

The Networked Readiness Index 2014: Benchmarking ICT Uptake in a World of Big Data

BEÑAT BILBAO-OSORIO, World Economic Forum

ROBERTO CROTTI, World Economic Forum

SOUMITRA DUTTA, Cornell University

BRUNO LANVIN, INSEAD

When *The Global Information Technology Report* (GITR) and the Networked Readiness Index (NRI) were created more than 13 years ago, the attention of decision makers was focused on how to develop strategies that would allow them to benefit from what *Time Magazine* had described as “the new economy”: a new way of organizing and managing economic activity based on the new opportunities that the Internet provided for businesses.¹ At present, the world is slowly emerging from one of the worst financial and economic crises in decades, and policymakers, business leaders, and civil society are looking into new opportunities that can consolidate growth, generate new employment, and create business opportunities. Information and communication technologies (ICTs) continue to rank high on the list as one of the key sources of new opportunities to foster innovation and boost economic and social prosperity, for both advanced and emerging economies.

For more than 13 years, the NRI has provided decision makers with a useful conceptual framework to evaluate the impact of ICTs at a global level and to benchmark the ICT readiness and usage of their economies.

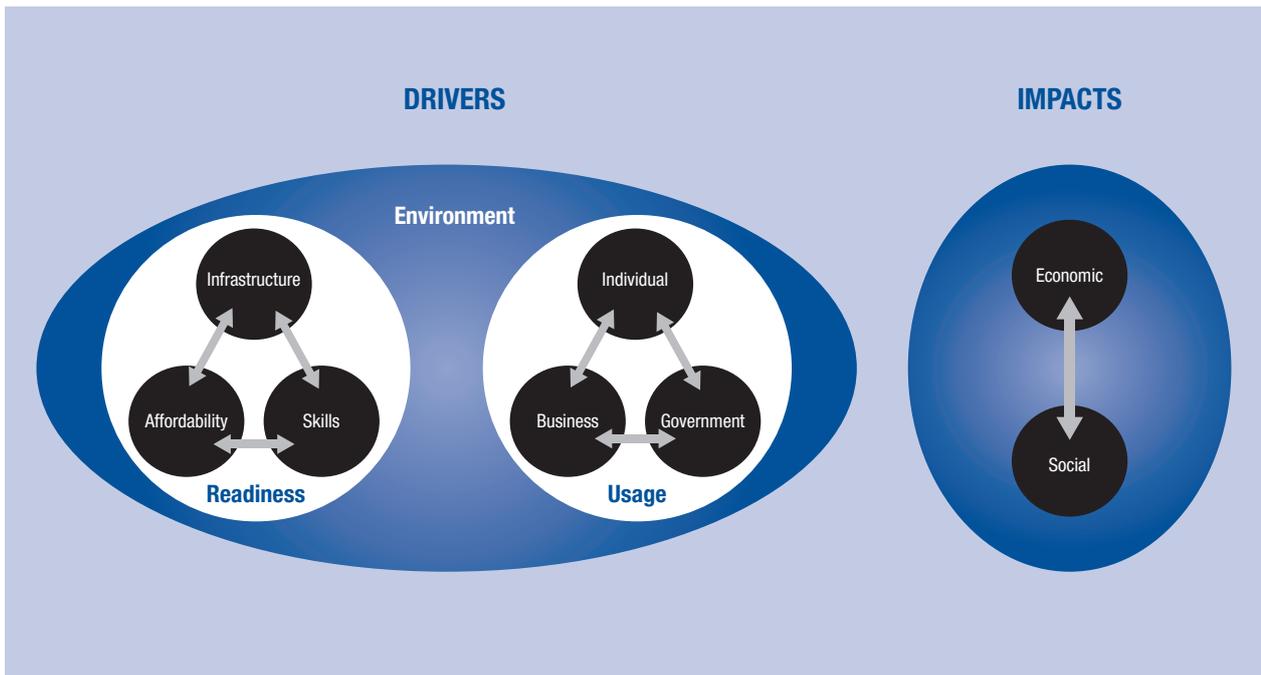
EXTRACTING VALUE FROM BIG DATA

Data have always had strategic value, but with the magnitude of data available today—and our capability to process them—they have become a new form of asset class. In a very real sense, data are now the equivalent of oil or gold. And today we are seeing a data boom rivaling the Texas oil boom of the 20th century and the San Francisco gold rush of the 1800s. It has spawned an entire support industry and has attracted a great deal of business press in recent years.

As explained in more detail in Chapter 1.3, this new asset class of big data is commonly described by what we call the “three Vs.” Big data is high volume, high velocity, and includes a high variety of sources of information. Next to those three Vs we could add a fourth: value. This is what everyone is looking for, and this is why big data today gets so much attention. In the quest for value, the challenge facing us is how to reduce the complexity and unwieldiness of big data so that it becomes truly valuable.

Big data can take the form of structured data such as financial transactions or unstructured data such as photographs or blog posts. It can be crowd-sourced or obtained from proprietary data sources. Big data has been fueled by both technological advances (such as the spread of radio-frequency identification, or RFID, chips) and social trends (such as the widespread adoption of social media). Our collective discussions, comments, likes, dislikes, and networks of social connections are now all data, and their scale is massive. What did we search for? What did we read? Where did we go? With whom do we associate? What do we eat? What do

Figure 1: The Networked Readiness Index framework



we purchase? In short, almost any imaginable human interaction can be captured and studied within the realm of big data.

Big data has arrived. It is changing our lives and changing the way we do business. Some examples include the following:

- Google uses big data to predict the next wave of influenza.²
- IBM uses data to optimize traffic flow in the city of Stockholm,³ and to get the best possible air quality.
- Dr. Jeffrey Brenner, a physician in New Jersey, uses medical billing data to map out hot spots where you can find his city's most complex and costly healthcare cases as part of a program to lower healthcare costs.⁴
- The National Center for Academic Transformation is using data mining to help understand which college students are more likely to succeed in which courses.⁵

But succeeding with big data requires more than just data. Data-based value creation requires the identification of patterns from which predictions can be inferred and decisions made. Businesses need to decide which data to use. The data each business owns might be as different as the businesses themselves; these data range from log files and GPS data to customer- or machine-to-machine data. Each business will need to select the data source it will use to create value.

Moreover, creating this value will require the right way of dissecting and then analyzing those data with the right analytics. It will require knowing how to separate valuable information from hype. Chapter 1.7 provides guidelines for businesses to make this transition. To a large extent, mastering big data can also be compared to irrigation. It is not enough to "bring water" to where it can create fertility and value. Flooding can destroy crops and even drive precious nutrients away. Mastering water resources requires the delicate management of how much is needed and when, and often requires complex and interconnected systems of channels, levees, and regulation. Success with these resources is what made ancient Egypt a brilliant civilization and turned China into a unified country. The stakes are not dissimilar when applied to big data, but this is a resource that could benefit the entire planet instead of just one country.

For many, "data-driven" has become the new management philosophy. The Economist Intelligence Unit released survey data showing that approximately two-thirds of executives feel that big data will help find new market opportunities and make better decisions.⁶ Nearly half of the surveyed respondents feel big data will increase competitiveness, and more than a third believe it will boost financial performance.

This world of big data has also become a source of concern. The consequences of big data for issues of privacy and other areas of society are not yet fully understood. Some prominent critics, such as Jaron Lanier,⁷ call on us to be cautious about readily believing any result created by the "wisdom of the crowd."

Moreover, applications of big data in military intelligence have created a growing concern for privacy around the world.

Indeed, we are now living in a world where anything and everything can be measured. “Data” could become a new ideology. We are just at the beginning of a long journey where, with the proper principles and guidelines, we should be able to collect, measure, and analyze more and more information about everyone and everything in order to make better decisions, individually and collectively.

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

Because of the potential high returns that ICTs can provide in transforming a nation’s economy and increasing its citizens’ well-being, assessing ICT developments has been the object of much academic and policy attention over the past decade. Several organizations have exerted significant effort toward measuring and benchmarking ICT deployment and uptake, but few have tried as hard to assess the returns that ICTs can actually provide to both the economy and society. Although data are still scarce in terms of ICT impacts, policy interest in measuring ICTs has shifted from measuring ICT access to measuring ICT impacts.

In 2012, after two years of research and consultations with ICT practitioners, policy and industry experts, and academia, the Networked Readiness Index (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:

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 several economies, 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
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 greater 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 ICTs 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 more extensive 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.
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: these 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 2014, 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 capacity of the business framework's 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.

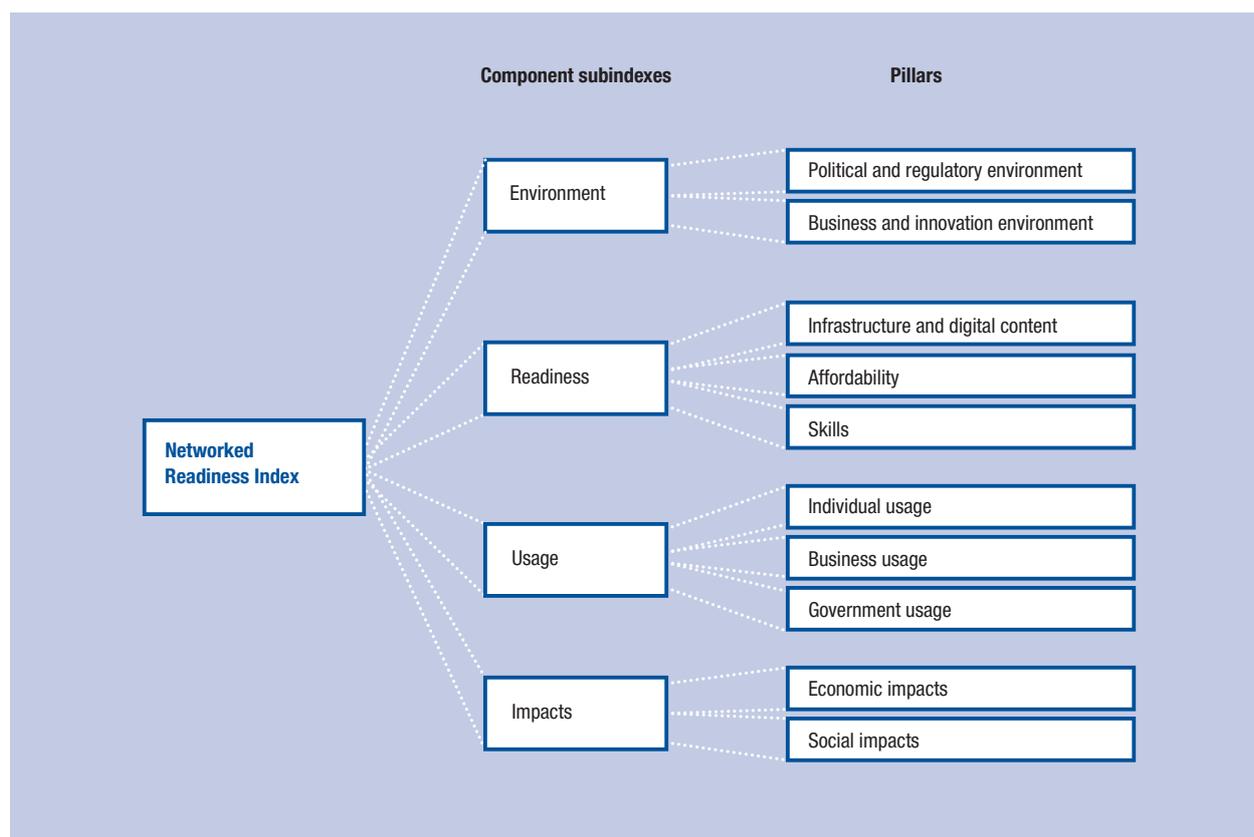
The *skills pillar* (four variables) gauges the ability of a society to make effective use of ICTs thanks to the existence of basic educational skills captured by the quality of the educational system, the level of adult literacy, and the rate of secondary education enrollment.

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.

Figure 2: The Networked Readiness Index structure



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. As we did last year, we split the e-commerce variable to distinguish the business-to-business dimension from the business-to-consumer one, because 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 effort they make to implement their visions for ICT development, and the number of government services they provide online.

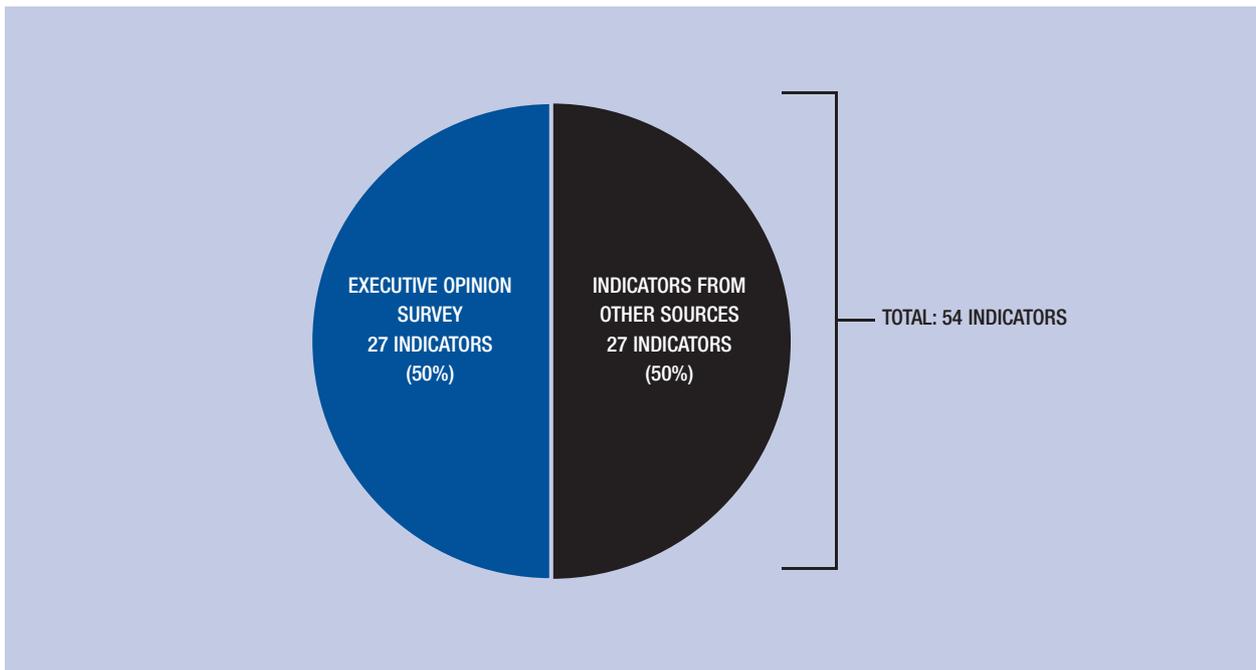
Impact subindex

The impact subindex gauges the broad economic and social impacts accruing from ICTs to boost competitiveness and well-being and that reflect the transformation 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 novel organizational practices. In addition, it also measures the overall shift of an economy toward more knowledge-intensive activities.

The *social impacts pillar* (four variables) aims to assess the ICT-driven improvements in well-being that result from 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 provide increased online services to their citizens, and thus improving their e-participation. It also assesses 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.

Figure 3: Breakdown of indicators used in the Networked Readiness Index 2014 by data source



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 directly translated into commercial activities, as is the case for the environment and for health—cannot yet be covered. 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 2014 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—or 50 percent—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*.⁸ The Survey represents a unique source of insight into many critical aspects related to the enabling environment, such as the effectiveness of law-making bodies and the intensity of local competition; into ICT readiness, such as the quality of the educational system and the accessibility of digital content; into ICT usage, such as capacity to innovate and the importance of government vision for ICTs; and into impacts, such as the impact of ICTs on developing new products and services and improving access to basic services.

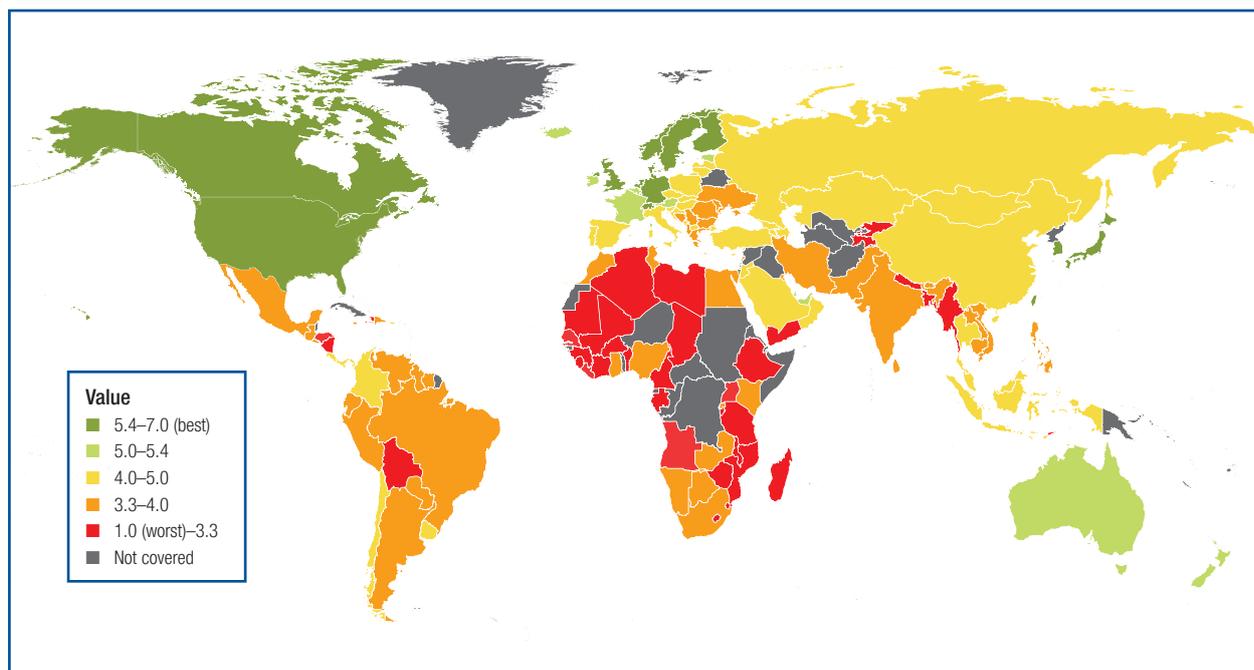
The NRI's coverage every year is determined by the Survey coverage and data availability for indicators obtained from other sources, mostly international organizations. This year the *Report* includes 148 economies, four more than the 2013 edition. The newly covered countries are Bhutan, Lao PDR, and Myanmar. We have also re-instated Angola and Tunisia into the Index, two countries that were not included in last year's edition. Tajikistan is not covered in the 2014 *Report* because Survey data could not be collected this year.

