	98	3.21	101	3.71
120	Tanzania	2.86	127	1.68	102	3.16	99	3.73
121	Bangladesh	2.83	128	1.65	132	2.81	68	4.03
122	Gabon	2.83	105	2.34	130	2.85	120	3.30
123	Kyrgyz Republic	2.81	94	2.70	138	2.65	130	3.08
124	Nicaragua	2.76	120	1.98	111	3.07	125	3.21
125	Zimbabwe	2.72	114	2.09	115	3.03	132	3.05
126	Burkina Faso	2.71	140	1.49	131	2.83	92	3.80
127	Benin	2.70	109	2.19	117	3.01	135	2.90
128	Mozambique	2.66	141	1.45	125	2.90	106	3.62
129	Libya	2.65	89	2.80	136	2.69	143	2.44
130	Ethiopia	2.62	143	1.34	140	2.62	83	3.91
131	Malawi	2.60	136	1.56	121	2.97	122	3.27
132	Mauritania	2.58	116	2.08	126	2.88	137	2.79
133	Madagascar	2.55	132	1.60	118	3.00	131	3.05
134	Nepal	2.54	137	1.54	127	2.87	124	3.21
135	Lesotho	2.52	129	1.65	133	2.79	128	3.12
136	Timor-Leste	2.51	124	1.80	139	2.63	129	3.11
137	Sierra Leone	2.50	133	1.59	141	2.59	119	3.33
138	Swaziland	2.49	119	1.98	124	2.90	140	2.58
139	Guinea	2.47	138	1.53	128	2.86	133	3.02
140	Algeria	2.42	100	2.46	144	2.15	139	2.65
141	Chad	2.34	142	1.35	134	2.79	136	2.89
142	Yemen	2.27	135	1.57	137	2.68	141	2.56
143	Haiti	2.17	134	1.58	142	2.56	144	2.36
144	Burundi	2.04	144	1.33	143	2.31	142	2.47

Table 5: Impact subindex and pillars

IMPACT SUBINDEX			Economic impacts		Social impacts		IMPACT SUBINDEX			Economic impacts		Social impacts	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Country/Economy	Score	Rank	Score	Rank	Score
1	Singapore	6.13	2	5.98	1	6.28	73	Gambia, The	3.44	63	3.31	79	3.57
2	Netherlands	6.00	4	5.93	3	6.08	74	Moldova	3.43	84	3.05	65	3.80
3	Finland	5.86	1	5.99	9	5.74	75	Vietnam	3.39	89	2.97	64	3.81
4	Sweden	5.77	3	5.93	10	5.62	76	Georgia	3.39	97	2.90	60	3.88
5	Korea, Rep.	5.71	12	5.24	2	6.19	77	Poland	3.38	64	3.31	86	3.45
6	Taiwan, China	5.65	7	5.49	6	5.82	78	Macedonia, FYR	3.36	92	2.96	70	3.77
7	Israel	5.54	6	5.63	14	5.45	79	Nigeria	3.34	65	3.28	88	3.40
8	United Kingdom	5.48	14	5.09	4	5.86	80	Mauritius	3.33	82	3.10	78	3.57
9	Switzerland	5.44	5	5.80	24	5.08	81	Ukraine	3.32	74	3.21	87	3.43
10	United States	5.43	11	5.32	11	5.55	82	Greece	3.31	80	3.12	83	3.51
11	Norway	5.32	13	5.17	13	5.47	83	Armenia	3.31	69	3.26	90	3.37
12	Hong Kong SAR	5.28	15	5.03	12	5.54	84	Guatemala	3.31	57	3.36	100	3.26
13	Denmark	5.25	9	5.33	19	5.18	85	El Salvador	3.30	103	2.85	71	3.76
14	Germany	5.22	10	5.32	22	5.12	86	Indonesia	3.30	101	2.85	72	3.74
15	Estonia	5.19	23	4.55	5	5.83	87	Bulgaria	3.30	75	3.20	89	3.39
16	Canada	5.14	16	4.93	17	5.35	88	Thailand	3.28	108	2.77	67	3.79
17	Japan	5.12	8	5.36	31	4.88	89	Albania	3.26	88	2.99	81	3.54
18	Australia	5.01	20	4.61	15	5.41	90	Ecuador	3.25	90	2.97	82	3.52
19	United Arab Emirates	4.94	28	4.13	7	5.75	91	Jamaica	3.23	81	3.10	92	3.36
20	France	4.86	17	4.92	32	4.79	92	South Africa	3.23	51	3.40	112	3.05
21	Luxembourg	4.81	25	4.47	20	5.15	93	Mali	3.17	71	3.23	108	3.11
22	New Zealand	4.81	26	4.47	21	5.15	94	Argentina	3.14	91	2.96	96	3.32
23	Qatar	4.80	33	3.85	8	5.75	95	Trinidad and Tobago	3.12	100	2.87	91	3.37
24	Austria	4.76	22	4.57	29	4.95	96	Bosnia and Herzegovina	3.12	96	2.90	95	3.33
25	Iceland	4.65	24	4.54	33	4.76	97	Romania	3.12	94	2.92	97	3.31
26	Puerto Rico	4.56	21	4.58	37	4.53	98	Serbia	3.09	105	2.83	93	3.36
27	Malaysia	4.52	29	4.02	25	5.02	99	Iran, Islamic Rep.	3.09	106	2.82	94	3.36
28	Belgium	4.51	19	4.67	41	4.34	100	Ghana	3.08	85	3.04	107	3.11
29	Malta	4.50	31	4.00	26	5.01	101	Kuwait	3.04	125	2.60	85	3.47
30	Lithuania	4.49	30	4.01	28	4.96	102	Tajikistan	3.03	111	2.75	98	3.31
31	Saudi Arabia	4.43	42	3.64	18	5.22	103	Guyana	3.02	107	2.80	102	3.24
32	Bahrain	4.39	52	3.39	16	5.38	104	Venezuela	3.01	95	2.91	106	3.11
33	Ireland	4.36	18	4.77	56	3.96	105	Botswana	2.97	114	2.73	103	3.21
34	Chile	4.35	35	3.73	27	4.97	106	Pakistan	2.97	99	2.88	113	3.05
35	Portugal	4.32	36	3.70	30	4.94	107	Cambodia	2.94	124	2.62	101	3.26
36	Spain	4.22	32	3.86	36	4.58	108	Honduras	2.94	98	2.89	114	2.99
37	Kazakhstan	4.18	66	3.28	23	5.09	109	Liberia	2.91	110	2.75	109	3.08
38	Barbados	4.13	27	4.24	52	4.03	110	Ethiopia	2.90	127	2.53	99	3.27
39	Brunei Darussalam	4.07	48	3.43	35	4.71	111	Morocco	2.89	122	2.65	105	3.13
40	Slovenia	4.05	34	3.82	46	4.27	112	Zambia	2.89	115	2.71	110	3.07
41	Oman	4.04	61	3.34	34	4.75	113	Benin	2.88	87	3.01	123	2.75
42	Hungary	4.00	41	3.66	40	4.35	114	Bolivia	2.88	123	2.62	104	3.14
43	Czech Republic	3.97	40	3.66	44	4.28	115	Uganda	2.86	121	2.65	111	3.07
44	Montenegro	3.87	39	3.67	49	4.08	116	Lebanon	2.86	102	2.85	120	2.86
45	Latvia	3.87	38	3.68	51	4.06	117	Mozambique	2.82	116	2.71	117	2.93
46	Uruguay	3.83	53	3.39	45	4.27	118	Nicaragua	2.80	120	2.67	116	2.93
47	Colombia	3.83	70	3.24	38	4.42	119	Cameroon	2.78	104	2.84	126	2.72
48	Panama	3.80	73	3.22	39	4.38	120	Côte d'Ivoire	2.77	93	2.93	129	2.61
49	Costa Rica	3.75	46	3.50	53	3.99	121	Paraguay	2.75	109	2.76	122	2.75
50	Brazil	3.74	50	3.40	48	4.08	122	Namibia	2.75	117	2.70	121	2.80
51	Cyprus	3.73	45	3.50	55	3.97	123	Kyrgyz Republic	2.75	126	2.56	115	2.93
52	Mexico	3.72	72	3.23	47	4.22	124	Malawi	2.73	112	2.74	127	2.71
53	Russian Federation	3.72	54	3.38	50	4.06	125	Burkina Faso	2.72	118	2.70	124	2.74
54	Jordan	3.70	49	3.42	54	3.98	126	Bangladesh	2.71	128	2.52	118	2.90
55	China	3.69	83	3.08	42	4.29	127	Tanzania	2.61	136	2.34	119	2.89
56	India	3.67	43	3.63	73	3.71	128	Zimbabwe	2.55	119	2.68	132	2.42
57	Slovak Republic	3.67	44	3.54	66	3.80	129	Nepal	2.54	135	2.36	125	2.73
58	Mongolia	3.65	86	3.02	43	4.29	130	Suriname	2.53	113	2.74	137	2.33
59	Azerbaijan	3.65	59	3.35	57	3.94	131	Timor-Leste	2.50	132	2.38	128	2.61
60	Italy	3.63	37	3.69	80	3.57	132	Gabon	2.42	129	2.44	133	2.41
61	Rwanda	3.62	58	3.35	61	3.88	133	Sierra Leone	2.42	133	2.37	131	2.46
62	Egypt	3.60	67	3.28	58	3.93	134	Mauritania	2.39	130	2.42	136	2.36
63	Croatia	3.59	55	3.38	68	3.79	135	Madagascar	2.38	139	2.25	130	2.50
64	Turkey	3.54	68	3.26	63	3.82	136	Guinea	2.33	131	2.40	140	2.25
65	Cape Verde	3.53	76	3.20	62	3.86	137	Swaziland	2.33	140	2.25	134	2.40
66	Dominican Republic	3.53	79	3.16	59	3.89	138	Libya	2.32	137	2.33	138	2.31
67	Senegal	3.51	60	3.35	75	3.67	139	Chad	2.30	138	2.33	139	2.26
68	Philippines	3.50	56	3.37	76	3.62	140	Lesotho	2.21	144	2.03	135	2.39
69	Seychelles	3.49	78	3.19	69	3.78	141	Haiti	2.20	134	2.37	142	2.03
70	Sri Lanka	3.47	62	3.33	77	3.62	142	Algeria	2.11	143	2.08	141	2.15
71	Kenya	3.47	47	3.46	84	3.47	143	Yemen	2.08	142	2.20	143	1.96
72	Peru	3.45	77	3.20	74	3.70	144	Burundi	2.06	141	2.23	144	1.90

Figure 4: The Networked Readiness Index map



Note: An interactive version of this map is available at www.weforum.org/gitr.

organizational models and 2nd for the impact of ICTs in creating new services and products, which highlights the importance of ICTs for innovation in service-based economies.