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 2014

This section provides an overview of the networked readiness landscape of the world as assessed by the

Figure 4: The Networked Readiness Index map



NRI 2014. 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 2014 rankings for the overall NRI, its four subindexes, and its 10 pillars. In addition, the Country/Economy Profiles and Data Tables sections at the end of the *Report* present the detailed results for the 148 economies covered by the study and the 54 indicators composing the NRI. To complement the analysis of the results, Box 1 presents a classification of countries based on their NRI 2014 scores and the change rate of this Index over a two-year period; Box 2 assesses the nature of the digital divide in Europe; and Box 3 discusses the challenges large emerging economies must overcome if they are to keep moving forward in integrating ICTs into more robust innovation ecosystems that could help them transition from what appears to be a mid-life crisis toward a knowledge-based society. Figure 4 presents an intensity map of the world; economies are 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. Finally, Appendix A of the present chapter details the structure of the NRI and describes the method of calculation.

TOP 10

As in previous years, the top 10 spots continue to be dominated by Northern European economies, the Asian Tigers, and some of the most advanced Western economies. Three **Nordic economies**—Finland, Sweden, and Norway—lead the rankings and are positioned among the top 5. Denmark and Iceland, the remaining two Nordic economies, also perform strongly, and despite small slips this year they feature among the top 20. Overall, their performance in terms of ICT readiness, with excellent digital infrastructures and robust innovation systems, allows them to score very highly both in ICT use—with almost universal Internet use, for example—and in innovation performances. The **Asian Tigers**—composed of Singapore, Hong Kong SAR, the Republic of Korea, and Taiwan (China)—also perform very strongly, all of them positioned at the forefront of the NRI and with Singapore, Hong Kong SAR, and the Republic of Korea featuring among the top 10. All these economies continue to boast outstanding business and innovation environments that are consistently ranked among the most conducive to entrepreneurship in the world. Finally, the top 10 includes some of the **most advanced Western economies**—the Netherlands, Switzerland, the United States, and the United Kingdom—that have recognized the potential of ICTs to embark in a new economic and social revolution, and thus have substantially invested in developing their digital potential.

In dynamic terms, this year the rankings remain very stable, with no movement in the top 6 and negligible

Table 1: The Networked Readiness Index 2014

Rank	Country/Economy	Value	2013 rank (out of 144)	Group*	Rank	Country/Economy	Value	2013 rank (out of 144)	Group*
1	Finland	6.04	1	ADV	75	Romania	3.95	75	CEE
2	Singapore	5.97	2	ADV	76	Sri Lanka	3.94	69	DEVASIA
3	Sweden	5.93	3	ADV	77	Moldova	3.89	77	CIS
4	Netherlands	5.79	4	ADV	78	Philippines	3.89	86	DEVASIA
5	Norway	5.70	5	ADV	79	Mexico	3.89	63	LATAM
6	Switzerland	5.62	6	ADV	80	Serbia	3.88	87	CEE
7	United States	5.61	9	ADV	81	Ukraine	3.87	73	CIS
8	Hong Kong SAR	5.60	14	ADV	82	Ecuador	3.85	91	LATAM
9	United Kingdom	5.54	7	ADV	83	India	3.85	68	DEVASIA
10	Korea, Rep.	5.54	11	ADV	84	Vietnam	3.84	84	DEVASIA
11	Luxembourg	5.53	16	ADV	85	Rwanda	3.78	88	SSA
12	Germany	5.50	13	ADV	86	Jamaica	3.77	85	LATAM
13	Denmark	5.50	8	ADV	87	Tunisia	3.77	n/a	MENA
14	Taiwan, China	5.47	10	ADV	88	Guyana	3.77	100	LATAM
15	Israel	5.42	15	ADV	89	Cape Verde	3.73	81	SSA
16	Japan	5.41	21	ADV	90	Peru	3.73	103	LATAM
17	Canada	5.41	12	ADV	91	Egypt	3.71	80	MENA
18	Australia	5.40	18	ADV	92	Kenya	3.71	92	SSA
19	Iceland	5.30	17	ADV	93	Dominican Republic	3.69	90	LATAM
20	New Zealand	5.27	20	ADV	94	Bhutan	3.68	n/a	DEVASIA
21	Estonia	5.27	22	ADV	95	Albania	3.66	83	CEE
22	Austria	5.26	19	ADV	96	Ghana	3.65	95	SSA
23	Qatar	5.22	23	MENA	97	Lebanon	3.64	94	MENA
24	United Arab Emirates	5.20	25	MENA	98	El Salvador	3.63	93	LATAM
25	France	5.09	26	ADV	99	Morocco	3.61	89	MENA
26	Ireland	5.07	27	ADV	100	Argentina	3.53	99	LATAM
27	Belgium	5.06	24	ADV	101	Guatemala	3.52	102	LATAM
28	Malta	4.96	28	ADV	102	Paraguay	3.47	104	LATAM
29	Bahrain	4.86	29	MENA	103	Botswana	3.43	96	SSA
30	Malaysia	4.83	30	DEVASIA	104	Iran, Islamic Rep.	3.42	101	MENA
31	Lithuania	4.78	32	CEE	105	Namibia	3.41	111	SSA
32	Saudi Arabia	4.78	31	MENA	106	Venezuela	3.39	108	LATAM
33	Portugal	4.73	33	ADV	107	Gambia, The	3.38	98	SSA
34	Spain	4.69	38	ADV	108	Cambodia	3.36	106	DEVASIA
35	Chile	4.61	34	LATAM	109	Lao PDR	3.34	n/a	DEVASIA
36	Slovenia	4.60	37	ADV	110	Zambia	3.34	115	SSA
37	Cyprus	4.60	35	ADV	111	Pakistan	3.33	105	MENA
38	Kazakhstan	4.58	43	CIS	112	Nigeria	3.31	113	SSA
39	Latvia	4.58	41	CEE	113	Suriname	3.30	117	LATAM
40	Oman	4.56	40	MENA	114	Senegal	3.30	107	SSA
41	Puerto Rico	4.54	36	ADV	115	Uganda	3.25	110	SSA
42	Czech Republic	4.49	42	ADV	116	Honduras	3.24	109	LATAM
43	Panama	4.36	46	LATAM	117	Zimbabwe	3.24	116	SSA
44	Jordan	4.36	47	MENA	118	Kyrgyz Republic	3.22	118	CIS
45	Brunei Darussalam	4.34	57	DEVASIA	119	Bangladesh	3.21	114	DEVASIA
46	Croatia	4.34	51	CEE	120	Bolivia	3.21	119	LATAM
47	Hungary	4.32	44	CEE	121	Liberia	3.19	97	SSA
48	Mauritius	4.31	55	SSA	122	Côte d'Ivoire	3.14	120	SSA
49	Azerbaijan	4.31	56	CIS	123	Nepal	3.09	126	DEVASIA
50	Russian Federation	4.30	54	CIS	124	Nicaragua	3.08	125	LATAM
51	Turkey	4.30	45	CEE	125	Tanzania	3.04	127	SSA
52	Montenegro	4.27	48	CEE	126	Swaziland	3.00	136	SSA
53	Costa Rica	4.25	53	LATAM	127	Mali	3.00	122	SSA
54	Poland	4.24	49	CEE	128	Gabon	2.98	121	SSA
55	Barbados	4.22	39	LATAM	129	Algeria	2.98	131	MENA
56	Uruguay	4.22	52	LATAM	130	Ethiopia	2.95	128	SSA
57	Macedonia, FYR	4.19	67	CEE	131	Cameroon	2.94	124	SSA
58	Italy	4.18	50	ADV	132	Malawi	2.90	129	SSA
59	Slovak Republic	4.12	61	ADV	133	Lesotho	2.88	138	SSA
60	Georgia	4.09	65	CIS	134	Sierra Leone	2.85	143	SSA
61	Mongolia	4.07	59	CIS	135	Benin	2.82	123	SSA
62	China	4.05	58	DEVASIA	136	Burkina Faso	2.78	130	SSA
63	Colombia	4.05	66	LATAM	137	Mozambique	2.77	133	SSA
64	Indonesia	4.04	76	DEVASIA	138	Libya	2.75	132	MENA
65	Armenia	4.03	82	CIS	139	Madagascar	2.74	137	SSA
66	Seychelles	4.02	79	SSA	140	Yemen	2.73	139	MENA
67	Thailand	4.01	74	DEVASIA	141	Timor-Leste	2.69	134	DEVASIA
68	Bosnia and Herzegovina	3.99	78	CEE	142	Mauritania	2.61	135	MENA
69	Brazil	3.98	60	LATAM	143	Haiti	2.52	141	LATAM
70	South Africa	3.98	70	SSA	144	Angola	2.52	n/a	SSA
71	Trinidad and Tobago	3.97	72	LATAM	145	Guinea	2.48	140	SSA
72	Kuwait	3.96	62	MENA	146	Myanmar	2.35	n/a	DEVASIA
73	Bulgaria	3.96	71	CEE	147	Burundi	2.31	144	SSA
74	Greece	3.95	64	ADV	148	Chad	2.22	142	SSA

Note: Group classification follows the International Monetary Fund's classification (situation as of October 2013).

* Groups: ADV = Advanced economies; 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	5.87	1	5.90	1	5.84	75	Mexico	3.88	70	3.68	85	4.07
2	New Zealand	5.63	2	5.88	8	5.37	76	Bhutan	3.87	43	4.17	123	3.57
3	Finland	5.62	3	5.86	9	5.37	77	China	3.87	56	3.97	115	3.76
4	Hong Kong SAR	5.56	11	5.40	2	5.72	78	Kuwait	3.85	75	3.61	81	4.09
5	United Kingdom	5.50	5	5.66	10	5.33	79	Sri Lanka	3.85	74	3.62	82	4.08
6	Netherlands	5.48	8	5.53	5	5.44	80	Bosnia and Herzegovina	3.83	76	3.59	83	4.08
7	Norway	5.46	7	5.54	6	5.38	81	Ecuador	3.81	89	3.51	78	4.12
8	Sweden	5.45	6	5.63	15	5.26	82	Liberia	3.80	92	3.45	75	4.15
9	Switzerland	5.41	9	5.51	12	5.31	83	Armenia	3.80	104	3.32	67	4.28
10	Canada	5.39	12	5.31	3	5.46	84	Morocco	3.79	81	3.56	88	4.03
11	Luxembourg	5.31	4	5.73	29	4.90	85	Romania	3.79	101	3.38	72	4.20
12	Ireland	5.27	13	5.29	16	5.25	86	Iran, Islamic Rep.	3.79	86	3.53	86	4.04
13	Qatar	5.23	14	5.23	17	5.23	87	Russian Federation	3.78	100	3.39	73	4.17
14	Australia	5.20	15	5.23	21	5.17	88	Italy	3.77	99	3.39	76	4.15
15	United States	5.19	22	5.00	7	5.38	89	Greece	3.76	114	3.20	64	4.32
16	Denmark	5.19	19	5.16	18	5.21	90	Philippines	3.76	87	3.51	92	4.01
17	Germany	5.14	10	5.41	31	4.87	91	India	3.76	73	3.64	103	3.87
18	United Arab Emirates	5.10	24	4.91	13	5.28	92	Kenya	3.75	71	3.67	110	3.83
19	Belgium	5.08	21	5.01	22	5.14	93	Peru	3.75	119	3.10	61	4.39
20	Iceland	5.01	27	4.81	19	5.21	94	Trinidad and Tobago	3.73	93	3.45	91	4.01
21	Japan	4.99	16	5.23	40	4.75	95	Albania	3.72	117	3.14	65	4.31
22	Israel	4.97	28	4.67	14	5.27	96	Vietnam	3.68	91	3.47	100	3.88
23	Austria	4.97	18	5.19	39	4.75	97	Dominican Republic	3.68	110	3.24	79	4.12
24	Malaysia	4.95	25	4.84	24	5.07	98	Cambodia	3.66	95	3.43	98	3.90
25	Taiwan, China	4.94	34	4.43	4	5.45	99	Lesotho	3.66	90	3.48	108	3.84
26	Estonia	4.88	26	4.83	28	4.93	100	Senegal	3.64	106	3.26	89	4.02
27	Saudi Arabia	4.86	31	4.59	23	5.12	101	Colombia	3.64	96	3.41	104	3.87
28	Rwanda	4.83	17	5.22	55	4.45	102	Tunisia	3.64	94	3.44	109	3.83
29	Chile	4.83	38	4.34	11	5.32	103	Lebanon	3.63	142	2.62	48	4.63
30	France	4.82	23	4.97	47	4.67	104	Uganda	3.59	77	3.57	121	3.61
31	South Africa	4.76	20	5.05	53	4.48	105	Guatemala	3.59	123	3.02	74	4.16
32	Puerto Rico	4.75	29	4.64	33	4.86	106	Serbia	3.58	118	3.11	87	4.04
33	Oman	4.69	32	4.54	36	4.84	107	Malawi	3.57	69	3.70	130	3.43
34	Korea, Rep.	4.68	42	4.18	20	5.19	108	Sierra Leone	3.55	82	3.55	124	3.55
35	Portugal	4.63	39	4.26	25	5.00	109	Nigeria	3.54	112	3.23	106	3.85
36	Malta	4.62	30	4.63	49	4.62	110	El Salvador	3.53	121	3.10	95	3.96
37	Mauritius	4.61	33	4.48	43	4.75	111	Côte d'Ivoire	3.52	116	3.16	102	3.87
38	Barbados	4.58	35	4.42	42	4.75	112	Ethiopia	3.50	102	3.37	120	3.64
39	Cyprus	4.57	45	4.16	26	4.98	113	Swaziland	3.49	84	3.55	129	3.44
40	Bahrain	4.52	48	4.07	27	4.96	114	Ukraine	3.48	130	2.89	84	4.08
41	Jordan	4.45	44	4.16	41	4.75	115	Tanzania	3.47	85	3.54	132	3.39
42	Latvia	4.44	53	4.01	32	4.86	116	Brazil	3.45	78	3.57	135	3.33
43	Lithuania	4.41	52	4.02	37	4.79	117	Mali	3.44	111	3.23	119	3.65
44	Turkey	4.38	55	4.00	38	4.77	118	Pakistan	3.44	124	3.00	101	3.88
45	Spain	4.31	47	4.09	51	4.54	119	Egypt	3.44	115	3.18	117	3.69
46	Panama	4.31	62	3.76	35	4.85	120	Madagascar	3.43	129	2.90	94	3.97
47	Slovenia	4.28	72	3.66	30	4.89	121	Moldova	3.42	126	2.98	105	3.85
48	Ghana	4.23	41	4.19	66	4.28	122	Kyrgyz Republic	3.39	131	2.89	99	3.89
49	Czech Republic	4.23	51	4.05	60	4.41	123	Nepal	3.39	125	2.99	113	3.78
50	Hungary	4.22	54	4.00	56	4.44	124	Mozambique	3.36	113	3.22	126	3.49
51	Uruguay	4.21	57	3.96	54	4.46	125	Cameroon	3.35	132	2.87	111	3.83
52	Montenegro	4.21	80	3.56	34	4.86	126	Burkina Faso	3.35	108	3.24	128	3.45
53	Macedonia, FYR	4.21	67	3.74	46	4.67	127	Benin	3.33	107	3.25	131	3.41
54	Brunei Darussalam	4.20	46	4.15	69	4.25	128	Nicaragua	3.32	103	3.32	136	3.31
55	Poland	4.12	65	3.75	52	4.49	129	Honduras	3.31	128	2.95	118	3.67
56	Thailand	4.12	79	3.56	45	4.69	130	Paraguay	3.30	136	2.66	96	3.94
57	Kazakhstan	4.11	61	3.80	58	4.42	131	Bolivia	3.22	109	3.24	139	3.20
58	Croatia	4.10	88	3.51	44	4.69	132	Bangladesh	3.21	138	2.65	114	3.77
59	Namibia	4.10	37	4.38	112	3.81	133	Zimbabwe	3.20	122	3.06	133	3.35
60	Zambia	4.07	59	3.82	63	4.33	134	Gabon	3.20	120	3.10	137	3.30
61	Botswana	4.05	40	4.26	107	3.84	135	Argentina	3.19	135	2.78	122	3.61
62	Seychelles	4.05	49	4.07	90	4.02	136	Libya	3.17	141	2.64	116	3.69
63	Indonesia	4.04	68	3.71	62	4.36	137	Suriname	3.16	134	2.84	127	3.48
64	Costa Rica	4.00	63	3.76	70	4.24	138	Timor-Leste	3.14	127	2.95	134	3.33
65	Guyana	4.00	64	3.76	71	4.23	139	Yemen	2.94	143	2.58	138	3.30
66	Lao PDR	3.99	50	4.06	97	3.92	140	Mauritania	2.91	133	2.86	143	2.95
67	Jamaica	3.96	60	3.82	80	4.10	141	Haiti	2.84	144	2.58	141	3.09
68	Gambia, The	3.95	36	4.39	125	3.50	142	Guinea	2.77	139	2.65	144	2.89
69	Cape Verde	3.94	58	3.91	93	3.98	143	Algeria	2.76	140	2.64	145	2.87
70	Azerbaijan	3.94	66	3.75	77	4.13	144	Burundi	2.73	146	2.43	142	3.03
71	Bulgaria	3.94	105	3.29	50	4.59	145	Venezuela	2.72	148	2.30	140	3.15
72	Mongolia	3.91	98	3.39	57	4.43	146	Myanmar	2.68	137	2.66	146	2.71
73	Georgia	3.91	97	3.40	59	4.42	147	Angola	2.59	145	2.52	147	2.65
74	Slovak Republic	3.90	83	3.55	68	4.25	148	Chad	2.40	147	2.43	148	2.36

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	6.61	1	6.88	18	6.41	1	6.55
2	Iceland	6.44	2	6.88	13	6.44	13	5.99
3	Sweden	6.39	3	6.85	10	6.48	21	5.83
4	Norway	6.28	6	6.80	28	6.18	17	5.86
5	United States	6.27	4	6.83	21	6.36	32	5.62
6	Singapore	6.20	16	6.30	46	5.88	2	6.42
7	Taiwan, China	6.17	5	6.81	53	5.74	14	5.96
8	Germany	6.16	11	6.48	43	5.94	12	6.05
9	Australia	6.15	8	6.79	49	5.83	20	5.85
10	Switzerland	6.15	9	6.69	66	5.40	3	6.36
11	Austria	6.14	10	6.53	34	6.09	22	5.79
12	Hong Kong SAR	6.11	26	5.88	22	6.36	10	6.08
13	Canada	6.10	7	6.79	65	5.41	8	6.10
14	Denmark	6.06	20	6.15	29	6.17	18	5.85
15	Netherlands	5.97	14	6.42	69	5.37	7	6.12
16	Cyprus	5.95	28	5.80	39	6.00	11	6.05
17	Korea, Rep.	5.93	13	6.42	57	5.72	31	5.66
18	Luxembourg	5.91	17	6.29	56	5.73	27	5.73
19	Japan	5.84	21	6.09	54	5.73	29	5.69
20	Israel	5.76	29	5.71	35	6.05	39	5.51
21	United Kingdom	5.74	15	6.36	79	5.16	28	5.69
22	Estonia	5.73	25	5.94	61	5.51	25	5.76
23	Malta	5.73	18	6.28	90	4.99	16	5.90
24	Lithuania	5.69	45	4.85	12	6.45	23	5.78
25	Belgium	5.66	22	6.04	101	4.59	4	6.34
26	Ireland	5.65	19	6.17	98	4.68	9	6.09
27	France	5.64	27	5.80	72	5.27	19	5.85
28	Slovenia	5.60	24	5.95	82	5.12	26	5.74
29	Latvia	5.60	41	5.03	26	6.21	35	5.56
30	Spain	5.60	32	5.48	41	5.99	50	5.33
31	Kazakhstan	5.57	58	4.50	2	6.88	51	5.32
32	Bahrain	5.52	39	5.05	25	6.29	58	5.23
33	Italy	5.49	42	4.91	32	6.09	43	5.47
34	Ukraine	5.49	74	4.06	3	6.88	37	5.54
35	Czech Republic	5.49	23	6.04	84	5.09	49	5.33
36	Qatar	5.48	31	5.60	100	4.59	5	6.26
37	Russian Federation	5.46	47	4.81	14	6.44	64	5.13
38	United Arab Emirates	5.44	30	5.62	85	5.09	33	5.62
39	Poland	5.40	38	5.07	52	5.78	48	5.34
40	Georgia	5.39	59	4.50	4	6.82	78	4.85
41	Croatia	5.38	54	4.57	36	6.03	36	5.55
42	Turkey	5.35	48	4.78	17	6.43	80	4.85
43	Portugal	5.35	36	5.18	62	5.47	46	5.40
44	Mongolia	5.31	69	4.19	7	6.61	65	5.12
45	New Zealand	5.27	12	6.42	127	3.24	6	6.14
46	Bosnia and Herzegovina	5.25	63	4.38	30	6.12	57	5.25
47	Mauritius	5.22	76	3.88	11	6.47	52	5.32
48	Jordan	5.22	88	3.51	6	6.64	38	5.51
49	Azerbaijan	5.21	55	4.55	40	5.99	66	5.09
50	Costa Rica	5.21	92	3.43	15	6.44	24	5.76
51	Armenia	5.13	53	4.58	63	5.45	47	5.37
52	Romania	5.11	51	4.69	68	5.39	54	5.26
53	Serbia	5.11	49	4.77	67	5.39	63	5.15
54	Saudi Arabia	5.11	33	5.32	96	4.73	55	5.26
55	Moldova	5.10	60	4.44	31	6.12	84	4.74
56	Trinidad and Tobago	5.09	57	4.52	74	5.25	42	5.49
57	Oman	5.07	70	4.14	33	6.09	73	4.99
58	Panama	5.06	65	4.28	27	6.20	86	4.72
59	Malaysia	5.03	71	4.12	48	5.88	67	5.09
60	Chile	5.01	44	4.86	81	5.13	71	5.02
61	Montenegro	4.99	46	4.81	103	4.54	34	5.62
62	Greece	4.97	40	5.04	102	4.59	53	5.29
63	Thailand	4.97	73	4.07	47	5.88	74	4.95
64	Kuwait	4.95	52	4.65	76	5.18	70	5.03
65	Indonesia	4.92	85	3.58	37	6.03	61	5.16
66	Slovak Republic	4.91	62	4.40	71	5.31	72	5.01
67	Hungary	4.89	64	4.35	94	4.80	41	5.50
68	Uruguay	4.88	50	4.76	80	5.14	83	4.75
69	Sri Lanka	4.88	104	3.12	38	6.02	40	5.51
70	Colombia	4.85	80	3.74	44	5.93	76	4.89
71	Macedonia, FYR	4.85	61	4.43	88	5.04	68	5.07
72	Venezuela	4.78	91	3.44	20	6.39	94	4.50
73	China	4.76	86	3.53	60	5.57	59	5.18
74	Seychelles	4.76	43	4.91	113	3.92	44	5.44
75	Bulgaria	4.75	34	5.26	119	3.74	56	5.26
76	Brazil	4.71	56	4.53	91	4.97	91	4.62
77	Vietnam	4.65	121	2.69	8	6.59	88	4.68
78	Brunei Darussalam	4.65	37	5.15	129	3.12	30	5.69
79	Lebanon	4.63	77	3.86	99	4.62	45	5.41
80	Guyana	4.62	98	3.32	70	5.37	60	5.18
81	Philippines	4.60	89	3.51	75	5.24	69	5.07
82	Paraguay	4.60	72	4.10	50	5.81	105	3.89
83	Ecuador	4.59	75	3.94	92	4.89	75	4.94
84	Bhutan	4.58	67	4.22	45	5.89	114	3.63
85	India	4.57	119	2.72	1	7.00	101	4.00
86	Albania	4.57	90	3.49	87	5.07	62	5.16
87	Tunisia	4.55	83	3.59	73	5.25	81	4.80
88	Jamaica	4.52	79	3.81	89	5.03	87	4.71
89	Puerto Rico	4.46	66	4.24	n/a	n/a	90	4.68
90	Peru	4.43	95	3.37	59	5.65	99	4.27
91	Barbados	4.40	35	5.25	144	1.99	15	5.95
92	Suriname	4.40	101	3.25	86	5.08	77	4.86
93	Egypt	4.35	99	3.30	16	6.44	120	3.32
94	Mexico	4.34	81	3.72	93	4.89	95	4.42
95	Morocco	4.31	93	3.42	51	5.78	111	3.73
96	El Salvador	4.24	102	3.15	55	5.73	107	3.85
97	Zimbabwe	4.20	128	2.42	24	6.33	108	3.85
98	South Africa	4.17	68	4.21	112	3.97	97	4.32
99	Kenya	4.14	94	3.39	97	4.73	98	4.29
100	Argentina	4.13	78	3.86	121	3.69	79	4.85
101	Algeria	4.12	127	2.43	42	5.96	102	3.99
102	Cape Verde	4.09	107	3.06	106	4.45	82	4.76
103	Dominican Republic	4.05	87	3.52	95	4.75	106	3.88
104	Bangladesh	4.02	112	2.88	23	6.34	128	2.84
105	Pakistan	3.97	110	2.97	19	6.40	136	2.54
106	Kyrgyz Republic	3.95	96	3.35	116	3.83	89	4.68
107	Guatemala	3.92	100	3.29	78	5.17	122	3.31
108	Honduras	3.89	115	2.83	77	5.18	112	3.67
109	Ghana	3.89	124	2.50	64	5.41	110	3.75
110	Iran, Islamic Rep.	3.87	103	3.14	118	3.74	85	4.73
111	Nepal	3.82	141	1.65	9	6.49	121	3.32
112	Uganda	3.80	113	2.87	58	5.68	127	2.86
113	Cambodia	3.73	97	3.35	105	4.50	119	3.34
114	Liberia	3.70	145	1.57	5	6.78	131	2.75
115	Bolivia	3.58	114	2.83	126	3.36	93	4.54
116	Namibia	3.46	106	3.10	125	3.37	104	3.91
117	Gabon	3.34	132	2.28	109	4.09	113	3.66
118	Botswana	3.32	109	3.01	142	2.39	92	4.57
119	Nigeria	3.31	117	2.81	107	4.42	132	2.71
120	Yemen	3.31	129	2.39	83	5.12	138	2.41
121	Nicaragua	3.30	82	3.66	140	2.48	109	3.76
122	Libya	3.23	84	3.58	145	1.73	96	4.37
123	Tanzania	3.17	120	2.70	111	4.03	129	2.77
124	Côte d'Ivoire	3.15	105	3.11	120	3.70	133	2.65
125	Rwanda	3.14	108	3.05	128	3.13	123	3.25
126	Zambia	3.12	130	2.37	124	3.40	117	3.59
127	Senegal	3.08	116	2.83	117	3.78	134	2.64
128	Swaziland	3.07	118	2.79	143	2.28	100	4.14
129	Lao PDR	3.03	125	2.46	130	3.10	118	3.51
130	Lesotho	2.99	131	2.37	138	2.66	103	3.95
131	Gambia, The	2.85	123	2.60	137	2.75	124	3.20
132	Timor-Leste	2.80	111	2.97	133	2.83	135	2.61
133	Mauritania	2.78	139	1.72	104	4.53	145	2.08
134	Benin	2.76	122	2.69	134	2.82	130	2.76
135	Ethiopia	2.70	135	1.95	115	3.85	140	2.30
136	Malawi	2.70	126	2.43	139	2.62	125	3.03
137	Cameroon	2.65	143	1.58	136	2.77	116	3.60
138	Angola	2.63	146	1.55	110	4.07	141	2.26
139	Guinea	2.63	134	2.01	122	3.69	142	2.17
140	Haiti	2.61	142	1.63	108	4.09	143	2.11
141	Sierra Leone	2.59	138	1.85	114	3.88	146	2.03
142	Mozambique	2.31	137	1.86	132	3.06	147	2.00
143	Mali	2.29	140	1.69	135	2.78	139	2.41
144	Madagascar	2.29	144	1.57	141	2.42	126	2.88
145	Burundi	2.28	133	2.12	n/a	n/a	137	2.45
146	Chad	2.24	148	1.39	123	3.44	148	1.89
147	Burkina Faso	2.21	147	1.41	131	3.10	144	2.11
148	Myanmar	2.16	136	1.88	146	1.00	115	3.60

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	6.06	1	6.59	3	5.99	7	5.60
2	Finland	6.01	6	6.42	2	6.02	8	5.57
3	Korea, Rep.	5.89	9	6.32	10	5.48	3	5.85
4	Singapore	5.87	10	6.13	15	5.21	1	6.26
5	Netherlands	5.86	4	6.48	6	5.71	14	5.40
6	Norway	5.79	2	6.57	12	5.44	15	5.36
7	Denmark	5.75	3	6.57	7	5.66	26	5.01
8	Luxembourg	5.73	5	6.43	13	5.27	10	5.48
9	Japan	5.69	16	5.92	4	5.99	22	5.15
10	Switzerland	5.64	11	6.07	1	6.10	35	4.74
11	United States	5.60	18	5.76	9	5.56	11	5.47
12	United Kingdom	5.58	8	6.33	17	5.06	17	5.35
13	Germany	5.51	19	5.72	5	5.85	27	4.97
14	Israel	5.45	26	5.51	8	5.66	19	5.19
15	Hong Kong SAR	5.41	12	6.03	16	5.13	24	5.07
16	New Zealand	5.37	13	5.98	21	4.81	18	5.34
17	Taiwan, China	5.34	28	5.44	14	5.24	16	5.36
18	Qatar	5.33	21	5.69	26	4.53	4	5.77
19	Australia	5.28	15	5.92	24	4.75	21	5.17
20	Austria	5.27	20	5.71	11	5.44	36	4.65
21	United Arab Emirates	5.24	29	5.30	29	4.37	2	6.06
22	Estonia	5.22	17	5.84	28	4.38	12	5.45
23	France	5.16	22	5.65	20	4.88	28	4.96
24	Iceland	5.16	7	6.39	22	4.80	53	4.28
25	Bahrain	5.13	14	5.96	49	3.81	5	5.62
26	Canada	5.04	27	5.46	25	4.63	25	5.05
27	Belgium	5.02	25	5.52	18	5.05	42	4.47
28	Malta	5.01	24	5.55	32	4.09	13	5.40
29	Ireland	4.92	23	5.57	23	4.75	45	4.43
30	Malaysia	4.83	49	4.49	27	4.45	9	5.55
31	Saudi Arabia	4.78	44	4.67	34	4.04	6	5.62
32	Portugal	4.56	42	4.83	35	4.04	33	4.81
33	Spain	4.53	32	5.21	40	3.96	44	4.44
34	Lithuania	4.51	41	4.83	33	4.09	37	4.60
35	Slovenia	4.44	34	5.09	37	4.02	57	4.20
36	Puerto Rico	4.40	63	4.03	19	5.05	63	4.12
37	Oman	4.40	56	4.30	57	3.72	20	5.18
38	Kazakhstan	4.39	51	4.42	66	3.61	23	5.12
39	Chile	4.37	52	4.40	45	3.89	32	4.83
40	Czech Republic	4.36	30	5.26	31	4.10	96	3.72
41	Brunei Darussalam	4.36	50	4.47	56	3.73	30	4.86
42	Latvia	4.35	31	5.25	48	3.81	78	3.97
43	Barbados	4.30	33	5.11	53	3.77	72	4.01
44	Azerbaijan	4.24	61	4.19	52	3.78	34	4.77
45	Hungary	4.21	40	4.91	62	3.67	69	4.04
46	Croatia	4.18	39	4.99	81	3.46	65	4.08
47	Brazil	4.13	59	4.21	41	3.92	54	4.27
48	Cyprus	4.13	45	4.62	58	3.71	66	4.07
49	Slovak Republic	4.11	35	5.09	65	3.66	106	3.60
50	Panama	4.10	68	3.74	39	3.99	39	4.56
51	Italy	4.07	37	5.05	61	3.68	112	3.49
52	Montenegro	4.07	55	4.32	69	3.59	51	4.30
53	Russian Federation	4.06	46	4.61	84	3.45	61	4.13
54	Poland	4.06	36	5.08	75	3.52	108	3.57
55	Uruguay	4.05	48	4.55	86	3.43	59	4.16
56	Macedonia, FYR	4.03	53	4.38	101	3.31	47	4.41
57	Costa Rica	4.02	64	3.95	38	4.01	64	4.12
58	Kuwait	4.00	38	5.01	94	3.40	105	3.60
59	Jordan	3.96	67	3.79	47	3.81	52	4.28
60	Mauritius	3.95	66	3.86	64	3.66	48	4.34
61	China	3.91	80	3.27	44	3.89	38	4.58
62	Colombia	3.91	77	3.40	79	3.47	31	4.86
63	Turkey	3.90	69	3.69	46	3.87	60	4.14
64	Seychelles	3.90	65	3.87	55	3.76	68	4.06
65	Bulgaria	3.87	47	4.61	104	3.29	97	3.71
66	Trinidad and Tobago	3.86	60	4.20	87	3.43	80	3.96
67	Greece	3.83	43	4.74	102	3.30	117	3.45
68	Romania	3.76	62	4.17	98	3.34	90	3.77
69	Indonesia	3.75	95	2.90	36	4.03	49	4.31
70	South Africa	3.72	78	3.39	30	4.15	103	3.62
71	Mexico	3.72	89	3.07	70	3.59	40	4.50
72	Serbia	3.66	54	4.36	133	2.93	100	3.69
73	Armenia	3.65	74	3.52	82	3.45	76	3.98
74	Ecuador	3.63	83	3.18	71	3.59	62	4.13
75	Georgia	3.63	76	3.43	110	3.21	55	4.24
76	Philippines	3.63	91	2.94	43	3.89	67	4.06
77	Argentina	3.62	57	4.26	99	3.33	121	3.26
78	Vietnam	3.60	84	3.18	88	3.43	58	4.19
79	Bosnia and Herzegovina	3.59	70	3.67	92	3.42	99	3.69
80	Thailand	3.58	85	3.17	59	3.70	84	3.88
81	Sri Lanka	3.54	112	2.38	50	3.80	43	4.44
82	Morocco	3.53	72	3.63	111	3.21	92	3.76
83	Moldova	3.53	73	3.55	125	3.05	75	3.99
84	Tunisia	3.51	81	3.25	103	3.30	77	3.98
85	Mongolia	3.50	90	3.04	83	3.45	71	4.02
86	Kenya	3.49	113	2.30	54	3.76	46	4.41
87	Dominican Republic	3.49	93	2.92	67	3.60	81	3.95
88	Botswana	3.46	79	3.31	106	3.25	86	3.82
89	Egypt	3.45	71	3.66	112	3.21	113	3.49
90	Lebanon	3.45	58	4.23	116	3.19	136	2.93
91	India	3.45	121	2.08	51	3.78	41	4.48
92	Cape Verde	3.45	97	2.84	115	3.19	50	4.31
93	El Salvador	3.44	96	2.85	80	3.47	74	4.00
94	Jamaica	3.43	87	3.10	72	3.58	104	3.62
95	Albania	3.41	82	3.25	107	3.24	93	3.75
96	Guatemala	3.41	99	2.77	42	3.90	109	3.57
97	Rwanda	3.39	138	1.68	76	3.52	29	4.96
98	Peru	3.36	94	2.91	89	3.43	94	3.75
99	Gambia, The	3.35	120	2.12	60	3.69	56	4.24
100	Ghana	3.34	100	2.74	90	3.42	85	3.88
101	Ukraine	3.34	75	3.49	93	3.40	129	3.12
102	Guyana	3.34	103	2.54	63	3.66	87	3.81
103	Namibia	3.25	101	2.69	68	3.59	116	3.47
104	Zambia	3.17	123	2.04	77	3.51	79	3.97
105	Nigeria	3.17	110	2.42	73	3.55	111	3.54
106	Senegal	3.17	115	2.26	85	3.45	88	3.80
107	Cambodia	3.16	105	2.51	78	3.48	114	3.48
108	Venezuela	3.13	88	3.07	119	3.15	127	3.18
109	Paraguay	3.13	98	2.79	105	3.27	120	3.33
110	Bhutan	3.10	114	2.28	130	2.99	70	4.04
111	Mali	3.08	118	2.14	114	3.19	82	3.91
112	Lao PDR	3.07	129	1.87	74	3.54	89	3.80
113	Iran, Islamic Rep.	3.05	111	2.39	129	3.00	91	3.76
114	Suriname	3.04	86	3.11	108	3.23	141	2.78
115	Côte d'Ivoire	3.04	117	2.17	96	3.37	107	3.58
116	Bolivia	3.02	108	2.44	118	3.16	115	3.47
117	Honduras	2.95	106	2.46	91	3.42	133	2.98
118	Zimbabwe	2.93	107	2.45	109	3.22	128	3.14
119	Cameroon	2.93	130	1.78	95	3.38	102	3.64
120	Bangladesh	2.91	134	1.72	127	3.00	73	4.00
121	Pakistan	2.91	126	1.93	97	3.36	118	3.43
122	Gabon	2.90	109	2.43	126	3.02	122	3.26
123	Nicaragua	2.84	122	2.08	113	3.20	123	3.25
124	Tanzania	2.84	137	1.69	120	3.13	98	3.69
125	Uganda	2.83	140	1.63	122	3.12	95	3.75
126	Kyrgyz Republic	2.81	102	2.55	137	2.88	132	3.00
127	Burkina Faso	2.73	139	1.67	135	2.88	101	3.65
128	Swaziland	2.72	119	2.13	117	3.19	140	2.84
129	Madagascar	2.71	141	1.60	100	3.32	126	3.22
130	Ethiopia	2.71	146	1.46	141	2.77	83	3.90
131	Mozambique	2.70	144	1.50	124	3.06	110	3.55
132	Liberia	2.68	136	1.69	123	3.10	124	3.24
133	Nepal	2.66	125	1.96	132	2.95	130	3.07
134	Algeria	2.66	104	2.54	147	2.47	134	2.97
135	Sierra Leone	2.64	135	1.70	134	2.88	119	3.35
136	Malawi	2.63	142	1.55	121	3.12	125	3.23
137	Benin	2.63	124	1.98	128	3.00	137	2.90
138	Lesotho	2.57	127	1.92	136	2.88	135	2.93
139	Libya	2.56	92	2.92	144	2.63	148	2.13
140	Mauritania	2.54	116	2.24	139	2.85	146	2.53
141	Timor-Leste	2.48	128	1.90	142	2.66	138	2.89
142	Angola	2.48	133	1.74	143	2.64	131	3.07
143	Yemen	2.44	131	1.78	131	2.95	145	2.57
144	Guinea	2.39	145	1.47	138	2.85	139	2.84
145	Haiti	2.34	132	1.78	140	2.77	147	2.46
146	Myanmar	2.22	143	1.51	145	2.50	143	2.65
147	Chad	2.18	147	1.34	146	2.50	142	2.70
148	Burundi	2.12	148	1.30	148	2.42	144	2.64