Denmark ranks 8th overall, yet it is only 4th among the Nordics. Down four places, the country worsens its showing in almost two-thirds of the indicators comprising the NRI. The level of networked readiness remains astounding, however. Denmark tops the individual usage pillar, boasting some of the highest rates of Internet usage (6th), households with personal computers (6th), broadband Internet subscriptions (3rd), and mobile broadband subscriptions (6th).

Down one, the **United States** slips to 9th place despite a performance essentially unchanged from the previous year. This constitutes the country's worst showing since the first edition of the GTR in 2001, in which it ranked 1st, although changes to the methodology and in the composition of the NRI over time cause the results not to be strictly comparable. The United States now appears in the top 10 of only two pillars, compared with six just one year ago. The country still possesses many strengths, which have contributed to making it the world's innovation powerhouse for decades. However, this leadership is now being contested. The United States ranks only 12th worldwide for the number of PCT patent applications in 2009 and 2010 on a per capita basis. The rate of 134 applications per million population is less than half that of leading Sweden (297 applications), Switzerland (285), and Finland (279).

Gaining one rank, **Taiwan, China**, enters the top 10. Second among the Tigers, Taiwan owes its fast-paced economic development to ICTs, which have been at the heart of its industrialization since the early 1980s. In addition to being a major manufacturing base for electronics and high-tech products, Taiwan has become an innovation hub. Beyond the ICT sector, technology has permeated the entire society. Usage of ICTs is widespread (15th) and their impacts are profound both economically (7th) and socially (6th). On a less positive note, Taiwan's performance is undermined by the relatively mediocre quality of its political and regulatory environment (33rd), Taiwan's second-worst pillar rank.⁵

EUROPE AND THE COMMONWEALTH OF INDEPENDENT STATES

Several European countries continue to lead the rankings, showcasing their strong efforts and commitment to fully develop and leverage ICTs to boost their competitiveness and the well-being of their citizens. As presented in the previous section, seven European countries, led by Finland and Sweden, are positioned within the top 10. Within the European Union, while stark intra-regional disparities persist, it is worth noting that the divergence across Member States in the NRI is significantly narrower than it is in the Global Competitiveness Index,⁶ the most comprehensive analysis for measuring the set of policies, institutions, and factors that drive the productivity of an economy. This reflects the longstanding efforts of the European

Box 1: Sketching the new digital divide

The Networked Readiness Index (NRI) aims to measure the ability of countries to leverage information and communication technologies (ICTs) for improved competitiveness and well-being. This ability depends on multiple factors, as detailed in this chapter and reflected in the comprehensive framework underpinning the NRI. The NRI results confirm the presence of the digital divide between advanced economies on the one hand and emerging and developing economies on the other.

Figure 4 presents an intensity map of the world, with economies color-coded based on their NRI overall score measured on a 1-to-7 scale, with best- and worst-performing economies appearing in dark green and red, respectively. The contrast between advanced economies (see Table 1 for classification) and the rest of the world is stark and betrays the inability or limited capacity of a vast majority of countries to fully reap the benefits of ICTs. The green color, corresponding to a score of 5 and above, paints parts of Western Europe, with all Nordics but one painted dark green, along with the United States, Canada, Australia, New Zealand, Japan, and the Asian Tigers. The rest of the map is almost entirely devoid of green. The only exceptions are Israel (in 15th place, with an NRI score of 5.4), Estonia (22nd, 5.1), Qatar (23rd, 5.1), and the United Arab Emirates (25th, 5.1)—all pockets of strong performance in their respective regions, which are characterized by serious shortcomings.

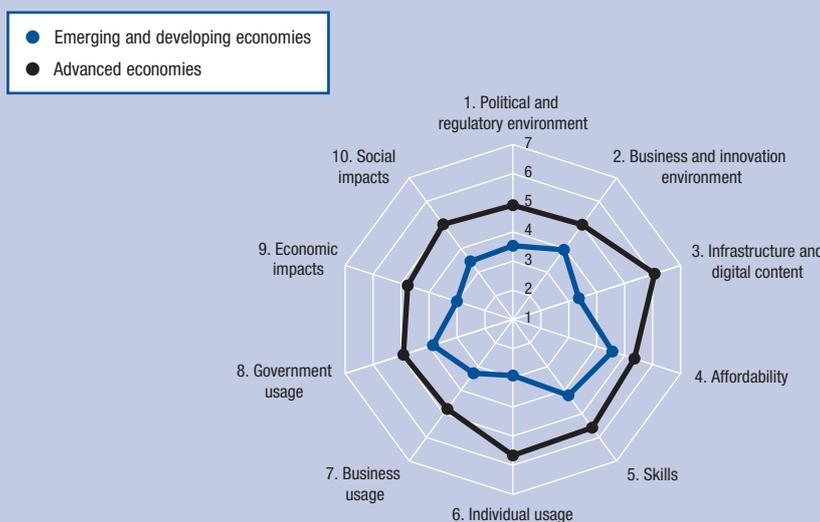
Although a vast majority of them trail the advanced economies, the developing and emerging economies do not draw a homogenous picture—far from it. The map is mostly yellow (corresponding to NRI scores between 4 and 5) in Central and Eastern Asia and orange (scores between 3.3 and 4), with red patches in the Caucasus. The picture is predominantly orange in the rest of Developing Asia. In South

Asia, Bangladesh and Nepal show in red, while the Southeast Asia region presents a slightly brighter image, devoid of red and with Malaysia in yellow. The orange color also dominates in Latin America and the Caribbean. There, Chile, Uruguay, Panama, and Costa Rica contribute to a brighter picture, but 19 countries score below the mid-point and four of them are coded red (scores lower than 3.3) on the map. The picture is predominantly red across sub-Saharan Africa, where only a handful of nations, including South Africa and Kenya, appear in orange. Mauritius (not shown on the map) is the only one of the region's 33 studied countries to obtain a score above 4. Finally, the patchwork of colors—from green to red—in the Middle East and North Africa (MENA) region betrays its profound diversity. In the NRI rankings, a gap of 111 places separates Qatar (23rd, with a score of 5.1) from Yemen (139th, 2.6).

In Europe—home to advanced, emerging, and developing economies—the picture is very mixed. A patch of yellow stretches almost uninterruptedly from the Iberian Peninsula through Italy, Slovenia, the Czech Republic, Poland, and the Baltics on to Russia. Adjacent is a cluster of underperformers, depicted in orange and comprising most of the Balkan countries, Romania, and Ukraine. Greece belongs to this group. Sitting 63 places behind Finland, it is the only advanced economy, along with the Slovak Republic, to score lower than 4.

Looking in greater detail, Figure A reveals that the digital divide is present across the 10 pillars of the NRI, even though the average scores necessarily conceal vast differences within the two groups. A traditional conception of the digital divide tends to focus on differences in terms of infrastructure and technological adoption. Despite rapid growth, the divide

Figure A: The digital divide in the 10 pillars of the NRI



Note: Pillar scores are measured on a 1-to-7 scale (where 1 is the lowest score and 7 is the highest).

(Cont'd.)

Box 1: Sketching the new digital divide (cont'd.)

in these two areas remains high. Of the 10 pillars, *infrastructure and digital content* and *individual usage* are the two where the score differentials between advanced economies and the rest of the world are the biggest (2.7). Although mobile telephony is becoming ubiquitous almost everywhere, figures for Internet usage and broadband access, let alone mobile broadband access and PC ownership, remain low in most parts of the world.

Table A reports aggregate penetration rates (weighted by population) for various technologies in the 109 developing economies and 35 advanced economies covered by the NRI. As of 2011, there were 81 mobile telephony subscriptions per 100 population in the developing economies under review, not too far from the 111 subscriptions per 100 population of advanced economies. However, when it comes to Internet access, the ratios are much more skewed. Seventy-seven percent of individuals in advanced economies use the Internet, about three times as many as in developing countries (25 percent). The figures for PC ownership yield a similar ratio of 3.5 to 1 higher. In terms of mobile broadband subscriptions, the ratio is 7.3 to 1 in favor of advanced economies. Mobile telephony alone will not allow developing countries to bridge the digital divide. One must hope that the

same degree of innovation, competition, and attention that contributed to making mobile telephony affordable, useful, and ubiquitous will spread to other technologies.

Figure A reveals that the divide is not limited to mere differences in terms of ICT adoption. It extends well beyond, covering all aspects of networked readiness. In particular, the gap is large when it comes to ICT impacts. This is arguably the result of biggest concern, as impact is ultimately what really matters. Narrowing this *new* digital divide will take even more effort than narrowing the gap in ICT access.

In the 2012 edition of the GTR, we had already highlighted the digital divide in our analysis. Very little progress has been made this year toward reducing this divide, with a few exceptions. Several members of the Gulf Cooperation Council and the Commonwealth of Independent States have posted significant improvements. But these encouraging developments have only a negligible impact on the overall picture and conclusions drawn here. The lack of convergence since last year is not surprising given the complexity and multiplicity of factors driving a country's networked readiness. It will take time and considerable effort for the developing world to reduce the gap.

Table A: Penetration of various technologies, 2011

Population-weighted rates	Developing economies (109)	Advanced economies (35)	All economies (144)	Ratio of advanced to developing economies
Mobile cellular telephone subscriptions per 100 pop.	81.3	110.7	85.7	1.4
Fixed (wired) broadband subscriptions per 100 pop.	5.1	28.7	8.7	5.7
Active mobile broadband subscriptions per 100 pop.	8.8	64.8	17.0	7.3
Percentage of individuals using the Internet	25.0	77.3	32.8	3.1
Percentage of households with a computer	22.2	77.7	31.2	3.5

Source: Authors' calculation, based on ITU's *World Telecommunication/ICT Indicators Database* 2012 (December 2012 edition).

Note: See Table 1 for country classification. Penetration rates are based on the sample of 144 economies included in the NRI. For each technology, economies for which no data are available for 2011 are excluded from the calculation.

Union to narrow the digital divide in Europe and build an internal digital market, as corroborated by the launch of a new Digital Agenda for Europe,⁷ one of the seven flagship initiatives of the European Commission's Europe 2020 Strategy for growth and jobs for the present decade.

Within Europe—beyond the Nordic countries, the Netherlands, Switzerland, and the United Kingdom—**Germany** in 13th place and going up three notches is leveraging ICTs quite efficiently, especially in terms of boosting its economic impacts for competitiveness, where it scores within the top 10. The country continues to boast a highly developed ICT infrastructure (10th), which translates into a high uptake by individuals

(14th), with one of the highest broadband Internet subscriptions (8th) in the world, and by businesses (5th) that are extensively using ICTs in their transactions with other businesses (14th) and with consumers (14th). In addition, the outstanding innovation capacity of the local firms (3rd) coupled with a well-performing educational system (20th) results in the already-mentioned high levels of economic impacts (10th) and in innovation and knowledge-intensive activities (15th).

Luxembourg, in 16th place and five ranks higher than last year, continues to improve its ICT infrastructure (12th) and its strong uptake by individuals, businesses, and government. Since identifying ICTs as one of the crucial sectors needed to diversify its economy and

improve efficiency in other crucial sectors, such as the financial sector, Luxembourg's government's strong vision (5th) in upgrading ICT uptake has resulted in one of the world's highest rates of Internet users (5th) and households with a personal computer (3rd) and an Internet connection (6th). Notwithstanding these achievements, the economic impacts of ICTs (25th) to boost innovation, while improving, still remains below other very advanced economies, the result of some weaknesses in an innovation system that has recently been developed. Further strengthening the country's national innovation capacity would thus yield better results for the ICT infrastructure and uptake that is already world class.

Within the top 20, as last year, **Austria** places 19th, with a rather stable profile. The country continues to exhibit a very strong ICT infrastructure and digital content (9th) that, coupled with a good skill base (24th), allows for a strong individual uptake (19th), with high rates of Internet users (15th) and extensive use of the Internet for economic transactions between businesses (3rd) and with consumers (16th). Moreover, the country's long-lasting investments in innovation and the integration of ICTs in this favorable ecosystem result in good economic impacts (22nd). On a less positive note, Austria continues to suffer from high tax rates (120th) and cumbersome procedures (97th) to open a business, which can hinder the ability of existing and new businesses to appear and grow.

Once again, **Estonia** ranks as the highest Central and Eastern European country, in 22nd place, gaining two positions in the rankings. The strong vision of its government (23rd) and its success (14th) in developing ICTs as one of the critical industries for the local economy continues to yield good impacts (15th), both in economic (23rd) and social (5th) terms, where the country depicts one of the strongest performances across the globe. Following the example of the Nordic countries, Estonia has managed to develop a strong ICT infrastructure and encourage a strong uptake by citizens (23rd), by businesses in their transactions with other businesses and government (15th), and by the government (23rd), which continues to expand its offerings of online services. Going forward, the country could benefit even further by strengthening its innovation system, which still suffers from some weaknesses and limits the private sector's capacity to innovate (33rd) and thus benefit from the full potential that ICTs can offer.

Belgium, in 24th place—two notches down from last year—continues to leverage ICTs strongly to obtain high economic impacts (19th) thanks to a well-developed ICT infrastructure (18th), a world-class educational system (3rd), and an innovation and entrepreneurship-prone environment (18th) that allows for a fairly high innovation capacity in local firms (11th). In order to keep boosting ICT uptake, mobile cellular tariffs should

fall (127th), as this seems to affect mobile phone subscriptions (50th) and especially mobile broadband subscriptions (56th). Furthermore, the government could expand its offerings of online services (39th), notably the facilities to increase citizens' online participation (81st), which remains below the EU average.

Despite a drop of three positions, **France**—in 26th place—achieves a good and harmonious uptake of ICTs across all different agents in society and achieves strong economic impacts (17th), thanks to a good skill base (21st). Overall, ICT infrastructure and digital content has continued to improve (28th) and, although a bit more costly to access (86th), overall use has remained high, with the government significantly expanding its offerings of online services (8th). On a less positive note, a slight deterioration in the business and innovation environment (39th), along with a high tax system (130th), can potentially impede future ICT-related startups.

Portugal and **Spain**, despite their current economic difficulties, maintain their positions in the rankings at 33rd and 38th place, respectively. Both countries have managed to develop a solid ICT infrastructure (34th and 31st, respectively), which has resulted in relatively good levels of ICT uptake by most stakeholders. This is the case especially for Spain, where both the government's offerings of online services (23rd) and Internet broadband subscriptions (26th), including mobile broadband (25th), are high and close to those of other Western European economies despite the high cost of mobile telephony (132nd). In both cases, the economic impacts that could accrue from ICTs are somewhat jeopardized because of weaknesses in their innovation systems and the quality of their educational systems (94th and 97th, respectively), which limit the capacity of businesses to innovate (40th and 44th, respectively) and, therefore, hinder the needed economic transformation of both countries toward higher-knowledge-intensive activities (53rd and 37th, respectively).

In Southeastern Europe, **Slovenia**, stable in 37th place, continues its regional leadership in terms of leveraging ICTs. With a well-developed ICT infrastructure and a good skill base (36th) despite some quality concerns in the educational system (63rd), the country has obtained high levels of ICT penetration, with Internet users reaching close to three-quarters of the population (28th) and a high level of broadband Internet subscriptions (24th), despite the relatively high cost of ICT access (85th). In order to improve the economic impacts of ICTs (34th), Slovenia should continue strengthening its rather pro-business environment while addressing some of the weaknesses of its innovation system, such as the lack of available venture capital (113th). This rather positive outlook contrasts with the situation of other countries in the region, such as **Bosnia and Herzegovina** and **Serbia** in 78th and 87th positions, respectively, which reflect a yet insufficiently

developed ICT infrastructure and uptake and weak innovation systems that hamper their capacity to fully leverage ICTs to boost competitiveness.

Stable in 42nd place, the **Czech Republic** continues to strive in terms of a well-developed ICT infrastructure (23rd) and high penetration in terms of individual usage (29th), with many Internet users (27th) and mobile broadband subscriptions (21st), despite the high cost of ICTs (99th). As a result, e-commerce, both between businesses (23rd) and between businesses and consumers (8th), is well developed. On a less positive note, and although governmental online services have increased, they remain relatively low (53rd). Going forward, the country could benefit more from ICTs to boost innovation (82nd) and raise competitiveness by addressing some of the current weaknesses in the innovation system, such as limited venture capital (84th). Other countries in Central Europe—such as **Hungary**, **Poland**, and the **Slovak Republic** in 44th, 49th, and 61st place, respectively—have also remained stable with little variation in the rankings, despite relatively well developed ICT infrastructures and penetration rates. However, serious weaknesses in their innovation systems hinder their capacity to properly integrate their digital development into a well-performing ecosystem that allows for higher innovation rates. In addition, **Bulgaria** and **Romania**, in 71st and 75th place, respectively, close the EU rankings, with lower rates of ICT uptake and unstable environments that impede their potential for higher economic and social returns.

Turkey, in 45th place, ascends seven notches in the rankings, thanks to an overall improvement in its political and regulatory framework (54th) and in its business and innovation environment (43rd); a significant improvement in developing crucial ICT infrastructure, such as international Internet broadband capacity (42nd); and, above all, a drop in tariffs to access ICTs (4th), which have allowed for higher ICT penetration in terms of broadband subscriptions (56th) and Internet users (69th). Notwithstanding this progress, the country still suffers from an insufficiently developed skills pool (81st), the result of a low secondary education enrollment rate (88th) and a poor educational system (100th) that hamper the capacity of the country to fully leverage ICTs to boost innovation and raise national productivity levels. Addressing these weaknesses while improving government online tools to boost citizens' participation could help the country increase both its economic and social impacts going forward.

A drop of two places leaves **Italy** in 50th position. Deterioration in the country's political and regulatory environment (95th) and a relative stagnation in its progress toward improving its ICT infrastructure (40th), boosting a higher ICT uptake, and consequently obtaining higher economic and social impacts have resulted in this small decline. Overall, it is worth noting

the perception of a lack of coherent government vision to boost ICTs (118th) and the limited role that ICTs play in organizing economic transactions between businesses (101st) and between businesses and consumers (83rd). These factors, coupled with the persistent weaknesses in the innovation system (69th) and in the quality of education (87th), are hindering the country's capacity to leverage ICTs better and obtain higher economic and social impacts.

As in Italy, the rapid deterioration of the political and regulatory environment (103rd), the lack of a government vision to boost ICTs (138th), and the stark weaknesses in the national innovation system that hold back the capacity of local firms to innovate (104th) have resulted in **Greece's** drop of five positions, down to 64th place. The current economic difficulties have slightly affected the country's otherwise fairly well developed ICT infrastructure (46th), mainly in terms of international Internet bandwidth (51st), although individual uptake (43rd) has improved, notably in the number of Internet users (51st). In terms of obtaining better returns for national ICT investments, the country will need to address the already-mentioned weaknesses in its innovation system and improve the quality of its educational system (115th).