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	5.93	6	5.63	1	6.24	75	Vietnam	3.41	96	2.98	62	3.85
2	Finland	5.91	1	6.04	7	5.78	76	Tunisia	3.39	90	3.03	72	3.76
3	Netherlands	5.85	5	5.63	3	6.06	77	Seychelles	3.39	77	3.16	79	3.63
4	Sweden	5.82	2	6.03	10	5.62	78	Poland	3.39	62	3.36	88	3.42
5	Korea, Rep.	5.67	7	5.25	2	6.09	79	Gambia, The	3.39	67	3.27	84	3.50
6	Israel	5.52	4	5.64	14	5.40	80	Ecuador	3.38	95	2.99	71	3.78
7	Taiwan, China	5.43	12	5.08	6	5.79	81	Peru	3.37	84	3.08	75	3.67
8	United States	5.39	9	5.20	12	5.58	82	Italy	3.37	58	3.40	94	3.34
9	United Kingdom	5.36	14	5.01	9	5.72	83	Thailand	3.35	104	2.88	68	3.83
10	Hong Kong SAR	5.32	13	5.03	11	5.62	84	El Salvador	3.31	109	2.84	70	3.78
11	Switzerland	5.30	3	5.64	26	4.96	85	Senegal	3.29	82	3.10	86	3.48
12	Norway	5.29	15	5.00	13	5.58	86	Bulgaria	3.27	73	3.20	93	3.35
13	Estonia	5.23	22	4.58	4	5.88	87	Bosnia and Herzegovina	3.27	88	3.04	85	3.49
14	Germany	5.20	8	5.22	20	5.17	88	Lao PDR	3.27	74	3.18	92	3.35
15	Luxembourg	5.17	10	5.16	19	5.17	89	South Africa	3.25	49	3.48	113	3.02
16	Japan	5.12	11	5.12	23	5.13	90	Greece	3.24	91	3.03	87	3.45
17	Canada	5.10	17	4.87	16	5.33	91	Nigeria	3.23	72	3.20	99	3.25
18	United Arab Emirates	5.01	27	4.19	5	5.84	92	Trinidad and Tobago	3.21	92	3.02	89	3.41
19	Denmark	4.99	16	4.94	24	5.05	93	Serbia	3.19	93	3.00	90	3.38
20	Australia	4.95	23	4.57	15	5.33	94	Jamaica	3.18	78	3.13	100	3.24
21	Qatar	4.84	32	3.95	8	5.72	95	Mali	3.18	69	3.25	109	3.10
22	New Zealand	4.81	26	4.44	17	5.18	96	Argentina	3.18	87	3.07	98	3.29
23	France	4.73	19	4.77	35	4.68	97	Bhutan	3.17	112	2.78	81	3.56
24	Austria	4.67	24	4.51	31	4.83	98	Ukraine	3.16	79	3.12	102	3.20
25	Iceland	4.61	25	4.51	34	4.72	99	Guatemala	3.16	94	2.99	95	3.32
26	Puerto Rico	4.56	21	4.66	38	4.46	100	Romania	3.13	97	2.96	96	3.30
27	Lithuania	4.53	28	4.11	27	4.96	101	Ghana	3.12	85	3.08	106	3.17
28	Malaysia	4.51	30	4.01	25	5.00	102	Guyana	3.12	106	2.87	91	3.37
29	Belgium	4.50	20	4.67	40	4.33	103	Kuwait	3.04	127	2.58	82	3.50
30	Malta	4.49	29	4.03	28	4.94	104	Bolivia	3.01	111	2.79	101	3.24
31	Ireland	4.43	18	4.83	55	4.03	105	Pakistan	2.99	98	2.96	112	3.03
32	Saudi Arabia	4.40	37	3.65	22	5.14	106	Zambia	2.99	113	2.78	104	3.20
33	Portugal	4.36	34	3.87	30	4.85	107	Iran, Islamic Rep.	2.97	114	2.77	105	3.17
34	Spain	4.30	31	3.97	36	4.63	108	Albania	2.95	125	2.60	97	3.30
35	Bahrain	4.26	63	3.35	18	5.17	109	Venezuela	2.94	115	2.76	108	3.12
36	Kazakhstan	4.26	60	3.38	21	5.15	110	Botswana	2.90	120	2.68	107	3.12
37	Chile	4.23	43	3.55	29	4.91	111	Cambodia	2.90	117	2.70	110	3.10
38	Brunei Darussalam	4.15	51	3.48	32	4.82	112	Ethiopia	2.88	128	2.57	103	3.20
39	Slovenia	4.07	33	3.92	43	4.22	113	Nicaragua	2.87	122	2.65	111	3.08
40	Oman	4.07	56	3.41	33	4.73	114	Lebanon	2.87	101	2.92	121	2.81
41	Panama	3.99	46	3.49	37	4.48	115	Paraguay	2.86	99	2.95	125	2.78
42	Hungary	3.97	36	3.68	42	4.26	116	Cameroon	2.85	103	2.88	123	2.81
43	Latvia	3.94	35	3.71	45	4.17	117	Namibia	2.85	105	2.88	122	2.81
44	Russian Federation	3.91	41	3.56	41	4.27	118	Burkina Faso	2.84	108	2.85	120	2.84
45	Czech Republic	3.87	38	3.63	47	4.12	119	Côte d'Ivoire	2.84	102	2.92	127	2.76
46	Azerbaijan	3.85	42	3.55	46	4.15	120	Honduras	2.80	116	2.75	119	2.85
47	Montenegro	3.81	39	3.60	56	4.02	121	Morocco	2.79	123	2.64	115	2.94
48	Jordan	3.81	44	3.53	51	4.09	122	Uganda	2.79	126	2.60	114	2.98
49	Colombia	3.79	75	3.16	39	4.42	123	Mozambique	2.73	121	2.67	124	2.79
50	Costa Rica	3.75	52	3.47	54	4.04	124	Swaziland	2.73	118	2.70	126	2.76
51	Rwanda	3.75	53	3.45	53	4.05	125	Malawi	2.72	110	2.79	131	2.64
52	Cyprus	3.73	45	3.49	57	3.97	126	Kyrgyz Republic	2.71	131	2.50	116	2.92
53	Uruguay	3.73	61	3.36	50	4.10	127	Bangladesh	2.71	130	2.50	118	2.91
54	Croatia	3.69	40	3.56	66	3.83	128	Tanzania	2.68	132	2.45	117	2.91
55	Macedonia, FYR	3.68	65	3.31	52	4.06	129	Suriname	2.62	107	2.86	138	2.38
56	China	3.67	81	3.11	44	4.22	130	Sierra Leone	2.62	124	2.63	133	2.61
57	Brazil	3.64	64	3.34	58	3.94	131	Zimbabwe	2.61	129	2.54	130	2.69
58	Barbados	3.62	57	3.40	64	3.84	132	Benin	2.58	119	2.69	136	2.47
59	Mexico	3.62	80	3.12	48	4.11	133	Liberia	2.57	134	2.43	128	2.71
60	India	3.61	50	3.48	73	3.74	134	Madagascar	2.52	135	2.42	132	2.61
61	Egypt	3.61	59	3.38	65	3.83	135	Nepal	2.51	141	2.32	129	2.70
62	Philippines	3.57	48	3.49	76	3.66	136	Gabon	2.49	136	2.41	134	2.58
63	Mongolia	3.57	89	3.04	49	4.10	137	Algeria	2.39	133	2.44	140	2.34
64	Dominican Republic	3.55	71	3.22	61	3.88	138	Angola	2.38	137	2.40	139	2.36
65	Turkey	3.55	68	3.27	67	3.83	139	Timor-Leste	2.34	143	2.30	137	2.39
66	Slovak Republic	3.54	54	3.44	78	3.63	140	Myanmar	2.33	139	2.37	141	2.30
67	Armenia	3.53	47	3.49	80	3.58	141	Lesotho	2.31	147	2.08	135	2.53
68	Moldova	3.52	76	3.16	60	3.89	142	Haiti	2.30	138	2.39	143	2.22
69	Sri Lanka	3.47	66	3.30	77	3.64	143	Yemen	2.24	140	2.35	145	2.13
70	Mauritius	3.47	70	3.25	74	3.69	144	Mauritania	2.23	142	2.32	144	2.14
71	Kenya	3.46	55	3.42	83	3.50	145	Guinea	2.15	148	2.04	142	2.27
72	Indonesia	3.46	86	3.07	63	3.84	146	Burundi	2.09	144	2.18	147	2.00
73	Cape Verde	3.45	83	3.09	69	3.81	147	Chad	2.08	146	2.12	146	2.05
74	Georgia	3.44	100	2.95	59	3.93	148	Libya	2.03	145	2.12	148	1.94

changes in the rest, with the exception of the significant improvement by six positions of Hong Kong SAR, which climbs to 8th place. Box 1 presents and analyzes the position and evolution of different economies in the rankings over the past two years, highlighting different dynamics in building and leveraging their digital ecosystems.

For a second consecutive year, **Finland** tops the rankings with a strong performance across the board. It ranks 1st in the readiness subindex thanks to an outstanding digital ICT infrastructure—the best in the world—and 2nd in both the usage and impact subindexes, with more than 90 percent of its population using the Internet and with high levels of technological and non-technological innovation. The country also comes in 3rd in the environment subindex, with a very robust innovation system. This positive digital landscape has been created over the years, as Finland decidedly started investing in building its ICT ecosystem in the mid-1990s as an answer to its financial and economic crisis at that time. Since then, the active role of all stakeholders—government, businesses, and individuals—has resulted in the positive outcome we see today.

As in past years, **Singapore** continues to follow closely in the rankings, remaining in 2nd place. With the best pro-business and pro-innovation environment worldwide, the city-state continues to obtain the top rank in terms of ICT impacts, notably on the social dimension. Supported by a government with a clear digital strategy that offers the best online services in the world, an ICT infrastructure that is relentlessly being improved over time (16th), and one of the highest quality educational systems in the world (3rd), notably in terms of math and science (1st), Singapore has become one of the most knowledge-intensive economies globally (2nd) and is an ICT-generation powerhouse (9th). Improving the already very high number of Internet users (29th) or households with a personal computer and Internet access (11th) to the level of some Nordic countries, coupled with reducing the cost of accessing fixed broadband Internet (now at 87th), would allow Singapore to lead the overall rankings.

Sweden (3rd) maintains its position this year despite a slight improvement in its overall score. Overall, the very strong performance of Sweden reflects its world-class, affordable (11th) ICT infrastructure (3rd) and a stable and pro-business and innovation environment (15th), despite its high tax rate (123rd). These strengths result in outstanding uptake and use of ICTs by individuals (1st), businesses (3rd), and government (7th) and one of the highest technological and non-technological innovation performances in the world (2nd), making Sweden a truly knowledge-based society.

The **Netherlands** retains its 4th position despite a slight decline in its score driven by a small drop in the economic impacts pillar, where it nevertheless ranks a

very respectable 5th globally. The country, as a service-based economy, has quickly and skilfully recognized the importance of ICTs to boost its innovation and competitiveness potential; this is reflected in virtually all the indicators, where the country ranks among the best in the world. ICTs have permeated all stages of society in the Netherlands, with nearly all individuals having access to a computer (1st) with an Internet connection at home (3rd), a large number of government services are online (5th), and businesses use extensive e-commerce in their transactions with other businesses (11th) and with consumers (4th). These scores, coupled with an environment highly conducive to innovation and entrepreneurship, result in very high levels of ICT-based innovations and the highest citizen e-participation in the world (1st). Although the affordability (67th) of a well-developed ICT infrastructure and digital content (14th) still remains an unresolved issue, it does not seem to interfere in the capacity of the country to fully leverage ICTs to obtain meaningful economic (5th) and social (3rd) impacts.

Stable at 5th place, **Norway** continues to leverage ICTs effectively. With a well-developed and affordable (28th) ICT infrastructure (6th), ICT uptake is virtually universal among Norway's population: 95 percent are Internet users and more than 90 percent have access to a personal computer (5th) and Internet (4th) at home. In addition, the country benefits from a stable pro-business and innovation environment (6th) and a government that is aware of the importance of ICTs for the economic and social development of a geographically vast nation with a widely dispersed population. Despite these many assets, compared with its Nordic neighbors, Norway depicts poorer results in terms of technological innovation (12th), notably in the domain of ICTs (16th); improving the quality of the overall educational system (18th), notably in the area of math and science (47th), may represent part of the solution.