Within the Commonwealth of Independent States, several countries have fully recognized the potential of ICTs to leapfrog and diversify their economies, and important progress has been recorded since last year.

Leading the region, **Kazakhstan** depicts a strong performance with a rise of 12 positions to 43rd place. Improvements virtually across the board—led by a strong government vision (35th) that continues to develop the ICT infrastructure (63rd) and supports stronger ICT uptake—as evidenced by the number of Internet users (62nd), along with households with a personal computer (63rd) and those with Internet access (55th), which have almost doubled since the last observation—have driven this good result. Notwithstanding this progress, the economic impacts (66th) accruing from a higher use of ICTs remain modest in their ability to spur new services or products (92nd) and raise the national competitiveness, mainly because of a low capacity for local innovation (92nd), an educational system that is deemed insufficient for the challenges ahead (101st), weaknesses in the political and regulatory environment (77th), and some concerns about the functioning of the judicial system (94th).

The **Russian Federation**, overtaking China as the leading large emerging economy, rises two positions to 54th place thanks to improvements in higher rates of general ICT uptake, with growing numbers of Internet users (57th) and, especially, a spectacular increase in mobile broadband subscriptions (20th) that has multiplied exponentially, as almost half of the population now benefit from it. Despite this progress, the country

continues to suffer from low rates of e-business (107th), a weak political and regulatory framework (108th), and a poor business and innovation environment (90th) that affects its capacity to further leverage ICTs to boost its economy and benefit from higher rates of products and service innovation (123rd).

Azerbaijan, in 56th place, continues its ascension in the rankings as a result of an improvement in its ICT infrastructure, especially in terms of international Internet bandwidth capacity (64th), that—coupled with affordable prices (20th)—result in higher rates of ICT uptake. This is seen in rising numbers of broadband subscriptions (53rd), including mobile broadband (50th), which has rapidly expanded in the past year. Despite these significant advances in boosting the national connectivity, economic and social impacts (59th) could be further enhanced if the current weaknesses in fostering innovation and entrepreneurship (86th) and increasing the quality of the educational system (109th) were addressed.

Within the region, **Georgia** and **Armenia**—showing some of the highest gains in our rankings, of 23 and 12 positions, respectively—reach 65th and 82nd place, respectively. They are joined by **Ukraine** and **Tajikistan** with more moderate rises of two positions to 73rd and 112th place, respectively, in this overall regional positive trend. On a less positive note, the **Kyrgyz Republic**, at 118th, has not managed to join its neighbors in better leveraging ICTs to boost its economic competitiveness.

ASIA AND THE PACIFIC

Asia is home to some of the wealthiest economies and some of the most successful development stories in the world, but also to some of the poorest countries. A similarly profound diversity characterizes Asia's digital landscape, thus making it impossible to draw a uniform picture of the region. The most digitized and innovative economies—the Asian Tigers—co-exist in the region with some of the least-connected ones. Nowhere else does the regional digital divide run so deeply. Regardless of their position on the development ladder, all Asian economies have much to gain from increased networked readiness. It will allow populations of the least-advanced countries to gain access to much-needed basic services, improved government transparency and efficiency, and—for the most advanced, many of which suffer from anemic economic growth—it will contribute to boosting their innovation capacity. The NRI reveals that in the case of Asia's best-performing economies, the governments typically lead the digital effort, unlike in Europe. At the heart of Asia, and representative of its immense diversity, the **Association of Southeast Asian Nations (ASEAN)** is fairly dynamic. Led by Singapore, all eight ASEAN members covered by the NRI improve their overall score and a majority progress in the rankings, albeit in some

cases—such as Cambodia and the Philippines—from a low base.

The **Republic of Korea** (11th) gains one rank and now stands in the doorway of the top 10. The country's performance is particularly lopsided. Korea ranks 32nd and 23rd in the environment subindex and the readiness subindex, respectively. By contrast—and remarkably enough—it places 4th in the usage subindex and 5th in the impact subindex.

The lowest-ranked Tiger economy, **Hong Kong SAR**, places 14th overall. Its performance is arguably more balanced than those of Taiwan and Korea: Hong Kong ranks no lower than 30th in nine of the ten pillars.⁸ The most positive aspect is its 2nd rank in the business and innovation environment pillar, just behind Singapore. ICT usage is widespread (20th), and Hong Kong holds the record for the most mobile telephone subscriptions per capita, with 215 for every 100 population.

Australia occupies the 18th rank, one notch lower than a year ago. The county's performance is undermined by a poor score in the affordability pillar. Although most of the 19 main ICT service categories are fully liberalized, average prices of mobile telephony and Internet remain very high by international standards, earning Australia the 97th rank in this category.

Ahead of its neighbor in the previous edition of the NRI, **New Zealand** drops six places to 20th, two lower than Australia this year. The quality of its regulatory and business environment is outstanding, earning New Zealand the 2nd spot in the environment subindex, just behind Singapore. In particular, the transparency and efficiency of its institutions are among the world's best. The excellent skill base of the population (6th) also contributes to the country's high degree of readiness. As for most advanced economies featuring high in the NRI, the affordability pillar (100th) is New Zealand's only real weakness.

One of the world's most prolific innovators, **Japan** ranks a disappointing 21st overall and is down three spots from the previous edition. A number of important shortcomings in the environment subindex, including red tape, prevent the country from playing a leading role in the NRI. The biggest competitive advantage of Japan is without doubt its innovative and sophisticated business sector (2nd). Technology and innovation have greatly contributed to making Japan one of the most productive economies worldwide. But beyond the tremendous impact of technology on the economy, it has not had an important impact on society at large (31st). A more conducive institutional framework, including a renewed commitment by the government, could usher in new drivers of growth for Japan.

Despite losing one rank, **Malaysia** (30th) remains the best-ranked economy in Developing Asia. Trying to emulate the success of Korea and other Asian Tigers, the Malaysian government has been pursuing

a long-term transformation plan with the ambition of achieving high-income status by the end of the decade, with ICTs playing a critical role. Most government-related indicators reflect this commitment, and Malaysia places 7th in the government usage pillar. Businesses are quite aggressive at adopting technology and are increasingly innovative. The government-led efforts seem to be starting to have a transformational impact on the economy (29th) and the society at large (25th). Areas of weaker performance include infrastructure (73rd) and individual usage (46th), owing to the relatively low rates of adoption of the latest technologies.

China posts a fall of seven places in the rankings this year, and occupies the 58th position overall and second among the BRICS countries,⁹ falling below Russia (54th). To better leverage ICTs, China faces important challenges across the board. Its institutional framework (56th), and especially its business environment (105th), present serious shortcomings that stifle entrepreneurship and innovation, including excessive red tape, high taxes (127th), and questionable intellectual property protection—for instance, almost 80 percent of installed software in China is estimated to be pirated. Our study also points to the limited or delayed availability of new technologies (107th) despite the presence of pockets of technological excellence in certain sectors and regions of the country. In terms of readiness, the country ranks a low 83rd in the infrastructure and digital content pillar, mainly because of its underdeveloped Internet infrastructure, especially in certain rural areas that do not benefit from the rapid development experienced in urban centers. China gets high marks in the affordability and skills categories, placing 40th and 53rd, respectively. Looking at actual ICT usage (58th), penetration rates remain quite low in absolute terms but should be considered in the light of the sheer size of the country and the large rural population. A mere 40 percent of individuals use the Internet on a regular basis. There are 12 fixed broadband Internet subscriptions for every 100 population; mobile broadband Internet is nearly as widespread, with 10 subscriptions per 100 population. By contrast, ICT usage among businesses is extensive (35th). China is becoming more and more innovative, and this in turn encourages further and quicker adoption of technologies. The government is placing great hopes in ICTs to boost productivity and, ultimately, growth. Its efforts in promoting and using ICTs are reflected in China's strong showing in the government usage pillar (38th).

With a performance essentially unchanged from the previous edition, **India** progresses one rank to 68th. India's performance remains very mixed. The most worrisome aspects are the mediocre quality of the political, regulatory, and business environment (85th), as well as its lack of digital infrastructure (111th). Extensive red tape stands in the way of businesses,

and corporate tax at 62 percent of profit is among the highest in the world. Other variables within the environment subindex are better assessed, including the availability of new technologies (47th), the availability of venture capital (26th), the intensity of local competition (34th), and the quality of management schools (33rd). A critical determinant of a country's readiness, India's literacy rate is among the lowest in the sample at 63 percent (121st). On the other hand, intense competition in the sector and innovations for the "bottom of the pyramid" have made India the leader in the affordability pillar, thus providing a significant boost to its readiness. Partly owing to the weaknesses noted above, adoption of ICTs remains dismally low in India, as reflected in its 121st rank in the individual usage pillar. Although mobile telephony is becoming ubiquitous, only one person in ten uses the Internet regularly. Accessing it at broadband speed remains the privilege of a very few, with a single fixed broadband Internet subscription for every 100 population. Mobile broadband access has already become more widespread, with two subscriptions per 100 population. By contrast, businesses are early and assiduous adopters of new technologies (40th). And the government is placing a lot of emphasis on ICTs as a way to address some of the country's most pressing issues, including job creation, corruption and red tape, and education. Whether this vision will translate into a transformation of the economy and society remains to be seen. But already ICTs are having an—albeit small—transformational impact on the economy, which is partly reflected in India's performance in the economic impacts pillar (43rd).

Thanks to a two-place improvement, **Sri Lanka** (69th) now trails its neighbor by just one rank, even though the country fails to improve its score. Sri Lanka and India are the only two countries in the **South Asia Association for Regional Cooperation (SAARC)** group to rank higher than the 100th mark. A huge gulf separates them from other SAARC members **Pakistan** (105th, down three), **Bangladesh** (114th, down one), and **Nepal** (126th).

Within ASEAN, **Thailand** (74th) leads a group of four members that do not leverage ICTs to their full potential. Trailing by more than 70 and 40 places behind Singapore and Malaysia, respectively, Thailand exhibits a number of weaknesses across the board. The highlights of its performance are the relative affordability of ICTs (45th), in particular mobile telephony, and the quality of its business and innovation environment (52nd). However, in this latter category as elsewhere, Thailand alternates good and poor assessments. Aside from mobile telephony, other technologies remain relatively scant, translating to a middling 88th rank in the individual usage pillar. Also the institutional environment does not seem to be particularly conducive (81st) and the government does not appear to be particularly ardent at pushing

the digital agenda nationwide (86th). In this dimension, the satisfactory ranks obtained in both the Government Online Service Index (64th) and E-Participation Index (46th) conceal relatively low marks (0.51 and 0.32, respectively, on a 0-to-1 scale).

ASEAN's most populous country, **Indonesia**, advances by four ranks and climbs to 76th place. The affordability pillar is where Indonesia ranks the highest (39th). Elsewhere, its most positive features are found in the usage subindex, where Indonesia improves by no less than 15 places to reach 70th position. In particular, the country ranks an impressive 40th for business usage. Companies are quick at absorbing the latest technologies and are becoming increasingly innovative. Mobile telephony is already ubiquitous, but other technologies exhibit spectacular growth rates, though from a very low base (92nd in individual usage pillar, up 11). For instance, mobile broadband technology increased more than tenfold between 2010 and 2011, reaching 22 subscriptions per 100 population (48th). Also, Indonesians are notoriously very assiduous users of virtual social networks (only 51st, but with an impressive score of 5.7 on a 1-to-7 scale). Finally, a 17-place jump in the government usage also contributes to the positive trend. Unfortunately, these positive results do not—yet—translate into similar progress in the various measures of ICT impact, earning Indonesia a low 86th rank in this subindex, unchanged from a year ago.

With a performance essentially unchanged from the previous year, **Vietnam** loses one rank to place 84th. As for most ASEAN countries, the affordability pillar constitutes the best aspect of Vietnam's performance (38th). For the rest, many shortcomings are present in all dimensions of the NRI. Perhaps the most worrisome aspect is the poor overall quality of the political, regulatory, and business environments. As a result, Vietnam ranks a disappointing 97th in the environment subindex. Such lack of conduciveness is not only detrimental to ICT development, but also seriously undermines the country's competitiveness in general.

Second to last within ASEAN, the **Philippines** remains in 86th position despite a significant improvement in its overall score. The country manages to boost its marks where it is the most desperately needed, namely the environment subindex. Up 11 spots year to year, the Philippines still ranks a dismal 100th in this dimension, the very last among ASEAN countries. In particular, the extent of red tape remains alarming despite some progress, and the Philippines is among the worst worldwide in several related indicators. On a much more positive note, the country ranks 68th in terms of ICT impacts (up 16). The role of ICTs in creating new products and services (43rd) and organization models (33rd) is not negligible and contributes to this encouraging result.

Twenty places behind the Philippines and closing the rankings among ASEAN countries, **Cambodia** (106th) improves its showing by two ranks. The country ranks beyond the 100th mark in six of the ten pillars of the NRI. Amid this mostly gloomy picture, the fact that it shows progress on approximately two-thirds of the indicators is encouraging.

LATIN AMERICA AND THE CARIBBEAN

Digitally connecting the hemisphere remains one of the key challenges for the region, as recognized during the Sixth Summit of the Americas, which took place in Colombia in April 2012.¹⁰ While several countries—including Panama, Mexico, Colombia, and El Salvador—have made remarkable improvements that are clearly reflected in important gains in the scores and rankings of the NRI, overall, Latin America and the Caribbean still suffers from a serious lag that prevents it from fully leveraging the potential of ICTs to boost regional productivity. The social and, most remarkably, economic impacts accruing from ICTs remain low in comparison to other regions, despite government-led efforts to develop and upgrade ICT infrastructure and despite governments' increasing use of Internet to communicate and interact with individuals and the business community. Weaknesses in the political and regulatory environment, the existence of large segments of the population with a low skill base, and poor development of the innovation system are all factors hindering the potential that ICT developments could have on the regional economy.

Chile, in 34th place and up this year by five positions, remains once again the country within Latin America that is making the strongest efforts to leverage ICTs to boost its competitiveness and increase civil participation. In the past year, the country has continued its attempts to strengthen ICT infrastructure and increase connectivity and the use of the Internet (50th)—although still far from the values of more advanced economies, this depicts one of the highest scores for this set of indicators in the region. In addition, the government has continued to increase its offerings of online services (24th) and supports the online active participation of its citizens (19th) in the decision-making process. That, coupled with its entrepreneurial-friendly and efficient legal framework, result in relatively high values in terms of economic (35th) and especially social (27th) impacts accruing from ICTs. Notwithstanding this favorable outlook, the economic impacts of ICTs in terms of boosting technological and non-technological innovation are not yet fully leveraged because of some important and recurring weaknesses in the quality of the educational system (91st) and a relatively low capacity to innovate (83rd). Boosting innovation and improving the quality of education for all segments of the population should be the two key areas to strengthen going forward

to keep supporting Chile's transition toward higher-value-added economic activities.

With its slight drop of four positions, **Barbados** remains one of the best performers in the region thanks mainly to its outstanding educational system (7th) and very high connectivity, both in terms of ICT infrastructure and digital content (38th) and in its level of Internet users (30th), despite the still-high cost of accessing ICTs (111th). In addition, the country boasts a relatively efficient environment for ICT development and uptake (36th) that widely supports the high levels of individuals (26th) and businesses (43rd) using ICTs in their transactions. However, the government seems to lag behind in fully leveraging the potential of ICTs. Despite recognition of its vision for developing ICTs (36th), the offerings of online services for citizens and businesses (95th), as well as the opportunities for citizen participation (111th), remain limited. Addressing these weaknesses and strengthening the overall innovation capacity of indigenous firms (91st) would allow Barbados to benefit more from ICTs.

Panama continues its steady ascent in the rankings, rising 11 positions to 46th place. The country's strategy to fully develop ICTs as one of the key factors driving its productivity and supporting crucial sectors of its economy, such as logistics and banking, seems to be paying off. Further efforts to address long-lasting structural weaknesses in terms of the quality of education (112th) and innovation (94th) will be crucial going forward; these weaknesses are also taking a toll on the potential economic impacts (73rd) accruing from ICTs. Overall, the clear, firm vision of the government (20th) to continue its efforts to develop its national ICT infrastructure are reflected in the doubling of international Internet bandwidth capacity (36th) and in the number of households with a computer and Internet connection (77th). While still low in comparison with international standards, these improvements have led to a higher ICT uptake by all agents in the society.

Despite a decline in the rankings, **Uruguay**, in 52nd place, remains one of the Latin American countries that is leveraging ICTs better to obtain meaningful economic and social impacts. Overall, the country continues to develop its ICT infrastructure, expanding its international Internet bandwidth capacity (44th). It now enjoys full mobile network coverage for its entire population (1st), although this remains relatively costly (80th), especially in terms of mobile cellular tariffs (94th). Overall, the efforts to expand ICT uptake in the population continue to improve and, for the first time, more than half of the population is using the Internet (53rd) and benefiting from one of the highest school Internet access rates in the world (15th). Notwithstanding these important strengths, the economic impacts of ICTs, especially in supporting Uruguay's transition to a more knowledge-based economy (67th), face two primary limitations. First, the local innovation system is insufficiently developed,

thus not allowing local businesses to rely on a high capacity to innovate (74th). Second, the quality of the educational system (107th), while one of the best in the region, does not seem to provide the skills that are increasingly demanded by local firms. As a result and going forward, continuing the good progress in increasing ICT uptake should be accompanied by further efforts to strengthen the local innovation system in order to obtain greater economic impacts that can boost national competitiveness.

Costa Rica, together with Panama, remains the leader in ICT uptake in Central America and climbs five positions in the rankings to 53rd place. Overall, the country has continued its efforts to develop its very affordable (6th) ICT infrastructure, especially in terms of improving its international Internet bandwidth capacity (40th) that, coupled with a well-performing educational system (21st), allows for an overall strong ICT readiness (33rd). However, ICT uptake, especially among individuals (71st), remains relatively low. Moreover, concerns in the political and regulatory framework (74th)—notably in terms of the time needed to enforce contracts (122nd) and in the business and innovation environment (94th), with excessive red tape (132nd) needed to start a business—also affect the national capacity to leverage ICTs even further to boost national competitiveness.

Rising five positions since last year thanks to improvements in ICT infrastructure (62nd) and ICT uptake (44th), **Brazil** is now in 60th place. In the past year, the country has more than doubled its international Internet bandwidth capacity per user (47th) and expanded its mobile network coverage to its entire population. As a result, ICT uptake by individuals has sharply increased (58th) in virtually all dimensions analyzed in the NRI. Notwithstanding this progress, expanded coverage's translation into greater economic impacts in terms of innovation and higher competitiveness has somewhat stagnated (50th). This is mainly the result of important weaknesses in the business and innovation environment (126th), which still suffers from excessive red tape and burdensome procedures, and the quality of the educational system (116th), which does not seem to provide the necessary skills for a rapidly changing economy in need of a wider talent pool.

Mexico experiences a sharp rise of 13 positions to attain 63rd place in the rankings, driven mainly by government efforts to deeply develop its offerings of online services (28th), increase its citizens' participation to support their government (25th), and an overall improvement in the business and innovation environment. Despite these important steps forward, the country has made less progress in further developing its ICT infrastructure (82nd) and significantly reducing its access costs (63rd), notably in terms of mobile telephony (102nd). As a result, ICT uptake in terms of

Internet users (78th) or households with Internet access has not progressed. This, coupled with a skills shortage (87th) because of the low quality of the educational system (100th), has resulted in little progress in terms of economic impacts accruing from ICTs (72nd). Adopting and implementing a holistic digital agenda that could boost the development and uptake of ICTs and their inclusion in a more robust innovation system could help address some of these important weaknesses and provide better results.