Switzerland revalidates its 6th position of the previous edition. The country benefits from very good, albeit expensive (66th) ICT infrastructure (9th) and a good educational system that provides the necessary skills to create a knowledge-based, technology-rich economy. Those assets, coupled with a stable political and regulatory environment (9th) and excellent conditions for innovation and entrepreneurship (12th), have resulted in outstanding uptake and use of ICTs by businesses (1st) in all their transactions and in their ability to foster innovation. In this process of digitization, the government appears to be lagging slightly behind (35th): government online services (32nd) continue to be relatively reduced compared with those of other countries of its economic and social level of development, which partially affects its overall social impacts (26th).

The **United States** moves up two positions to 7th place, thanks to slight improvements in many areas of the Index. These include the country's already

Box 1: Which countries are bridging the digital divide and which countries are not? An evolutionary analysis of the NRI results

The GITR series, through its Networked Readiness Index (NRI), depicts how countries leverage ICTs to boost competitiveness and well-being. A constant finding in the NRI analysis, and one that gets reflected in the overall rankings, is that developed economies continue to lead the way in creating robust and impactful digital ecosystems while many developing and emerging economies have remained comparatively stagnant. This stagnation persists despite some improvements to their ICT infrastructures—specifically, ensuring more and better mobile telephony access and services. As a result, there has been little progress in bridging the digital divide across nations. This lack of progress casts doubts about the capacity of developing and emerging economies to embrace the full potential that ICTs have to offer.

However, the NRI rankings reflect the situation only at a particular moment in time. They do not take into account the evolution that different countries experience over time.

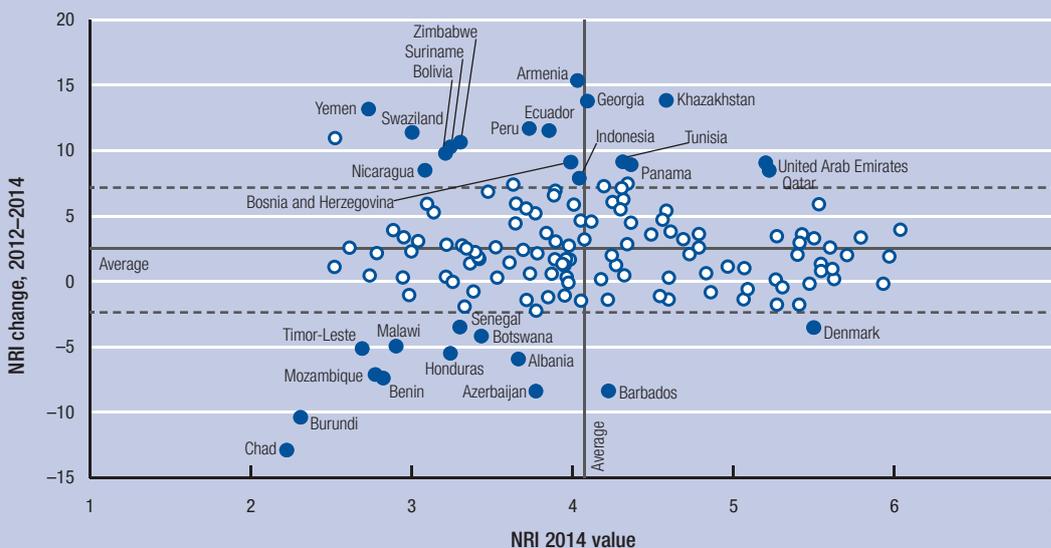
Figure A presents the situation of each analyzed economy based on both its current NRI score and its NRI evolution over the past three years. The position of each economy is then determined according to whether it falls above or below the NRI average in 2014, and whether it falls above or below the average change in the NRI score over the past two editions. As a result, each country's position in the figure reflects its placement in relation to the sample average—that is, whether it has an above- or below-average ICT capacity. Each country's position also indicates whether it is growing above or below the sample average—that is, whether it is catching up or lagging behind in the long-term

race of developing and leveraging its digital ecosystem. In addition, and in order to identify with more precision those countries that have experienced the starkest changes over time, the figure includes an upper and a lower band. These bands are calculated based on the standard deviation of the NRI change of the past two years; the upper band is the sample average change plus 1 standard deviation, and the lower band is the sample average change minus 1 standard deviation.

Based on this classification, and following the logic of a slightly modified Boston Consulting Group (BCG)'s "Growth-Share Matrix,"¹ we can identify four groups of countries:

1. *Rising stars*: Those countries whose NRI scores are above the sample average and whose scores are also growing more quickly than average. Armenia, Georgia, Kazakhstan, Panama, Qatar, and the United Arab Emirates belong to this group.
2. *Sliding stars*:² Those countries whose NRI scores are above average, but in which evolution seems to be lagging behind. Barbados and Denmark belong to this group.
3. *Question marks*: Those countries whose NRI scores are below average but that are quickly catching up. Bolivia, Ecuador, Haiti, Nicaragua, Peru, Suriname, Swaziland, and Yemen belong to this group.
4. *Laggards*: Those countries whose NRI is below average and that are lagging increasingly behind. Benin, Botswana, Burundi, Chad, Malawi, Mozambique, Timor-Leste, and Tunisia are in this group.

Figure A: The NRI 2014 compared with its evolution since 2012



Source: Authors' calculations.

(Cont'd.)

Box 1: Which countries are bridging the digital divide and which countries are not? An evolutionary analysis of the NRI results *(cont'd.)*

From this classification, we can learn several interesting things. First of all, several oil- and gas-rich economies in the Commonwealth of Independent States and Gulf Cooperation Council are quickly improving their digital ecosystems. The governments in these countries have recognized the importance of investing in ICTs as a way to diversify their economies and are quickly developing their digital infrastructure in order not to miss the digital revolution. Second, many countries in sub-Saharan Africa are lagging behind, with no sign of improvement over time. This gap may hamper their capacity to support further economic and social development as the positive impacts of ICTs become more and more apparent; this can have important consequences for their future economic development if actions are not adopted urgently. Third, in Latin America, those countries that

are particularly lagging behind are making significant strides to improve their digital potential. The rest of the countries in the region remain fairly stable. Panama, as an exception, is one of the leading countries in the region that relentlessly continues to strengthen its digital potential. Fourth, Barbados, and especially Denmark (which has always scored at the forefront of the rankings), should not be complacent but should address any weaknesses in the conditions that may hamper their potential to take advantage of their ICT capacity.

Notes

- 1 See the BCG matrix, available at <http://www.strategicmanagementinsight.com/tools/bcg-matrix-growth-share.html>.
- 2 In the original Boston Consulting Group's classification, this group would be the "cash cows."

good business and innovation environment (7th) and improvements in its ICT infrastructure (4th), notably in terms of wider access to international Internet bandwidth per user. Overall, the country exhibits a robust uptake of ICTs by all major stakeholders—businesses (9th), government (11th), and individuals (18th)—who manage to leverage well one of the best and more affordable (20th) ICT infrastructures (4th). Coupled with a pro-business and pro-innovation environment (7th), these result in a strong innovation capacity (5th) and significant ICT-related economic impacts (9th). The ranking of the United States, the largest economy in the world, in the top 10 shows that fully leveraging ICTs is not dependent on small or medium-sized economies, but instead depends on undertaking the right investments and creating the right condition for it.

With the most pronounced improvement among the top 10, **Hong Kong SAR** climbs six positions to 8th place. The sharp improvement in its score is driven by improvements in conditions for innovation and entrepreneurship (2nd) that were already very positive, a robust skills base (10th), and stronger business (16th) and government usage (24th). Overall, Hong Kong SAR enjoys a fairly well developed ICT infrastructure that, coupled with a stable environment conducive to innovation and entrepreneurship (4th), results in good economic (13th) and social (11th) impacts. Notwithstanding these strengths, individual uptake remains lower than it is in the Nordic countries that lead the rankings.

Despite a drop of two places, the **United Kingdom** continues to exhibit a very strong performance in 9th position. As in the Netherlands, as a service-based economy, the country early recognized the importance of ICTs to support its innovation and competitiveness performance. As a result, it has managed to build a well-developed ICT infrastructure (15th), exhibiting one of the

highest population uptakes (8th) and a well-developed e-commerce (1st), which, coupled with a strong pro-business environment, has resulted in solid economic (14th) and social (9th) impacts.

The **Republic of Korea** moves up one position, entering the top 10 this year. A country that has largely based its economic success on the ICT industry, Korea benefits from a strong ICT infrastructure (13th) and an excellent ICT uptake by individuals (9th), businesses (10th), and especially government (3rd), which ranks 1st in the world in terms of online services. The country's strong focus on developing its technological capacity as part of its economic development strategy has also resulted in a sturdy technological innovation performance (8th), notably in the field of ICTs (4th). Improvements in the conditions needed to support innovation and entrepreneurship (34th) could help Korea to leverage further its significant effort to become a leading knowledge-intensive economy.

EUROPE AND THE COMMONWEALTH OF INDEPENDENT STATES

Europe has been at the forefront of developing a digital ecosystem as a key ingredient that fosters innovation and competitiveness. As a result, several European countries lead the NRI rankings, with six European economies—Finland, Sweden, the Netherlands, Norway, Switzerland, and the United Kingdom—in the top 10. In addition, in order to maximize the positive impacts of ICTs throughout the European Union and create synergies and positive spillover effects, the European Commission has developed its Digital Agenda as one of seven flagship initiatives under its growth strategy Europe 2020.⁹ Despite these efforts, important differences remain across European economies, with Southern and Central and Eastern European

economies continuing to lag behind. A deeper analysis of the root causes of these differences shows that, in general, ICT infrastructure and individual uptake is more homogeneous across EU Member States. However, less favorable conditions for innovation and entrepreneurship across European countries result in starker disparities in terms of the economic impacts—for example, innovation performance—accruing from their use, which illustrates the changing nature of the digital divide in Europe and in the rest of the world. The digital divide should not be regarded only in terms of access to ICT infrastructure, but also in terms of the impacts that using ICTs can provide for the economy and society in general. Box 2 develops this analysis further and provides some recommendations for policies that would help to bridge the European digital divide.

Luxembourg, in 11th place, climbs five places thanks to continued improvements across the board. The country continues to reap the benefits of significant past efforts made to develop the ICT sector as a key economic strategy for diversifying its local economy. With one of the best ICT infrastructures in the world (17th), Luxembourg counts on a high ICT uptake (8th), with both businesses (13th) and individuals (5th) using these technologies extensively. Combined with optimal business conditions and a reliable and efficient political and regulatory environment (4th), the country has persisted in improving economic impacts, thanks to more technological and non-technological related innovations (10th) and the highest share of the workforce working in knowledge-intensive jobs in the world. In order to maintain this good momentum, the country should persevere in enhancing its overall innovation system (29th) so that it can fully leverage its ICT potential.

Germany continues to rise, this year by one position, to reach 12th place, thanks to persistent improvements in its overall business environment (17th) and the perceived quality of its educational system (14th), which seems to provide the right set of skills to engage in an innovation-driven globalized economy. With a very good ICT infrastructure (11th), which translates into high levels of individual (11th) and business (5th) ICT uptake, Germany benefits from high levels of ICT-driven economic impacts (8th), as reflected in the excellent innovation capacity (3rd) of local companies.

Despite a drop of five places this year, driven mainly by a slight deterioration of its business environment (16th), **Denmark**, now at 13th place, continues to benefit from one of the highest rates of ICT usage (7th), with all stakeholders using ICTs in their everyday activities. More precisely, ICT uptake among individuals (3rd) is one of the highest in the world: almost the entire population has access to a computer and an Internet connection at home and uses the Internet; businesses use ICTs for their communication and transactions with other businesses (18th) and clients (14th); and governments offer a large share of their services online (13th). Despite

this good performance, in comparison with other Nordic economies, there is some concern about the decreased ability of businesses to fully leverage ICTs to generate new services and products (33rd) and innovate by offering new organizational models (29th). These issues can potentially have a negative impact on an innovation-reliant country's ability to support further economic growth and social development.

Estonia moves up one place to 21st position thanks to improvements across many dimensions of the Index, notably ICT usage (22nd) by both individuals (17th) and businesses (28th). Following the model of neighboring Finland, the country has recognized the crucial role that ICTs have to play in the local economy and for social development. The result is that Estonia ranks 1st among the Baltic Republics, followed by **Lithuania** at 31st place and **Latvia** at 39th; it is also 1st among Central and Eastern European countries and well ahead of Southern European nations. With a well-developed ICT infrastructure (25th) and a good environment for business and innovation (28th), private companies have developed well-functioning e-commerce strategies (6th) and the country is managing to yield good economic (22nd) and social (4th) ICT-related results. Going forward, Estonia should follow the examples of its Nordic neighbors in developing a robust innovation system that can help further its decisive transition into a full-fledged knowledge-based society.

Moving out of the top 20, **Austria** drops three places to land at 22nd position, despite its very stable profile. Overall, the country boasts a very strong ICT infrastructure (10th) with high levels of business usage (11th), especially when interacting with other businesses (9th). Coupled with other innovation-related investments, such as research and development (R&D) and a favorable business environment (23rd), this results in a good technological performance both in the ICT sector (13th) and in the economy in general (10th). Further improvements in the entrepreneurial environment by easing the procedures to open new businesses (103rd), and in the quality of education in important areas for innovation, such as mathematics and science (39th), could help Austria leverage its digital potential better and obtain an even more robust innovation performance.

France moves up one position to 25th place, thanks to slight improvements in all three pillars of the readiness subindex: ICT infrastructure, affordability, and skills. Overall, the country presents a very harmonious uptake of ICTs across all agents, exhibiting one of the highest broadband Internet subscription rates in the world (4th), a fairly good development of e-commerce (27th), and a vast number of government services online (8th). Although some concerns about the business and innovation system (47th) exist—France has one of the highest tax systems in the world (136th) and relatively low levels of venture capital availability (49th)—the country manages to obtain

Box 2: The digital divide in Europe

Europe is slowly emerging from one of the worst financial and economic crises in decades, but growth prospects remain unstable and unemployment stubbornly high in many countries, notably those most severely hit by the crisis. Technological progress and digitization can represent one of the main sources of potential economic growth and employment generation for Europe, as has been recognized by the European Commission.¹

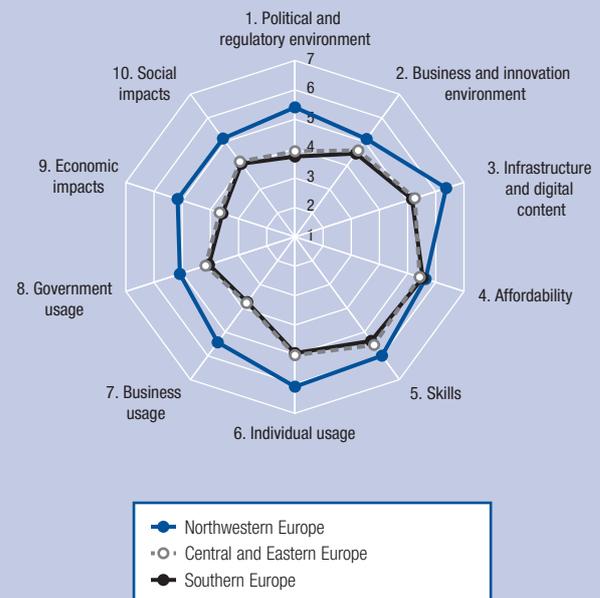
However, the level of digitization is not the same across European Union (EU) Member States, and thus the potential to benefit from ICT adoption remains uneven. An analysis of the Networked Readiness Index (NRI) results shows that, while many European countries are leading in the rankings and several Nordic and Western countries are within the top 10, many others continue to lag behind. A digital divide persists within the European Union.

Although it is difficult to create homogeneous groups of European countries in terms of their level of digitization and the benefits accruing from it, a broad classification by geography would show that Northern and Western Europe depicts much stronger results than Southern and Central and Eastern Europe, even if the situation differs broadly within these groups. For example, within Central and Eastern Europe, Estonia presents values similar to those of some of the countries in Western Europe; within Southern Europe, Portugal and Spain outperform Greece.

Figure A presents the NRI results for each of the 10 pillars for these three groups of EU Member States. Based on this analysis, a number of key findings can be highlighted:

1. The gap between Northwestern European economies and the rest of the Member States is reflected in all of the 10 pillars of the NRI, from the market and regulatory conditions that support high levels of ICT uptake to levels of usage by all stakeholders and the economic and social impacts accruing from ICTs.
2. Overall, most countries depict fairly well developed ICT infrastructures. Although some countries should continue strengthening these infrastructures, they may not be the main source of the digital divide in Europe.
3. The cost of accessing ICTs is similar in all EU Member States and thus should not be regarded as a primary source of different levels of ICT uptake.
4. The gap in ICT usage across countries is bigger for businesses and narrower across governments. Overall, governments in most EU Member States have recognized the importance of developing ICTs and offer a fairly large number of public services online. However, the differences among countries in the capacity of their businesses to develop and integrate ICTs in their business models are much starker.
5. The gap in terms of social and especially economic impacts is the widest of the four subindexes, illustrating the new nature of the digital divide in Europe. Because the benefits of ICTs increasingly permeate all activities, the digital divide within Europe becomes starker when viewed by considering the impacts that benefit different stakeholders.

Figure A: The NRI 2014: European Union



Source: Authors' calculations.

Note: Southern Europe includes Greece, Italy, Portugal, and Spain; Northwestern Europe includes Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, Sweden, and the United Kingdom; and Central and Eastern Europe includes Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, and Slovenia.

These findings have several policy implications both for EU Member States and for the European Commission's effort to build a common Digital Agenda that stimulates a virtuous circle of investment in ICT infrastructure, higher uptake levels, and stronger impacts for all. Arguably the main implication is that digital strategies should focus not only on developing ICT infrastructure but also on creating the right conditions for an effective use of ICTs to boost innovation, competitiveness, and greater social inclusion. In order to do all that, public policies and company strategies are needed to improve the digital literacy of the population; to boost the overall skills capacity of the workforce through effective educational and training systems; and to encourage an effective integration of ICTs with other sources of innovation, such as R&D investments or higher levels of on-the-job training. To maximize their impact, these activities will need to be coordinated across stakeholders, so creating and strengthening public-private collaborations will be key.

Note

- 1 European Commission 2013.

good economic impacts (19th) and a large share of its population is employed in knowledge-intensive jobs (10th).

Benefiting from a fairly well developed ICT infrastructure (19th) and a pro-business and innovation environment (16th), **Ireland** moves up one position to 26th place. Since the early days of the Internet revolution, Ireland has identified ICTs as one of the key industries that could help diversify its economy and has attracted many global ICT companies thanks to its favorable environment for business. As a result, the island boasts good levels of digital connectivity that, coupled with a skilful labor force, has resulted in good economic impacts (18th) derived from technology-related innovations. On a less positive note, the government seems to lag behind in embracing ICTs in their offerings of online services (55th), which affects the country's capacity to fully leverage ICTs to increase their social impacts (55th).

Portugal and **Spain**, at 33rd and 34th position respectively, present fairly stable profiles. As in past editions, both countries have managed to develop good ICT infrastructures (36th and 32nd, respectively) and ICT uptake has permeated among their populations, particularly in Spain where almost three-quarters are Internet users (34th). In addition, both governments have made significant attempts to increase the number of services they offer online. Despite these efforts, both countries continue to struggle to fully leverage ICTs to boost innovation (42nd and 57th, respectively), and weaknesses in their innovation ecosystems persist, notably in Spain (51st). Addressing these weaknesses and integrating ICT investments better with other innovation-enhancing investments, such as R&D, would result in more robust economic outputs, which are needed for the economic transformation of these countries.

In Southeastern Europe, once again **Slovenia**, despite its current economic difficulties, continues to lead the rankings, moving up one position to reach 36th place. The country boasts a fairly robust ICT infrastructure (24th), along with good ICT uptake by individuals (34th) and government in its offering of online services (35th). Despite these positive features, Slovenia does not manage to completely leverage the full economic potential of ICTs for boosting innovation, where it continues to lag behind other EU countries. Weaknesses in Slovenia's innovation system, with low levels of venture capital (127th), a limited capacity to innovate (54th), and low levels of on-the-job training (105th) result in low levels of innovation, in terms of both new products and services (69th) and organizational models (68th), which hinder the productivity-enhancing potential of the economy. Within the region, **Croatia** follows at 47th place, with **Bosnia and Herzegovina** (68th) and **Serbia** (79th) lagging behind because of insufficient development of their ICT infrastructures, weak ICT uptake, and weaknesses in their innovation systems that hinder their potential to fully enjoy the benefits that can accrue from ICT.

In Central and Eastern Europe, the **Czech Republic** repeats last year's position at 42nd place, despite sharp improvements in rendering a fairly good ICT infrastructure (23rd) more affordable (84th), which has resulted in a slightly higher ICT uptake by individuals (30th). However, this improvement is set off by a slight deterioration in the political and regulatory environment (51st) that does not allow for better ICT-related economic (38th) or social impacts (47th). Overall, the country continues to depict strong ICT uptake by individuals, reflected by the fact that a large share of its population uses the Internet (28th) and e-commerce is well developed (9th). However, the government continues to lag behind in supporting and promoting the use of ICTs in their activities (96th), and weaknesses in the innovation and entrepreneurial systems (60th) hinder the country's capacity to fully leverage ICTs for improving innovation, competitiveness, and well-being.

Other countries in Central Europe—such as **Hungary** and **Poland**, at 48th and 55th place respectively—have lost some ground in the rankings because of the relatively faster progress of other countries, while the **Slovak Republic** improves its position by two places to reach 59th position. In addition, **Bulgaria** and **Romania**, 72nd and 76th respectively, drop one position each, depicting relatively stable profiles.

Despite a slight improvement in many indicators related to ICT infrastructure (42nd) and uptake (37th), which gives rise to a stable score, **Italy** suffers from a significant drop of eight places in the rankings to reach 58th place: other countries progress faster in building and fully utilizing their digital ecosystems. Persistent weaknesses in Italy's political and regulatory environment (99th), coupled with some significant challenges in its innovation system, hinder the country's capacity to fully leverage ICTs to boost innovation, competitiveness, and well-being.

As in the case of Italy, **Greece** suffers from a notable drop of 10 ranks despite a slight improvement in its overall score, coming in at 74th place this year. Continued improvements in its ICT infrastructure (40th) and the uptake of its citizens (43rd), as well as a rising number of broadband Internet subscriptions (27th) and Internet users (53rd), are not reflected in better, innovation-led economic (91st) or social (87th) impacts. Weaknesses in the country's political and regulatory environment (114th) coupled with a low capacity to innovate (117th) and scarce access to venture capital (146th) affect the country's capacity to introduce new services and products (129th) or organizational models (128th) that could help to transform its national economy and lead it toward more productive activities.

Within the Commonwealth of Independent States, several countries improve their performances, reflecting the key importance and hopes they have placed on ICTs to diversify their economies and lead them toward more knowledge-intensive activities.

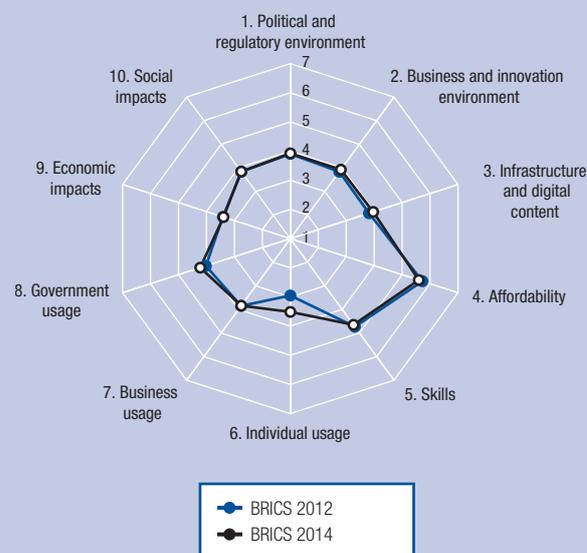
Box 3: Challenges faced by BRICS economies to fully leverage ICTs

Since the beginning of the worst financial and economic crisis of the past 80 years, the global economy has experienced a change in its traditional growth patterns. Advanced economies exhibited negative or sluggish growth, while emerging markets, and notably the BRICS economies—Brazil, the Russian Federation, India, China, and South Africa—continued to show robust growth. Several different reasons may explain these growth patterns for emerging markets; among them are the development of stronger domestic markets, an increase in the price of commodities, and access to more and better financing thanks to higher capital in-flows.

Notwithstanding this progress of the BRICS, we have recently observed that many of these emerging economies are experiencing difficulties in maintaining the rapid economic growth of these past years. Many of the favorable conditions fueling that growth have begun to fade away; this can have consequences not only for these particular countries, but—given their size and increasing importance in an interconnected world—also for the global economy.

In order to support sustained and stable growth in the long term, emerging markets must increase their levels of productivity, which they can do in two ways: by introducing the necessary reforms that will improve the functioning of their markets and boost their innovation potential, and by better leveraging their digital ecosystems. In terms of the latter, an analysis of the Networked Readiness Index (NRI) results for the past years shows that, in general, little progress has been achieved.

Figure A: The NRI in BRICS economies, 2012 and 2014



Source: Authors' calculations.

Table A: The NRI in BRICS economies, 2012 and 2014

	BRAZIL		RUSSIAN FEDERATION		INDIA		CHINA		SOUTH AFRICA											
	2012		2014		2012		2014		2012		2014									
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value								
Networked Readiness Index	65	3.9	69	4.0	56	4.0	50	4.3	69	3.9	83	3.8	51	4.1	62	4.1	72	3.9	70	4.0
Environment subindex	101	3.5	116	3.4	100	3.5	87	3.8	78	3.7	91	3.8	64	3.9	77	3.9	34	4.6	31	4.8
1. Political and regulatory environment	77	3.6	78	3.6	102	3.2	100	3.4	71	3.7	73	3.6	46	4.1	56	4.0	23	4.9	20	5.0
2. Business and innovation environment	121	3.5	135	3.3	83	3.8	73	4.2	91	3.8	103	3.9	105	3.7	115	3.8	50	4.4	53	4.5
Readiness subindex	72	4.7	76	4.7	32	5.4	37	5.5	64	4.8	85	4.6	66	4.8	73	4.8	94	4.1	98	4.2
3. Infrastructure and digital content	68	4.0	56	4.5	40	4.8	47	4.8	100	3.2	119	2.7	87	3.5	86	3.5	82	3.6	68	4.2
4. Affordability	67	5.3	91	5.0	17	6.2	14	6.4	1	6.9	1	7.0	42	5.7	60	5.6	94	4.6	112	4.0
5. Skills	86	4.7	91	4.6	53	5.2	64	5.1	100	4.3	101	4.0	57	5.2	59	5.2	101	4.3	97	4.3
Usage subindex	54	3.8	47	4.1	60	3.7	53	4.1	78	3.4	91	3.4	51	3.8	61	3.9	76	3.4	70	3.7
6. Individual usage	66	3.3	59	4.2	52	3.9	46	4.6	117	2.0	121	2.1	82	2.9	80	3.3	96	2.6	78	3.4
7. Business usage	33	4.0	41	3.9	83	3.4	84	3.4	47	3.8	51	3.8	37	4.0	44	3.9	34	4.0	30	4.2
8. Government usage	59	4.0	54	4.3	71	3.7	61	4.1	46	4.3	41	4.5	33	4.6	38	4.6	89	3.6	103	3.6
Impact subindex	53	3.7	57	3.6	73	3.4	44	3.9	52	3.7	60	3.6	41	4.0	56	3.7	81	3.3	89	3.3
9. Economic impacts	52	3.5	64	3.3	53	3.4	41	3.6	41	3.6	50	3.5	79	3.2	81	3.1	59	3.4	49	3.5
10. Social impacts	54	3.9	58	3.9	89	3.4	41	4.3	65	3.8	73	3.7	30	4.8	44	4.2	98	3.3	113	3.0

(Cont'd)

Box 3: Challenges faced by BRICS economies to fully leverage ICTs (cont'd.)

Figure A compares the NRI scores by pillar for the BRICS economies in the 2012 and 2014 editions. Overall, the results have remained stable in virtually all pillars, and notably so for the economic and social impacts accruing from ICTs. The only exception has been a slight improvement in the individual usage score, which reflects the significant effort made to facilitate a broader access to ICTs for a wider share of the population.

In comparative terms, however, this stability in the scores represents a drop in the global rankings because other economies are progressing faster in developing and leveraging their ICT potential. Table A shows that since 2012—with the exception of the Russian Federation, which rises six places in the rankings—all other BRICS economies have dropped over time, in some cases significantly, and are now classified around the middle of the overall rankings. A more nuanced analysis of the different subindexes confirms that this drop in rankings is particularly important for economic

and social impacts, where only the Russian Federation manages to improve in both score and rank.

Reversing this situation will require the adoption of holistic strategies that support better development of ICT infrastructure and higher uptake of ICTs throughout these countries, including in rural areas. Although the vast expanse of these nations may represent a challenge, they should continue to invest in strengthening their ICT infrastructures and facilitating wider access to them. In addition, and very importantly, the conditions needed to better leverage ICTs need to be improved by integrating these technologies better into more robust innovation and entrepreneurial ecosystems that can support higher economic and social returns. Strengthening the institutional framework to support the development of ICTs, improving the quality of the educational systems and of the scientific and technological base in the country, and supporting interactions between research institutions and local companies will be thus be key going forward.

Kazakhstan is one of the most prominent of this group, leading the regional rankings at 38th, five positions up from the last edition. The country has improved its ICT infrastructure (58th), which remains one of the most affordable to access in the world (2nd)—an advantage that is also reflected in stronger ICT uptake by individuals (54th), with more than half of its population using the Internet or owning a computer with an Internet connection at home. The effort to upgrade the digital capacity of the country has been led by a strong government vision (27th) that recognizes the importance of promoting ICTs to diversify an economy that otherwise continues to be very reliant on the extraction of fossil fuels. Going forward, the country needs to continue building and strengthening its innovation system and the capacity of local companies to innovate (now 74th) to improve the economic impacts accruing from an increasing uptake of ICTs.

With a similar profile, **Azerbaijan** follows Kazakhstan closely in the rankings as it positions itself at 49th place, seven places up since the last edition. Improvements in the country's ICT infrastructure (55th), giving rise to much higher ICT uptake—especially by individuals (61st)—have yielded this positive result. Despite this advance, the country continues to lag behind in terms of fostering technological innovation, exhibiting low levels of overall and ICT-related patents (75th). To some extent this lag reflects the severe impediments existing in an incipient innovation system (77th) and the insufficient quality of its educational system (114th). Addressing these long-term challenges over the coming years will be crucial for Azerbaijan to diversify its economy and make it less dependent on oil revenues while transitioning toward a knowledge-based society.

Similar to other countries in the region, and in sharp contrast to other BRICS economies (see Box 3) the **Russian Federation** moves up four positions to

enter the top 50 this year. Slight improvements in the country's ICT infrastructure, which has become more affordable, along with higher rates of individual uptake (46th), have resulted in this positive outcome. Despite this progress, the country continues to suffer from a fairly inefficient political and regulatory environment (100th) and weaknesses in its innovation system, including a poor quality educational system (85th) that hinders its capacity to fully leverage ICTs to innovate, either through new products and services (113th) or new organizational models (93rd). It is also worth noting that, although individual ICT uptake is rather good (46th), both government usage (61st) and a poor government vision for developing ICTs (102nd) as well as inferior business uptake (84th) to support its innovation potential (64th) and business activity (94th) remain in need of attention.

Within the region, **Georgia** at 60th place and especially **Armenia**—which has one of the sharpest improvements and reaches 62nd place this year—continue on their positive path toward higher positions in the rankings. In contrast, **Ukraine**, in the middle of a difficult political and social context, drops to 80th place, while the **Kyrgyz Republic** repeats its 118th position of the past edition.

ASIA AND THE PACIFIC

With three economies from the region in the top 10 of the NRI rankings and several countries showing improvement, Asia and the Pacific is very dynamic and active in developing its ICT agenda. Yet a significant digital divide persists between the most advanced economies—such as the Asian Tigers and Japan—and emerging economies and other trailing countries.

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 among them to gain access to much-needed basic services, to improve government transparency and efficiency, and—for the most advanced—it will contribute to boosting their innovation capacity and allow them to attain higher levels of competitiveness.

Taiwan, China, slips to 14th place in this edition despite a stable performance in terms of score. This relative drop in the rankings is primarily the result of improvements in other countries. Taiwan remains at the frontier both as a high-tech manufacturer and as a technology-driven economy, with strong usage of ICTs among all society's stakeholders. In addition, the economy manages to improve its already developed infrastructure (5th) by, for example, expanding its international Internet bandwidth by a significant amount and by making access to ICTs more affordable (53rd). Consequently, the economy scores strong social (6th) and economic impacts (12th), although these could be increased further by addressing some weaknesses in its political and regulatory environment (34th). This remains Taiwan's main area for improvement, especially with its lengthy procedures to enforce contracts (131st).

Japan moves up five positions to attain 16th place this year. Although a link between this improvement and its current economic outlook cannot be established, renewed business confidence in the political environment may have contributed to this progress. In addition, Japan has achieved marginal improvements in its ICT infrastructure, which has become more affordable, and maintains its competitive advantage in the high innovation capacity of local firms (4th). Technology and innovation continue to play a key role in making Japan one of the most productive economies worldwide; these have managed to extend to society, as social impacts have continued to improve (23rd). Yet further improvements in social and economic impacts could be achieved by incentivizing a more dynamic environment that could, for example, foster innovation through new organizational models (37th). A more conducive institutional framework, especially the general business and innovation environment (40th), could contribute to delivering better results and boost competitiveness.

Australia occupies the 18th rank and is stable since last year, despite an improved score. The country registers a sharp improvement in the affordability of ICTs (49th) and in some notable aspects of individual usage, such as the penetration of broadband subscriptions. According to ITU, the increase in smartphone usage is leading to more handset data download because owners of smartphones are more likely to purchase goods, access video and audio content, pay bills, and use other online services.¹⁰ This increased usage is partially reflected in some aspects of their economic impacts through the creation of new services, new products, and new organizational models. Compared with individuals, businesses and government are less dynamic in taking up ICTs.

Neighboring **New Zealand** (20th) shows a stable performance in the rankings with a slight advancement in score. The country's regulatory and business environment remains its strongest competitive advantage (2nd overall in the environment subindex, just behind Singapore). New Zealand ranks 1st for the independence of its judicial system and 1st in both the number of days and the number of procedures to start a business. The excellent skill base of its population (6th) also contributes to the country's ability to properly use and leverage a fairly good ICT infrastructure, although it remains rather pricy (127th), constituting New Zealand's main weakness.