Colombia ranks in 66th place, seven notches up since last year, thanks to efforts to drive prices of fixed broadband Internet tariffs (75th) down that have resulted in an increase in the number of Internet users (70th); and thanks also to the continued effort, led by the government, to increase the number of available online services (16th) and the support for raising citizens' online participation (11th). Despite these remarkable improvements, the country still suffers from an underdeveloped ICT infrastructure and digital content (96th), along with a political and regulatory framework (92nd) and a business and innovation environment (95th) that hampers the country's capacity to fully leverage ICTs for competitiveness. The result is limited economic impacts (70th).

A lack of progress in upgrading a rather costly access (114th) to national ICT infrastructure has caused **Argentina** to fall seven positions to 99th place. The country boasts fairly good results in terms of international Internet bandwidth capacity (52nd) and high levels of educational enrollment, notably at the tertiary level (21st). However, the poor business climate for entrepreneurship and innovation (110th) and weaknesses in the political and regulatory environment are hindering the country's potential to obtain greater economic impacts (91st) and move the national economy toward more knowledge-intensive activities (82nd).

Despite going up three places in the rankings to 103rd place, **Peru** continues to lag significantly in terms of leveraging ICTs to modernize its national economy. Even with a government push to increase the number of online services and a reduction in the cost of accessing broadband Internet (107th), insufficient progress in developing the national ICT infrastructure (86th) has resulted in the relative stagnation of ICT uptake, notably in terms of the number of Internet users (77th) and households with computers (82nd) or an Internet connection (83rd). Moreover, notwithstanding its relatively pro-business environment (57th), weaknesses in the political and regulatory environment (121st), the poor quality of its educational system (132nd), and its low capacity to innovate (103rd) are factors that are hampering the country's ability to obtain greater economic impacts and allow the national economy to transition toward higher-value-added activities.

Finally, **Paraguay** (104th), **Venezuela** (108th), **Bolivia** (119th), and **Haiti** (141st) close the regional rankings. These four countries fall behind others in the region because of important ICT connectivity weaknesses and an innovation-adverse environment that prevents high economic impacts that would result from innovation and the economic transformation of these countries toward knowledge-intensive activities.

SUB-SAHARAN AFRICA

Sub-Saharan Africa has continued to make significant efforts to build its ICT infrastructure, as reflected by important improvements in developing its broadband infrastructure and the expansion of its mobile network coverage. As a result, ICT usage, while still very low, has picked up slightly, as seen especially by an increase in the number of Internet users and the continued commitment of some governments in the region to expand the number of available online services. Despite this positive trend, the stubbornly high sharp digital divide from more advanced economies, notably in terms of ICT-driven economic and social impacts, persists. A still-costly access to ICT infrastructure and relatively low levels of skills with low educational attainments and unfavorable business conditions for entrepreneurship and innovation are hindering the region's capacity to fully leverage the potential of the increasingly available ICT infrastructure. As a result, only two countries—Mauritius (55th) and South Africa (70th)—are positioned in the top half of the rankings, while nine out of the bottom ten belong to the region.

Mauritius, in 55th place, two down from last year, continues to lead by far the regional classification thanks to a fairly strong political and regulatory framework (36th) and the government's strong vision (48th) to build and deploy ICTs as one of the three key strategic priority sectors for the development of the national economy. Overall, the country has continued to build its ICT structure, ensuring that it becomes affordable in order to support a stronger uptake from all agents in the country. As a result, broadband Internet subscriptions (60th) and Internet users (81st) have slightly increased, although the results also show that the use of ICTs for transactions between businesses (48th) is more extended than it is for individuals (92nd). The impacts of ICTs remain modest (80th), despite the presence of a business-friendly environment (46th), mainly because an insufficiently developed innovation capacity (112th) hampers the country's capacity to fully leverage ICTs to boost innovation and competitiveness.

Going up two positions, **South Africa** is in 70th place. Despite a sharp improvement in the development of its ICT infrastructure (59th)—notably in terms of international Internet bandwidth capacity (66th)—and a strong uptake by the business community (33rd), the ICT impacts (92nd), particularly the social ones

Box 2: Charting the increasing returns to ICTs and skills investments

In the past decade, as ICTs have become ubiquitous, policies aimed at assessing and monitoring ICTs have shifted their focus from determining the level of connectivity of a country to determining the benefits that this connectivity can yield in terms of the positive impacts to boost competitiveness and well-being. Understanding, identifying, and measuring all the potential impacts of ICTs are not easy tasks, notably but not only because of a lack of data. The NRI has made an important first step toward getting a better handle on the benefits accruing from ICTs so that countries can improve national innovation, enable the shift of national economic structures toward higher-value-added activities, improve government efficiency, and expand citizens' access to basic services and a broader civil participation.

Moreover, this policy shift toward assessing the impacts of ICTs has gained importance in the current economic context, where many developed economies face serious financial and economic difficulties and where governments and firms are forced to control their budgets more tightly. For these reasons, governments and businesses face the stark need to quantify the returns to different investment options. Similarly, developing economies must choose between different investment opportunities in order to render their economic growth more stable and sustained over time.

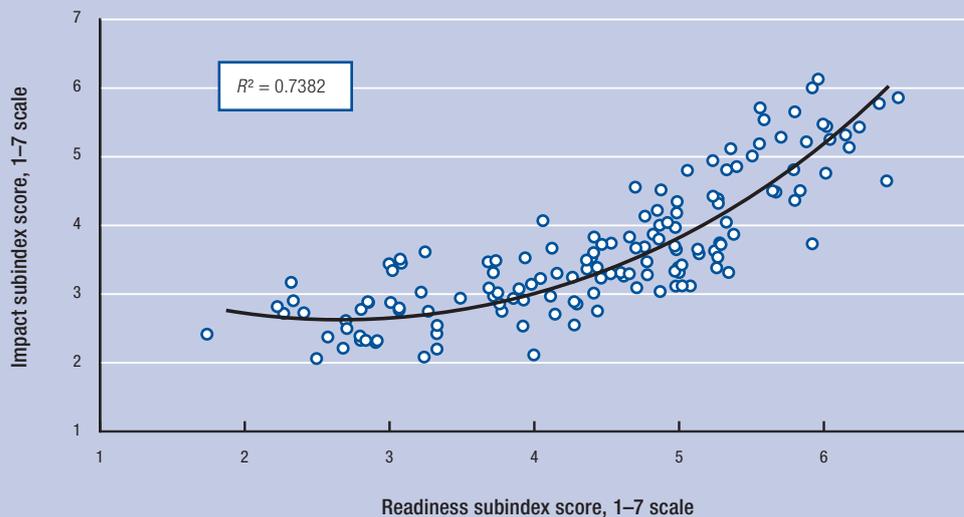
Running an econometric model to test the causality or provide an accurate estimate of the returns on any public investment is statistically challenging because of the difficulty in accounting for the totality of the potential results and isolating the individual contribution of the many interrelated

factors that influence the results. Against this backdrop, a correlation analysis could shed some preliminary light on the relationship that may exist between a particular set of investments and the expected returns on it. Figure A presents the relationship between the scores in the impacts subindex and the readiness subindex showings of the NRI.

As can be seen, the relationship between the scores of the two subindexes, while positive, does not seem to be fully linear but rather denotes an exponential relationship, suggesting that the higher the ICT readiness of a country is, the proportionally higher the economic and social impacts are. In other words, the correlation analysis suggests not only that a cumulative effect of readiness on ICTs and skills investments exists, but also that a minimum threshold in complementary investments—such as direct investments in ICT infrastructure and skills—may also exist for a country to start attaining meaningful and raising economic and social impacts.

These findings bear some important policy consequences both for developing and developed economies. For the former, a minimum set of investments in building an ICT infrastructure and developing the necessary skill base for its optimal exploitation is needed in order to obtain results. This may take several years of continued investment. For the latter, it seems that investments in ICTs and skills development have the potential to yield increasing returns by boosting innovation for productivity gains and enhancing societal well-being.

Figure A: Correlation analysis between the NRI 2013 impact subindex and the readiness subindex



Source: Authors' calculations.

(112th), remain limited. The perception of a lack of clear government vision (105th) to orchestrate and implement a holistic ICT strategy for the country, coupled with deficiencies in the educational system for some segments of the population (102nd), play negatively in this process and outweigh a rather positive political and regulatory framework for ICT development (21st) and pro-business environment (55th).

Already in the second half of the rankings and falling six positions this year, **Rwanda** is in 88th place. This drop is the result of a certain stagnation in ICT infrastructure development (105th) and uptake in society (139th), despite the strong government vision of developing the ICT industry as a priority (10th) and its efforts to increase the number of available online services, which nevertheless remain low (103rd). Overall, ICT impacts remain limited (61st) because of poor ICT infrastructure (105th) that is costly to access (116th) and impedes ICT uptake in society. Moreover, a weak skill base (113th), together with large segments of the population who remain illiterate (115th) and a low tertiary education enrollment rate (123rd), also affect Rwanda's capacity to fully leverage ICTs to boost innovation and competitiveness, despite the presence of a fairly sophisticated, stable, and strong political and regulatory environment for the development of ICTs (13th).

In East Africa, **Kenya** at 92nd place climbs one position this year. Overall, despite the government's strong vision for developing ICTs (28th), the country's overall readiness (110th) remains low because of insufficient development of an infrastructure (110th) that is costly to access (105th), combined with a weak skill base (93rd) that suffers from low secondary enrollment rates (109th) and high level of illiteracy (97th). In addition to addressing these weaknesses to increase its digital connectivity, the country needs to improve its business and innovation environment (106th) in order to fully leverage ICTs and boost their positive impacts (71st) in the economy and society. Also in East Africa, **Uganda**, **Zambia**, and **Tanzania**—in 110th, 115th, and 127th place, respectively—suffer from strong connectivity gaps and environments that lack the conditions to allow for a full leverage of the benefits of ICTs.