Malaysia is also stable (30th) and confirms its leadership as the highest ranked economy in Developing Asia. Malaysia maintains relatively competitive regulatory (25th) and business (24th) environments, and its government continues to use ICTs extensively (9th), highlighting the high priority of this sector in the government's agenda. Business usage (27th) is also strong, as firms invest to adopt new technologies and make the effort to become increasingly innovative. The combination of a favorable environment and an overall high level of ICT usage results in high positive economic (30th) and social (25th) impacts. However, individual usage (49th), although improving in many dimensions, has yet to expand so that ICTs become a widespread technology in Malaysian households. This will certainly increase as the economy develops, but further investment in infrastructure and digital content (71st) are needed to ease access and foster even higher economic and social impacts.

China falls four places in the rankings this year and occupies the 62nd position overall, despite an increase in its overall score. The country is slowly improving its innovation potential but still lags behind in leveraging the full potential of ICTs. For example, despite an increase in patent applications, the overall level remains relatively low (32nd) with just 11.5 applications per million population. Individual usage is also growing, which explains most of the progress in China's score. However, only just over 40 percent of individuals use the Internet on a regular basis and there are only 13 fixed broadband Internet subscriptions for every 100 people (51st). Mobile broadband Internet has registered more substantial growth, but its penetration is still low, with 17 subscriptions per 100 population (76th). Consequently, individual usage in China still ranks low (80th), trailing behind the level of ICTs used by other stakeholders: business (44th) and government (38th). Certainly the vast size of the country and its proportion of rural population does not allow for rapid improvement in ICT usage and infrastructure build up, yet China needs to fill the gap to meet its ICT potential. Some of the constraints to better leverage ICTs that have been faced by the country in the past are not improving. The institutional framework does not lead to higher ICT uptake (56th), and the business environment (115th) witnesses a relative

worsening because of excessive bureaucracy and red tape, high taxes (135th), and delayed availability of new technologies (107th), at least at the national, aggregate level. In terms of readiness, China is making an effort to improve its infrastructure, with augmented production of electricity and higher international Internet bandwidth capacity and server security. Yet performance in these dimensions is still relatively low because improvements hardly keep up with the country's rapid development. Moreover, progress on the construction of hard ICT infrastructure is counterbalanced by a diminished accessibility of digital content (67th). And although the skill base of the workforce is growing (for instance, participation in secondary education is growing to reach 86.6 percent of its population), it is not growing as quickly as in other competing economies, and the country attains a relatively low 59th position on the skills pillar. Furthermore, the affordability of ICTs has dropped to 60th place, representing the main area of decline. All these limitations combine to realize only low economic impacts (81st), allowing a limited impact of ICTs on new services and products and a low share of the workforce employed in knowledge-intensive activities. Further and sustained efforts should be made to unleash the innovative potential of ICTs, both through investment in capacity building and infrastructure and through a more open and creative environment that could foster new ideas and business models.

Since the last assessment, **Indonesia** climbs 12 places to attain 64th position, the third best result among members of the Association of Southeast Asian Nations (ASEAN) after Singapore and Malaysia.¹¹ This result is achieved thanks to balanced improvements across the board rather than to a sharp increase in one particular area, although more significant progress takes place in the environment subindex. Both the political and regulatory environment (68th) and the business environment (62nd) are improving. The former is driven by stronger perceptions about the effectiveness of the country's institutions, with enhanced intellectual property protection (55th), a more efficient legal system (49th), and better-developed ICT regulations (46th). The latter is driven by stronger local competition (66th, up several positions since last year) and the greater availability of the latest technologies (60th), while venture capital availability remains high (17th) and slightly improving as well. However, further advancements can be achieved in this area, as excessive red tape continues to limit the creation of new businesses. Indonesia's readiness also improves. While affordability remains one of its main strengths (37th), progress in skills and infrastructure add to the country's fairly solid performance. After having achieved full mobile network coverage last year, its international Internet bandwidth capacity improves significantly to reach 77th place. In terms of skills, the quality of its educational system is improving as well as its population's participation in higher education,

with a secondary education enrollment rate of 81 percent. Yet readiness can be further enhanced by continuing investing in education and especially in ICT infrastructure, where the capacity of secure Internet servers (105th) and electricity production (104th) remain insufficient to sustain future ICT development. Usage, also on a positive trend, has stayed more stable. Across stakeholders, businesses (36th) lead, with companies quickly absorbing the latest technologies and increasingly integrating ICTs in their daily activities. Businesses are followed by the government (49th), while households continue to lag behind (95th). The penetration of mobile phones passed 100 subscriptions per population a few years ago, mobile broadband subscriptions are rapidly evolving, and social networks are popular. However, the low usage of the Internet (112th) and the scarce availability of personal computers (103rd) and home Internet connections (117th) still reflect gaps in the fulfilment of Indonesia's ICT agenda. Consequently, economic and social impacts (86th and 63rd, respectively) are increasing but still low compared to the tremendous improvements registered in the few years. It is hoped that the benefits of ICTs are building up and will be secured in the near future.

Thailand, similar to most other ASEAN members, improves its performance this year, reaching 67th place in the rankings. Despite the wide gap vis-à-vis Singapore and, to a lesser extent, Malaysia, Thailand exhibits progress in all the subindexes. Its main strengths lie in its relative affordability of ICTs (47th) and its business and innovation environment (45th). However, in both these pillars Thailand alternates good results with areas for improvement. For example, in terms of affordability, the accessible mobile phone tariffs (30th) are counterbalanced by less competitive broadband Internet prices (86th). Similarly, the business and innovation environment includes a high level of local competition (41st) as well as low government procurement of advanced technology (105th). Business usage is another area of relative strength (59th), thanks to the widespread use of ICTs for consumer transactions (50th) and also to active technology absorption (50th). Individual usage of ICTs still lags behind (85th), yet it shows significant improvement with a good penetration of mobile phones (38th) and usage of virtual social networks (49th), comparable to those of advanced economies. Yet, aside from mobile telephony, other technologies remain relatively scant, especially the breadth of mobile broadband technologies (132nd). Moreover, the institutional environment does not seem to be particularly conducive (79th) and the government does not appear to be particularly eager to push the digital agenda nationwide (84th). The resulting economic impact is therefore not yet satisfactory (104th), with few ICT PCT applications, few organizational models, and a low share of the workforce in knowledge-intensive activities.

Sri Lanka, another ASEAN economy, drops seven places to take the 76th position in the rankings, but its score continues on a positive upward trend. The environment subindex, both in its political and regulatory component and in its business and innovation component, loses some ground, yet this is compensated for by stronger usage, especially among business (50th) and government (43rd) stakeholders. Individual usage is also improving, but because it is starting from a very low base (112th) it still needs to fill important gaps across the board, while the country's infrastructure (104th) demands sustained investments to support the ICT sector adequately.

India is the least performing of the BRICS economies and is continuing on its declining trajectory to arrive at 83rd place in this edition. The drop in rankings can be traced back mainly to difficulties in improving historical limitations and keeping up with other emerging economies in several dimensions. Overall, India's networked readiness profile remains hindered by the quality of its political, regulatory, and business environment (91st) and its lack of digital infrastructure (119th), which is reflected in low individual usage (121st) and wide gaps in education participation that limit the creation of a wide skill base (101st). Red tape and corporate tax continue to create a difficult environment for businesses to operate, with almost no improvements since the last assessment. On this dimension—despite the positive availability of venture capital (27th), competitive local markets (24th), the availability of the latest technologies (58th), and improving perceptions of judicial independence (40th)—bureaucracy and administrative costs are extremely burdensome. For example, enforcing contracts remains a long process, both in terms of number of procedures (134th) and time (146th). In terms of readiness, the development of the country's infrastructure proceeds slowly: for example, electricity production expands, but remains insufficient overall (101st); the number of secure Internet servers also increases but remains low (108th). However, the most worrisome signals of insufficient progress on the digital agenda come from the lack of skills buildup, with dismal progress made in secondary education participation (68.5 percent, ranking 105th) and literacy rate (127th). The inadequate diffusion of basic skills required in a knowledge society is certainly a drag on ICT development and hinders leveraging the yet-untapped innovation potential of large, young Indian human resources. The low level of ICT usage by households and individuals reflects the strong human, infrastructure, and digital divides that characterize India. The penetration of mobile phones is low (69.9 percent) and not growing, while the numbers of Internet users (12.6 percent), households with a personal computer (10.9 percent), and mobile broadband subscriptions (5 percent) are disappointing (all ranking below the 102nd position). The main strength of India lies in its very affordable set

of ICT tariffs (1st) and its businesses' capacity to adopt new technology (48th). The government continues to emphasize ICTs as a promising tool to address some of the country's priorities such as job creation, corruption, red tape, and education. However, this vision has yet to translate into a structural transformation of India's economy and society.

Improving its position both within the ASEAN group and overall, the **Philippines** climbs eight places to reach the 78th position. With a significant improvement in its overall score, the country continues its positive trend. The scores of all the 10 networked readiness pillars register an increase. A significant improvement in the perceived efficiency in the country's legal system and property rights protection drive the political and regulatory environment up to 87th place. ICT readiness is the other area where the Philippines improves the most, thanks to a more affordable (75th) access to ICT infrastructure and better skills (69th), despite the need for higher quality in the educational system. Business usage is, as in many other Asian economies, at a more advanced stage (43rd) than individual usage (91st). Progress made in terms of economic impacts registered last year continues this year, moving up eight positions and reaching 48th place. The role of ICTs in fostering innovation by creating new products and services (42nd) and organizational models (28th) is confirmed and contributes to this promising result.

With a stable performance, **Vietnam** is overtaken by the Philippines in the ASEAN group but remains 84th overall and marginally improves its score. The affordability pillar is corroborated as the main strength of Vietnam's performance (8th), jumping 30 positions since the last assessment. The business and innovation environment is the other main area where Vietnam progresses significantly, albeit from a low base (100th this year). The other many shortcomings endure: the poor overall quality of the political and regulatory environment (91st) and ICT infrastructure (121st) limit the expansion of the ICT sector, while available skills (88th) show no signs of development. The usage of ICTs by individuals (84th), businesses (88th), and government (58th) remain stable, with little progress registered since the last assessment. Such a lack of dynamism not only is detrimental to the development of ICTs, but also seriously undermines the country's competitiveness going forward.

The eight ASEAN members covered by the NRI in the last edition improve their overall scores and a majority make progress in the rankings as well, although some continue to be located toward the lower end: **Cambodia** (108th), the newly covered **Lao PDR** (109th), and **Myanmar** (146th) close the regional rankings.

Finally, **Bhutan**, assessed for the first time this year, ranks 94th; **Pakistan** is ranked 105th, down three places; **Bangladesh** is 114th, losing one position; and **Nepal** is 126th.

LATIN AMERICA AND THE CARIBBEAN

Improving the connectivity of the region continues to represent one of its main challenges despite the recent efforts of many countries to develop and update their ICT infrastructures. Countries such as Chile, Panama, Uruguay, and Colombia have made significant progress in developing and ensuring more and better access to ICT infrastructure, ensuring higher ICT usage across stakeholders. However, persistent weaknesses in the broader innovation system hinder the overall capacity of the region to fully leverage ICTs to foster its competitiveness potential, highlighting the rise of the new digital divide—that is, the divide between countries that are achieving positive economic and social impacts related to the use of ICTs and those that are not.

Despite a slight increase in its overall score, **Chile** drops one notch to 35th place while still leading the regional rankings. As mentioned above, the country relentlessly continues to develop its ICT infrastructure and ensure higher ICT usage across stakeholders, with one of the highest rates of Internet users (45th), e-commerce (35th), and online government (24th) services in the region. Despite this important progress, weaknesses in its innovation system, which are reflected in the relatively low capacity of Chilean companies to innovate (63rd) and concerns about the quality of its educational system (74th), especially math and science education (107th), continue to hinder Chile's capacity to fully leverage ICTs to support innovation and the transition to a knowledge-based economy.

Panama continues its ascent in the rankings, moving up three spots to 43rd place. The country has recognized the importance of ICTs as one of the key sources of economic growth for the future both as an industry and as an enabler for innovation, notably in the service sector. This governmental vision (22nd) is reflected in higher rates of ICT uptake by businesses (39th) and individuals (68th), even if the reported figures do not reflect the government's efforts to provide free universal Internet access. Notwithstanding this progress, the country still suffers from weaknesses in its educational system (75th), notably in important areas for innovation such as math and science (114th), and in its political and regulatory environment (62nd). Panama's overall capacity to innovate is also still low (50th). These weaknesses hinder its ability to fully leverage its digital potential to foster higher levels of competitiveness.

Stable at 53rd place, **Costa Rica** exhibits some progress in ensuring higher ICT uptake, with an important increase in the number of households with access to an Internet connection (59th) and a higher proportion of its population with mobile broadband subscriptions (70th), thanks to efforts to guarantee affordable (15th) access to the ICT infrastructure. Notwithstanding these strengths, overall individual (64th) and government (64th) usage remain a bit low, and some weaknesses in the political and regulatory environment

(63rd)—notably in the effectiveness of law-making bodies (140th) and the number of days to enforce a contract (123rd), as well as the conditions needed to boost innovation and entrepreneurship (70th)—affect the country's capacity to leverage its ICT potential to foster innovation and ensure the transition toward a knowledge-based economy (65th).

Barbados suffers a significant drop in the rankings, falling 16 positions to arrive at 55th place. This decline is driven by sharp increases in the price of accessing its ICT infrastructure and a drop in the economic impacts derived from ICT usage (57th). Overall, the Caribbean island continues to boast an excellent educational system (6th) that, coupled with a relatively favorable environment for business (38th), could result in higher economic impacts than those yet achieved. However, weaknesses in its innovation system, where companies report low levels of capacity to innovate (81st) and difficulties in accessing venture capital financing (98th), along with long and cumbersome procedures to start a business (94th), continue to hamper its innovation potential and thwart its ability to leverage the digital ecosystem. Going forward, addressing these weaknesses while continuing to improve its ICT infrastructure and uptake would result in greater economic and social impacts.

Despite the improvement in score that reflects the effort **Uruguay** has made to boost its ICT infrastructure and uptake over the past years, because other countries are progressing more quickly the country drops four places to land at 56th place. As in past years, Uruguay continues to improve its ICT infrastructure (50th), which has become more affordable (80th), resulting in higher levels of uptake by individuals (48th). Notwithstanding this progress, the country continues to suffer from weaknesses in its overall innovation system: of concern is the quality of its educational system (120th) and its capacity to provide the necessary skills for a changing economy, as well as its low capacity to innovate (88th). This situation results in modest economic impacts (61st) in terms of fostering innovation and ensuring a faster transition toward a knowledge-based economy (66th).

Colombia moves up three positions to reach 63rd place this year. Improvements in its ICT infrastructure, which has become relatively more affordable (44th), and in individual uptake (77th)—with a larger number of Internet users (66th) and households with a personal computer (74th) and an Internet connection (75th)—have allowed for this positive result. Notwithstanding this progress, the country continues to suffer from poor framework conditions for entrepreneurship and innovation (104th) and from weaknesses in its educational sector, notably in the quality of math and science education (108th), resulting in a poor capacity to innovate (83rd) and a small share of its population engaged in knowledge-intensive jobs (89th).

Despite a slight increase in NRI score thanks to improvements in its ICT infrastructure (56th), **Brazil** drops nine positions to arrive at 69th place because other economies have been faster to embrace the digital revolution. Overall, the country exhibits relatively high levels of ICT usage, with about half of its population using the Internet, a well-developed e-commerce industry (30th), and a government committed to offering a significant number of its services online (32nd), resulting in fairly good citizen e-participation (31st). However, a poor business and innovation environment (135th), coupled with weaknesses in its educational system (121st)—notably in the area of math and science (136th)—hampers the full attainment of the economic impacts that ICTs can provide (64th). Only a small proportion of its population is engaged in knowledge-intensive jobs (75th).

After a couple of years of important improvements in the rankings, **Mexico** does not consolidate past gains and falls 16 positions to reach 79th place. Despite some progress in expanding and upgrading its ICT infrastructure (81st) and uptake by individuals (89th), this is insufficient to catch up with advances in other economies, and thus Mexico does not manage to digitally converge with more-advanced economies. The cost of accessing its existing ICT infrastructure remains high (93rd) and the quality of its educational system (119th) continues to pose a severe challenge to providing the country with the skills necessary required for a changing and more digital economy. All this results in low ICT usage levels by both individuals and businesses, in spite of the government's significant efforts to offer many of its services online (28th), thereby enabling good rates of citizen e-participation (25th). In addition, its innovation ecosystem needs strengthening and, in general, Mexican companies have a low capacity to innovate (75th), resulting in low economic impacts (80th) and a population that concentrates largely on low-productivity activities and few jobs considered to be knowledge intensive (97th). A full implementation of the country's digital agenda and addressing the persistent weaknesses in the innovation system should help in resolving several of these persistent challenges.

Peru jumps 13 places to attain 90th position, thanks to some improvement in its ICT infrastructure—for example, greater access to international Internet bandwidth and higher individual uptake. Despite this progress, the country continues to lag significantly behind in terms of its capacity to fully leverage ICTs to build its competitiveness and modernize its economy, which continues to rely heavily on mining. Overall, weaknesses in its educational sector (134th), which does not seem to provide the right set of skills, coupled with relatively low deployment of its ICT infrastructure (95th), result in low levels of ICT uptake by both individuals (94th) and businesses (89th). In addition, weaknesses in enabling conditions for leveraging digital capacity

for innovation (93rd), along with a weak political and regulatory environment (119th) and an excessive number of days to open new businesses (103rd), result in a poor innovation capacity (106th) and an economy that is not able to offer many knowledge-intensive jobs (94th). Improving the development of ICT infrastructure and access to it, coupled with better conditions and interaction with other innovation-related investments—such as education, training, and R&D—would help to improve the situation going forward.