Ghana goes up two positions to 95th place, though the country still must overcome serious handicaps to fully leverage ICTs. Its insufficient ICT infrastructure and digital content development (121st), coupled with a weak skill base (106th), result in a poor digital usage across all agents (102nd) and, inevitably, in low economic and social impacts (100th).

Finally, several countries in **West and South Africa**, despite a wider proliferation of mobile technologies than in past years, are positioned at the bottom of the rankings—the consequence of insufficient development of ICT infrastructure that hinders their ICT uptake and results in a poor digital connectivity. Moreover,

unfavorable framework conditions for innovation and entrepreneurship result in a poor performance in terms of leveraging ICTs to boost innovation and raise national productivity.

MIDDLE EAST AND NORTH AFRICA

This region boasts one of the most diverse performances in the world. On the one hand, Israel and several Gulf Cooperation Council states have sharply improved their overall performances and have continued their investments to make ICTs one of the key national industries that attempt to diversify and transform their economies. On the other hand, several North African and Levantine nations have either fallen—or stagnated, in the best cases—in their efforts to leverage ICTs as part of their economic and social transformation toward more knowledge-intensive activities and open societies.

Israel, in 15th position, consolidates its regional leadership and climbs five places since last year. Important gains derived from improving its ICT infrastructure by increasing its international Internet bandwidth (39th), coupled with government efforts to expand the number of online services (15th) and online information and participatory tools to raise the citizens' overall participation (7th), have led to this positive performance. The country continues to boast one of the highest rates of ICT patents (4th), which reflects the importance of the sector in the national economy, and an environment that is highly conducive to innovation and entrepreneurship (15th), despite the lengthy time it still takes to open a business (90th) and to enforce contracts (124th). In order to continue leveraging the full potential of ICTs efficiently, and notwithstanding its high secondary (26th) and tertiary (32th) education enrollments, the country should aim at improving further the quality of the educational system (53rd)—notably in the fields of mathematics and science (89th)—despite certain poles of excellence.

Leading the Arab world, **Qatar** (23rd) rises five places in the rankings thanks to the government's sharp effort to expand its offerings of online services (27th) and increase the online participation of citizens (22nd). Moreover, mobile broadband subscriptions have exploded, leaping from 9.6 percent last year (43rd) to 70.3 percent this year (11th). While fixed broadband affordability remains a pending issue (108th)—which may affect the level of broadband Internet subscriptions (62nd)—the overall level of penetration and use of ICTs (16th) is high. That, coupled with the government's strong vision and its commitment to rapidly develop ICTs (2nd) as a means to diversify its economy, along with its efforts to create a business-friendly environment (12th) to spur entrepreneurship, have resulted in this strong overall assessment. Going forward, in order to translate the existing good ICT uptake into stronger economic impacts (33rd), the country should continue investing

in increasing the level of university enrollment (108th) so it can benefit from a higher local talent pool and strengthen its overall innovation system.

The **United Arab Emirates** goes up five places to 25th position. As part of the country's long-term strategy to diversify its economy, the government has continued to drive the development of the ICT industry decisively and to expand the use of ICTs to all segments of the economy and society (1st). Available government online services (9th), as well as the online participation of citizens (11th) and the important rise in mobile broadband subscriptions (49th), have driven this rise in the rankings. Overall—despite the high fixed broadband Internet tariffs (99th), which may be affecting the number of broadband Internet subscriptions (52nd)—the country's investments in increasing its ICT infrastructure, especially in terms of international Internet bandwidth (49th) and skills upgrading (25th), have provided the right conditions for a higher ICT uptake in the past year (23rd). Although the country continues to boast a very favorable business environment (17th) despite its excessive and cumbersome, complex process for enforcing contracts (137th), increasing the economic impacts of ICTs (28th) in terms of more innovation and higher-value-added activities will require higher levels of tertiary education (84th) and a consolidation of efforts to strengthen the national innovation system.

With a fairly stable profile, dropping two positions to 29th place, **Bahrain** continues to depict a robust performance. That assessment has been slightly affected by the perception of a certain stagnation in terms of the skills development that is crucial to enable the transition of the local economy toward higher-value-added activities. Overall, the strong government leadership for the extensive use and development of ICTs in the country (4th) has allowed a fairly well developed ICT infrastructure (39th), especially in terms of mobile network coverage (1st) and despite a low international Internet bandwidth capacity (73rd). Although the country counts on a fairly sophisticated business environment (14th), boosting the economic impacts derived from ICTs (52nd) will require continued support to strengthen the overall innovation system, especially at the business level, which retains a very low capacity (117th).

Saudi Arabia, in 31st place, goes up three notches in the rankings this year. This rise is driven mainly by a fall in the cost of using ICTs (65th), a strong government effort to expand the amount and quality of available online services (19th), and the creation of an environment in which citizens can increase their participation to support government (22nd). The government's clear vision of the potential of ICTs to modernize and diversify the local economy (7th) has resulted in a fairly well developed ICT infrastructure (36th) that, together with a business-friendly environment (25th) and despite the still-cumbersome process for starting a business

(102nd), provides the right ingredients for properly leveraging ICT and obtaining significant positive economic (42nd) and social (18th) impacts. Moving forward, skills development—by improving the quality of the educational system, especially for math and science (37th), and by boosting educational enrollment, especially at tertiary level (70th)—should become a priority. This would expand the local pool of talent and contribute to the transition toward a less resource-dependent and more knowledge-intensive economy (59th).

With a score identical to last year, **Jordan** remains stable in 47th place, leading the group of Levantine states where **Lebanon** ranks in 94th place, one position up from last year. ICT infrastructure (81st), notably international bandwidth capacity (97th), remains a challenge for Jordan, and despite the efforts to liberalize the market and render access to the existing infrastructure affordable (27th), ICT uptake by individuals (66th) remains low, especially in terms of broadband subscriptions (87th).

Stable at 62nd place, **Kuwait** continues to lag behind in the region in terms of leveraging ICTs, with low levels of both social (85th) and, especially, economic impacts (125th). Despite a very sharp rise ICT uptake in terms of Internet users (26th) and households with computers (38th), as well as Internet access (44th), the country still suffers from a shortage of skills (71st). This shortage, coupled with a low capacity to innovate (113th) and an environment that is less business friendly (71st) than those of other Gulf Cooperation Council states, result in the low economic impacts.

In North Africa, **Egypt** boasts the strongest performance in this year's rankings in 80th place, one notch down from last year. ICT infrastructure (98th) remains underdeveloped, especially in terms of expanding international Internet bandwidth capacity (114th). In spite of strong efforts to render its access affordable (8th), the penetration of ICTs in society is modest (69th) although improving, especially in terms of Internet users (73rd). Strengthening the technological capacity of local firms (86th), upgrading available skills (115th), and creating a more business friendly environment (98th) could result in greater economic impacts (67th) and contribute to stimulating the growth and job opportunities the country needs.

Morocco, at 89th position, moves two notches up in the rankings. At present, the country does not seem to be able to fully leverage ICTs to boost the desired economic (122nd) and social impacts (105th). A low skill base (114th)—the result of a poor educational system (105th), low adult literacy (130th), and low secondary (113th) and tertiary education (103rd) enrollment rates—and a weak innovation capacity (115th) are at the very basis of this inability. In addition, poor infrastructure development (95th), despite being affordable (30th), results in fairly low levels of ICT uptake by individuals

(67th). Moving forward, addressing these weaknesses will enable the country to benefit more fully from the potential positive impacts that ICT could bring, which would enable it to further modernize its national economy and improve its innovation and competitiveness capacity.

Falling 13 places, **Algeria** in 131st position continues to display weak leverage of ICT, with one of the lowest economic (143rd) and social (141st) impacts in the sample. A poor ICT infrastructure (119th) coupled with a weak skill base (101th) result in very low levels of ICT usage by all agents (140th), most markedly by businesses (144th). In addition, severe weaknesses in its political and regulatory framework (141st) and the absence of a business- and innovation-friendly environment (143rd) act as strong filters that hinder the capacity of any positive impacts to accrue.

CONCLUSIONS

The world has changed a lot in the 12 years since the first edition of the GITR. The Internet bubble is now a thing of the past, and many developing and emerging economies have become global technological and economic players achieving higher growth than more advanced economies, which continue to struggle to emerge from one of the worst economic crises since the 1930s. At the same time, the world has become increasingly hyperconnected, where the immediateness and a sense of constant accessibility are changing economic and social relations as well as opening a wide range of new opportunities for new products, services, and business models. Unsurprisingly, both developed and developing economies have turned to ICTs as a toolbox that can potentially boost competitiveness, growth, and employment in this rapidly changing and uncertain context. However, the relationships among these objectives are complex and the interplay and co-evolution of the many different factors render it sometimes difficult for stakeholders to understand, measure, and track progress and make decisions.

For more than a decade, the NRI has aimed at shedding light on these relationships with the adoption of a comprehensive framework that analyses the determinants that drive the capacity of societies to benefit from ICTs and transform themselves.

Against this backdrop, the analysis of the ICT landscape—thanks to the NRI results—reveals that in the past year, little progress has been made in bridging the new digital divide in terms of benefiting from higher economic and social impacts accruing from ICTs. Emerging and developing economies still trail significantly behind more advanced nations. However, the situation is not homogenous across all regions, with some countries in the Community of Independent States, the Gulf Cooperation Council, and ASEAN recording impressive progress, especially in terms of strengthening their ICT

infrastructure and higher rates of ICT uptake. In other regions, such as Latin America and Africa, progress in improving digital connectivity has been slower. In the large emerging BRICS economies, progress has also been relatively slow, with China dropping in the rankings and with India, the Russian Federation, and Brazil recording only small gains.

Furthermore, large intra-regional differences exist. In Latin America, for example, Panama has rapidly developed its ICT infrastructure and improved its ICT uptake rates. This trend has accentuated the stark intra-regional disparities that appear in virtually all regions and across developed and developing countries. Asia, for example, is home to some of the world's most successful economies in the digital landscape, while others continue to suffer from profound structural weaknesses and an underdeveloped ICT infrastructure. In Europe, the gap between the most advanced Nordic economies that lead the global rankings and those countries in Southern and Central and Eastern Europe is remarkable—and alarming—despite the many efforts to create an internal digital market and improve the digital connectivity of converging countries. This finding highlights the need to adopt harmonious and comprehensive strategies that do not focus only on improving access to ICTs. While important, access is only one ingredient in the recipe for success. Improving the ecosystem for spurring entrepreneurship and strengthening the conditions that enhance innovation are also crucial to boost competitiveness and well-being, to enhance economic growth, and to create jobs.

Finally, the nonlinear relationship between the digital readiness of a country and its economic and social impacts suggests the existence of increasing returns to ICTs, skills, and innovation investments. In other words, the more that countries invest in ICTs, skill development, and innovation, the proportionally higher returns they achieve. Conversely, the relationship also seems to point to a certain readiness threshold that may hinder the ability of certain countries to achieve any meaningful results if they do not invest sufficiently in these dimensions.

With the GITR series and the NRI, the World Economic Forum provides a comprehensive analytical framework for assessing not only the progress made in raising ICT connectivity in different countries, but also—and more importantly—in obtaining the desired economic and social impacts that higher connectivity can yield in generating growth and high-quality employment in a rapidly changing context. Designed and produced as a framework for multi-stakeholder dialogue, it also serves to identify and define policies and measures that can catalyze change toward better leveraging ICTs and achieve its full potential.

NOTES

- 1 Jipp 1963.
- 2 Katz 2012, p. 2.
- 3 Katz 2012, p. 3.
- 4 For detailed information of the Forum's Executive Opinion Survey, including the instrument, coverage administration, data edition, and score computation, refer to the dedicated chapter in *The Global Competitiveness Report 2012–2013*, available at www.weforum.org/gcr.
- 5 The assessment of Taiwan's networked readiness is based on partial data because a number of international organizations provide only limited data.
- 6 See World Economic Forum 2012.
- 7 See the European Commission's Digital Agenda, available at <http://ec.europa.eu/digital-agenda/>.
- 8 The assessment of Hong Kong's networked readiness is based on partial data because of its limited coverage by a number of international organizations.
- 9 *BRICS economies* is a term used to refer to a group of five large emerging economies: Brazil, the Russian Federation, India, China, and South Africa.
- 10 See http://www.summit-americas.org/default_en.htm.

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Appendix A: Structure and computation of the Networked Readiness Index 2013

This appendix presents the structure of the Networked Readiness Index 2013 (NRI). As explained in the chapter, the NRI framework separates environmental factors from ICT readiness, usage, and impact. That distinction is reflected in the NRI structure, which comprises four subindexes. Each subindex is in turn divided into a number of pillars, for a total of 10. The 54 individual indicators used in the computation of the NRI are distributed among the 10 pillars.

In the list below, the number preceding the period indicates the pillar to which the variable belongs (e.g., indicator 2.05 belongs to the 2nd pillar; indicator 8.03 belongs to the 8th pillar). The numbering of the indicators matches the numbering of the data tables at the end of the *Report*.

The computation of the NRI is based on successive aggregations of scores, from the indicator level (i.e., the most disaggregated level) to the overall NRI score (i.e., the highest level). Unless noted otherwise, we use an arithmetic mean to aggregate individual indicators within each pillar and also for higher aggregation levels (i.e., pillars and subindexes).^a

Throughout the *Report*, scores in the various dimensions of the NRI pillars are reported with a precision of two decimal points. However, exact figures are always used at every step of the computation of the NRI.

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 into 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, scores.^b

NETWORKED READINESS INDEX 2013

Networked Readiness
Index = 1/4 Environment subindex
+ 1/4 Readiness subindex
+ 1/4 Usage subindex
+ 1/4 Impact subindex

ENVIRONMENT SUBINDEX

Environment subindex = 1/2 Political and regulatory environment
+ 1/2 Business and innovation environment

1st pillar: Political and regulatory environment

- 1.01 Effectiveness of law-making bodies*
- 1.02 Laws relating to ICTs*
- 1.03 Judicial independence*
- 1.04 Efficiency of legal system in settling disputes**
- 1.05 Efficiency of legal system in challenging regulations**c
- 1.06 Intellectual property protection*
- 1.07 Software piracy rate, % software installed
- 1.08 Number of procedures to enforce a contract^d
- 1.09 Number of days to enforce a contract^d

2nd pillar: Business and innovation environment

- 2.01 Availability of latest technologies*
- 2.02 Venture capital availability*
- 2.03 Total tax rate, % profits
- 2.04 Number of days to start a business^e
- 2.05 Number of procedures to start a business^e
- 2.06 Intensity of local competition*
- 2.07 Tertiary education gross enrollment rate, %
- 2.08 Quality of management schools*
- 2.09 Government procurement of advanced technology products*

READINESS SUBINDEX

Readiness subindex = 1/3 Infrastructure and digital content
+ 1/3 Affordability
+ 1/3 Skills

3rd pillar: Infrastructure and digital content

- 3.01 Electricity production, kWh/capita
- 3.02 Mobile network coverage, % population
- 3.03 International Internet bandwidth, kb/s per user
- 3.04 Secure Internet servers per million population
- 3.05 Accessibility of digital content*

4th pillar: Affordability^f

- 4.01 Mobile cellular tariffs, PPP \$/min.
- 4.02 Fixed broadband Internet tariffs, PPP \$/month
- 4.03 Internet and telephony sectors competition index, 0–2 (best)

5th pillar: Skills

- 5.01 Quality of educational system*
- 5.02 Quality of math and science education*
- 5.03 Secondary education gross enrollment rate, %
- 5.04 Adult literacy rate, %

USAGE SUBINDEX

Usage subindex = 1/3 Individual usage
+ 1/3 Business usage
+ 1/3 Government usage

6th pillar: Individual usage

- 6.01 Mobile phone subscriptions per 100 population
- 6.02 Percentage of individuals using the Internet
- 6.03 Percentage of households with computer
- 6.04 Households with Internet access, %
- 6.05 Fixed broadband Internet subscriptions per 100 population
- 6.06 Mobile broadband Internet subscriptions per 100 population
- 6.07 Use of virtual social networks*

7th pillar: Business usage

- 7.01 Firm-level technology absorption*
- 7.02 Capacity for innovation*
- 7.03 PCT patent applications per million population
- 7.04 Business-to-business Internet use*^g
- 7.05 Business-to-consumer Internet use*^g
- 7.06 Extent of staff training*

8th pillar: Government usage

- 8.01 Importance of ICTs to government vision of the future*
- 8.02 Government Online Service Index, 0–1 (best)
- 8.03 Government success in ICT promotion*

IMPACT SUBINDEX

Impact subindex = 1/2 Economic impacts
+ 1/2 Social impacts

9th pillar: Economic impacts

- 9.01 Impact of ICTs on new services and products*
- 9.02 PCT ICT patent applications per million population
- 9.03 Impact of ICTs on new organizational models*
- 9.04 Employment in knowledge-intensive activities, % workforce

10th pillar: Social impacts

- 10.01 Impact of ICTs on access to basic services*
- 10.02 Internet access in schools*
- 10.03 ICT use and government efficiency*
- 10.04 E-Participation Index, 0–1 (best)

NOTES

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

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

When two individual indicators are averaged (e.g., indicators 1.04 and 1.05 in the 1st pillar), each receives half the weight of a normal indicator.

- b Formally, we have:

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

The *sample minimum* and *sample maximum* are, respectively, the lowest and highest country scores in the sample of economies covered by the GCI. In some instances, adjustments were made to account for extreme outliers. For those indicators for which a higher value indicates a worse outcome (i.e., indicators 1.07, 1.08, 1.09, 2.03, 2.04, 2.05, 4.01, and 4.02), the transformation formula takes the following form, thus ensuring that 1 and 7 still corresponds to the worst and best possible outcomes, respectively:

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

- c For indicators 1.04 and 1.05, the average of the respective scores is used in the computation of the NRI.
- d For indicators 1.08 and 1.09, the average of the respective normalized scores is used in the computation of the NRI.
- e For indicators 2.04 and 2.05, the average of the respective normalized scores is used in the computation of the NRI.

- f The affordability pillar is computed as follows: the average of the normalized scores of indicators 4.01 mobile cellular tariffs and 4.02 Fixed broadband Internet tariffs is multiplied by a *competition factor*, the value of which is derived from indicator 4.03 Internet and telephony sectors competition index. It corresponds to the score achieved by an economy on this indicator normalized on a scale from 0.75 (worst) to 1.00 (best), using the min-max transformation described above. A normalized score of 0.75 is assigned to an economy with a competition index score of 0, which means that a monopolistic situation prevails in the 19 categories of ICT services considered. A normalized score of 1.00 is assigned to an economy where all 19 categories are fully liberalized. Where data are missing for indicator 4.03 (i.e., Puerto Rico and Timor-Leste), the score on the affordability pillar, which is simply the average of the normalized scores of indicators 4.01 and 4.02, is used. For example, Tanzania obtains a score of 1.00 on the competition index. This translates into a competition factor of 0.875, which multiplies 2.944, corresponding to the average of Tanzania's normalized scores on the two tariff measures. Tanzania's score on the affordability pillar therefore is 2.576 (130th). The competition index score for Taiwan, China, was derived from national sources.
- g For indicators 7.04 and 7.05, the average of the respective scores is used in the computation of the NRI. For Albania, Ecuador, Georgia, Rwanda, and Sri Lanka, these two indicators are replaced by an indicator derived from the 2010 and 2011 editions of the Executive Opinion Survey. The associated question was: "To what extent do companies in your country use the Internet for their business activities? (e.g., buying and selling goods, interacting with customers and suppliers) [1 = not at all; 7 = extensively]." Results for these countries are presented in *The Global Information Technology Report 2012* (p.371) available at www.weforum.org/gitr.