Argentina drops one position to reach 100th place. In general, the country boasts few changes since last year. Although the development of an expensive (121st) ICT infrastructure (78th) and uptake by individuals (57th) present values above the Latin American average, the severe weaknesses in its business environment (135th) and concerns about the quality of its educational system (104th) and its ability to provide the workforce with the necessary skills for the economy result in this disappointing position.

Finally, **Paraguay** (102nd), **Venezuela** (106th), **Honduras** (117th), **Bolivia** (120th), **Nicaragua** (124th), and **Haiti** (143rd) close the regional rankings. These countries all suffer from both important weaknesses in the development of their ICT infrastructures and a lack of the innovation and entrepreneurial conditions that could help them fully leverage them.

SUB-SAHARAN AFRICA

Sub-Saharan Africa slowly continues to develop its ICT infrastructure, especially by expanding the share of the population covered by, and having access to, mobile telephony and by expanding the number of Internet users, which in some countries—such as South Africa—has almost doubled. These improvements have led to many important innovations that provide more and better services that were previously unavailable, such as financial services. Notwithstanding this progress, the region overall continues to suffer from a relatively poor ICT infrastructure, which remains costly to access, although some notable exceptions exist. More importantly, severe weaknesses persist in the region's business and innovation ecosystems, which result in very low positive economic and social impacts. Addressing these weaknesses, not only by developing a more solid ICT infrastructure but also by improving the framework conditions for innovation and entrepreneurship, will be crucial to avoid the emergence of a new digital divide that will be evident in a disparity of the economic and social impacts associated with what has been called the digital revolution.

Mauritius recovers the ground lost last year and moves up seven positions to attain 48th place. Gains across the board—most notably in terms of a better ICT infrastructure and skills base, along with a higher level of individual usage—have led this improvement. Overall, the government's vision (31st) to develop ICTs as a key

sector to support the economic development of the island, coupled with a positive political and regulatory environment, have resulted in improvements in an affordable (11th) ICT infrastructure and higher levels of ICT users, even if less than half of its population uses the Internet or has a computer with an Internet connection at home. Improving the economic impacts (70th) accruing from a higher use of ICTs will require resolving some important weaknesses in the innovation system, such as the capacity of local companies to innovate (72nd), which is still considered low.

Despite some important improvements in the penetration of ICTs among individuals, which is reflected in a higher NRI score, **South Africa** remains stable at 70th place. In the past year, an expensive (112th) ICT infrastructure (68th) has exhibited little progress. In using ICTs, the business community (30th) seems to have taken the lead, using ICTs vigorously in interactions with other businesses (30th); this business-to-business use seems much more developed than interactions with consumers (62nd). On the other hand, the government (103rd) lags substantially behind in embracing ICTs, offering few online services (80th), which in turn results in low social impacts (113th). Weaknesses in the innovation system, notably in terms of skills development (97th), also affect the country's economic potential (49th) despite its fairly robust political and regulatory environment.

In the bottom half of the rankings, **Rwanda** moves up three positions to reach 85th place, regaining some of the ground lost last year. Overall, the country depicts a profile similar to that of previous years. It makes little progress in improving its very expensive (128th) ICT infrastructure (108th), which results in a low uptake by its population (138th) despite the clear vision of the government (5th) to promote ICTs in the country. Weaknesses in its innovation system and the low share of its population that graduates from secondary education (139th) also affect its capacity to fully leverage ICTs to boost innovation (93rd) or increase its population's online participation (112th).

Despite some very significant efforts to boost its ICT infrastructure and ICT uptake by its population, **Kenya** remains stable at 92nd place. As in the case of Rwanda, despite a strong government vision (26th) to develop ICTs, the actual uptake by its population (113rd) continues to remain very low, albeit increasing: only around 10 percent of households have a computer (113th) or an Internet connection (103rd). Weaknesses in the innovation and entrepreneurial environment (110th) and a fairly low skills base (98th) also affect the capacity of the country to fully achieve the potential benefits accruing from ICTs.

In East Africa, **Zambia** (110th) and **Uganda** (115th), swapping places from last year, and **Tanzania** (125th) continue to lag behind in developing their ICT infrastructures, promoting higher ICT uptake, and finally benefiting from the economic yields associated with

it. The situation is similar in West Africa, where many countries—such as **Senegal** (113th), **Gabon** (128th), and **Cameroon** (131st)—remain at the bottom of the rankings as a consequence of both the insufficient development of their ICT infrastructures despite important progress made in their mobile telephony uptake, and weaknesses in their innovation systems that result in a low capacity to boost their overall competitiveness. Efforts to close the digital divide in these countries should focus not only on developing their ICT infrastructures but also on improving the framework conditions for innovation in order to avoid the perpetuation of the gap in economic and social impacts that constitute the new digital divide.

THE MIDDLE EAST AND NORTH AFRICA

As in previous years, the region depicts a highly diversified outlook in terms of the capacity of countries to leverage ICTs to boost competitiveness and well-being. On the one hand, Israel and several Gulf Cooperation Council states have continued their efforts to improve ICT uptake and integrate ICTs better in more robust innovation ecosystems in order to obtain higher returns.¹² On the other hand, many countries in North Africa continue to lag behind and suffer from important weaknesses in their framework conditions and overall innovation capacity that prevent them from fully leveraging ICTs and obtaining higher returns.

Israel repeats its position at 15th place, leading the regional rankings with a stable profile. The country continues to boast a fairly good ICT infrastructure (29th) that remains affordable (35th) and results in very high levels of ICT usage (14th) across all agents. Around three-quarters of the country's households count on a personal computer (21st) and Internet connection (29th) at home and are Internet users (31st), and more than half of its population has access to mobile broadband (26th). The government has also made a significant effort to offer its services online (15th), and e-commerce (23rd) is fairly well developed. In addition, the country benefits from a rather skilful labor force (39th), despite some concerns about the quality of education (56th), that—coupled with favorable conditions for innovation and entrepreneurship (14th) and a high capacity of companies to innovate (4th)—result in very high technological capacity, as evidenced by the high number of overall patents (5th), notably in ICT-related fields (4th).

Qatar remains stable at 23rd place and leads the rankings in the Arab world. In the past year, the country has continued to improve and upgrade its ICT infrastructure (31st) and uptake (18th), thanks to a decisive effort led by the government's strong vision (3rd) that has identified ICTs as one of the key industries that will diversify the local economy and boost the productivity of all sectors. Qatar is among the top 10 in the world in terms of Internet users (9th) and households having access to a computer (8th) and Internet connection (10th), which has become almost

universal and has helped to achieve very high social impacts (8th). Economic impacts (32nd), while improving, could be higher. Technological innovation (46th) remains modest, and just a quarter of its population is employed in knowledge-intensive jobs (61st). Continuing to address some of the weaknesses in its innovation system, which is quickly evolving and strengthening, would result in a higher technological potential.

The **United Arab Emirates** continues to move up in the rankings, this year by one position, to reach 24th place. Improvements in its ICT infrastructure (30th) and ICT uptake by individuals (29th) have led to greater economic impacts (27th) and thus the rise in the rankings. As in Qatar, the government has a strong vision (1st) to develop ICTs as one of the key industries to diversify the local economy; this is reflected in the already high and rapidly increasing levels of ICT uptake across all stakeholders. More precisely, 85 percent of its population use the Internet (14th) and have access to a personal computer at home (18th); government services are largely available online (9th) and e-commerce is relatively well established (20th). Benefiting from a pro-business environment, the country also obtains fairly good economic impacts (27th), even though its technological innovation capacity remains low (49th). Sustaining efforts to strengthen its innovation ecosystem will be important going forward in order to boost the potential results of a fairly well developed digital ecosystem.

Stable at 29th place, **Bahrain** continues to depict a robust performance. Although ICT infrastructure, especially in terms of international Internet bandwidth (74th), may not be as well developed in Bahrain as in other countries, it is less costly to access (25th) and uptake by individuals is one of the highest in the world (14th), with a very high number of Internet users (10th); the number of households with a personal computer (3rd) is similar to that of the Nordic countries. As for other countries in the region, the government has a strong vision to develop the sector (14th) and offers a wide range of services online. Notwithstanding these strengths, Bahrain suffers from an overall low capacity to innovate (82nd), which reflects persistent weaknesses in its innovation system. Along with some concerns about the quality of its educational system (48th), notably in math and science (77th), these weaknesses hamper the country's capacity to obtain higher economic impacts (63rd) and transition toward a knowledge-based economy (74th).

Despite some significant improvement in the uptake of ICTs by individuals and development in its infrastructure, **Saudi Arabia** falls one position to reach 32nd place. Overall the country depicts a very stable profile compared with that of previous editions. Similar to others in the region, the government (6th) is leading the effort to digitally connect and advance the country, while individual uptake (44th), despite recent improvements,

and business uptake (34th), with a limited development of e-commerce (54th), lag a bit behind. Notwithstanding a fairly business friendly environment (23rd) that should continue its efforts to cut red tape (107th), weaknesses in its innovation system do not allow the economic impacts that ICTs could bring (37th). Going forward, strengthening its innovation system through more and more efficient investments to foster the scientific and technological capacity of the country will be important to increasing the share of its population working at knowledge-intensive jobs (67th) and helping the transition from a resource-based economy toward an innovation-driven one.

In the Levantine, both **Jordan** and **Lebanon** improve their scores, but while Jordan moves up three positions to 44th place, reaffirming its leadership in the area, Lebanon drops three to 97th place.

In North Africa, countries—except Algeria—suffer significant drops and are positioned in the lower half of the rankings, illustrating the difficulties they face if they are to fully develop their ICT potential and leverage it to obtain great social and economic impacts. **Tunisia**, at 87th place, leads the area, followed by Egypt, Morocco, and Algeria at 91st, 99th, and 129th place, respectively.

Egypt, at 91st place, falls 11 positions despite a slight improvement in individual ICT uptake (71st), which has nevertheless been smaller than the improvement seen by other countries that have evolved faster. Overall, Egypt continues to lag behind in terms of developing its ICT infrastructure (99th), although it remains fairly affordable (16th). ICT uptake by government is average (42nd), but penetration among citizens (71st)—with less than half its population using the Internet (75th)—and businesses, in their interaction with other businesses (81st) and consumers (70th), remain modest. Weaknesses in the political and regulatory environment (115th) and the business and innovation environment (117th) result in a low innovation capacity by Egyptian companies (111th) and thus limited economic (59th) and social (65th) positive outcomes.

Falling 10 positions, **Morocco**, at 99th place, barely ranks among the first 100 analyzed economies. As in the case of Egypt, ICT infrastructure (93rd) has slowly improved. This is also the case of individual ICT uptake, although progress in Morocco has been slower than in other countries that are moving faster. Overall, the country's economic (123rd) and social (115th) impacts remain very low, partly as a consequence of the relatively low ICT uptake, partly because of the poor conditions for boosting innovation and entrepreneurship (88th) in the country, and partly because of its low skills base (111th). In comparative terms, individuals are more advanced in using ICTs, with more than half of its population using internet (57th), than both businesses, where e-business still lags behind, and the government, which notably scores poorly in terms of its offerings of online services (125th).

After a sharp drop in the past edition, **Algeria** manages to move up two positions to reach 129th place. With very poor general conditions for business and innovation development (145th), a poorly developed ICT infrastructure (127th), and very low ICT penetration across all stakeholders, it is not surprising that the country does not achieve higher economic (133rd) and social (140th) impacts.

CONCLUSIONS

With the advent of the information revolution, ICTs have become ubiquitous and the world hyperconnected, deeply transforming the economic and social relationships across stakeholders. In this environment of fast-paced change, a new form of asset that can be thought of as the gold or oil of previous economic revolution periods has emerged: data. Large amounts of data, often referred to as *big data*, are constantly generated both in a structured and non-structured manner. Thanks to advances in ICTs, the volume and velocity of generation of these data are unprecedented, as is the capacity of organizations to capture and treat them, potentially generating great economic and social value. However, success in extracting this value requires more than just the generation of or access to big data. Organizations, both public and private, need to decide how to acquire, treat, and interpret these data. This will frequently require new management philosophies and organizational structures capable of adapting and benefiting from the new market opportunities. At the same time, the potential of big data to be misused is also increasingly becoming a source of concern. Privacy issues, and sometimes concerns about geopolitical and strategic matters regarding national security, have been raised. Measures that can build resilience and avoid these perils will need to be developed.

Against this backdrop, for the past 13 years, the Networked Readiness Index (NRI) of the GITR series has contributed to better understanding and measuring the determinants and impacts that ICTs can make, analyzing national conditions and stakeholders' readiness to fully leverage the potential that ICTs unveil. An analysis of the digital landscape confirms some of the key findings that have been presented in previous editions. Overall, the digital divide between advanced economies and emerging and developing ones persists. This is notable especially in terms of the economic and social impacts that ICTs can provide and that characterize the changing nature of this digital divide. The NRI results show that many developing and emerging countries have made significant attempts to develop their ICT infrastructure—mainly by increasing mobile telephony, which has become increasingly available for a large share of the population and has resulted in new services, such as financial services, that were previously unavailable. However, progress in building and upgrading the enabling infrastructure to allow for more and higher

quality Internet connections or to expand ICT uptake has been slower, especially in the least-developed countries. In addition, these countries suffer from unfavorable business and innovation conditions and weaknesses in their educational systems, hindering their capacity to fully leverage the existing ICT uptake and resulting in lower innovation and competitiveness capacity. This situation is particularly worrisome in sub-Saharan African countries. On a more positive note, some countries, notably in the Commonwealth of Independent States and the Gulf Cooperation Council, have made significant progress over the past years, channeling many of the fossil fuel revenues toward ICT investments as a strategy to diversify their economies and make them less dependent on volatile international energy prices.

Another trend that is confirmed by the results is that large intra-regional disparities persist across all regions: from Latin America to Asia and the ASEAN countries, from the Middle East and North Africa to Europe and the EU countries. In Latin America, the regional rankings continue to be led by Chile, Panama, Costa Rica, and Uruguay—countries that portray relatively good results, albeit with some weaknesses in their overall innovation systems, in terms of increasingly developing their digital ecosystems. On the other hand, little progress is recorded for countries such as Brazil, Mexico, Argentina, Bolivia, and Venezuela. Within Asia and the ASEAN countries, the differences are also stark. Although Singapore continues to be at the forefront of the global rankings, Malaysia is the only other economy from the region that manages to score within the top 30, followed distantly by Indonesia and Thailand just above the top half of the rankings; Pakistan, Bangladesh, and Nepal come in toward the bottom of the rankings. In the Middle East and North Africa, the differences have become even more pronounced. While many countries from the Gulf Cooperation Council, especially Qatar and the United Arab Emirates, have continued their decisive progress toward strengthening their digital and innovation ecosystems, countries in North Africa continue to suffer from significant challenges to promoting ICT uptake and from poor conditions that present obstacles to integrating ICTs and leveraging them to boost innovation and competitiveness. Finally, in Europe, notably even within the European Union, the differences are also significant. A deeper analysis reveals that differences in terms of fostering ICT infrastructure and uptake are not so prominent—to a large extent, this is thanks to the efforts of the European Commission to develop a robust digital infrastructure throughout the Union. However, differences across countries in the conditions under which innovation can occur affect their capacity to fully take advantage of the existing infrastructure. Efforts to continue bettering these conditions for innovation will be key to reducing this new digital divide going forward.

Finally, of special importance given their size and influence in the global economy, is the situation of the

BRICS economies—more precisely, their inability to make decisive progress in developing and leveraging their ICT potential. Overall, although the situation differs across the five economies, they all seem to face difficulties in developing and benefiting from their digital potential. While their vast geographical expanse may hinder their capacity to quickly and more economically develop their ICT infrastructure and reach out to larger shares of the population, weaknesses in their innovation systems persist despite the many efforts to mitigate these limitations. This situation hampers their potential to benefit from the economic and social benefits that ICTs could bring about to boost their competitiveness and allow them to transition toward full-fledged knowledge-based societies.

The GTR series and the NRI provide a comprehensive analytical framework for assessing not only the progress made in raising ICT connectivity in different countries, but also—and more importantly—the progress made in obtaining the desired economic and social impacts that higher connectivity and the rise of big data 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 achieving their full potential.

NOTES

- 1 Alexander 1983.
- 2 Google, no date, *Explore Flu Trends Around the World*, available at <http://www.google.org/flutrends/>.
- 3 Schaefer et al. 2011.
- 4 Gawande 2011.
- 5 Parry 2012.
- 6 The Economist Intelligence Unit 2013.
- 7 See Lanier 2010; see also Kakutani 2010.
- 8 Browne et al. 2013.
- 9 See European Commission, 2010a, b.
- 10 ITU 2013, Box 2.4.
- 11 The members of the Association of Southeast Asian Nations (ASEAN) are Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.
- 12 The six Gulf Cooperation Council states are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

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Appendix A: Structure and computation of the Networked Readiness Index 2014

This appendix presents the structure of the Networked Readiness Index 2014 (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 2014

$$\begin{aligned} \text{Networked Readiness} \\ \text{Index} &= 1/4 \text{ Environment subindex} \\ &+ 1/4 \text{ Readiness subindex} \\ &+ 1/4 \text{ Usage subindex} \\ &+ 1/4 \text{ Impact subindex} \end{aligned}$$

ENVIRONMENT SUBINDEX

$$\begin{aligned} \text{Environment subindex} &= 1/2 \text{ Political and regulatory} \\ &\quad \text{environment} \\ &+ 1/2 \text{ Business and innovation} \\ &\quad \text{environment} \end{aligned}$$

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*^c
- 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:

When two individual indicators are averaged (e.g., indicators 1.04)

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

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. 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.