CHAPTER 1.1

Assessing the State of the World's Networked Readiness: Insight from the Networked Readiness Index 2007–2008

IRENE MIA, World Economic Forum
SOUMITRA DUTTA, INSEAD

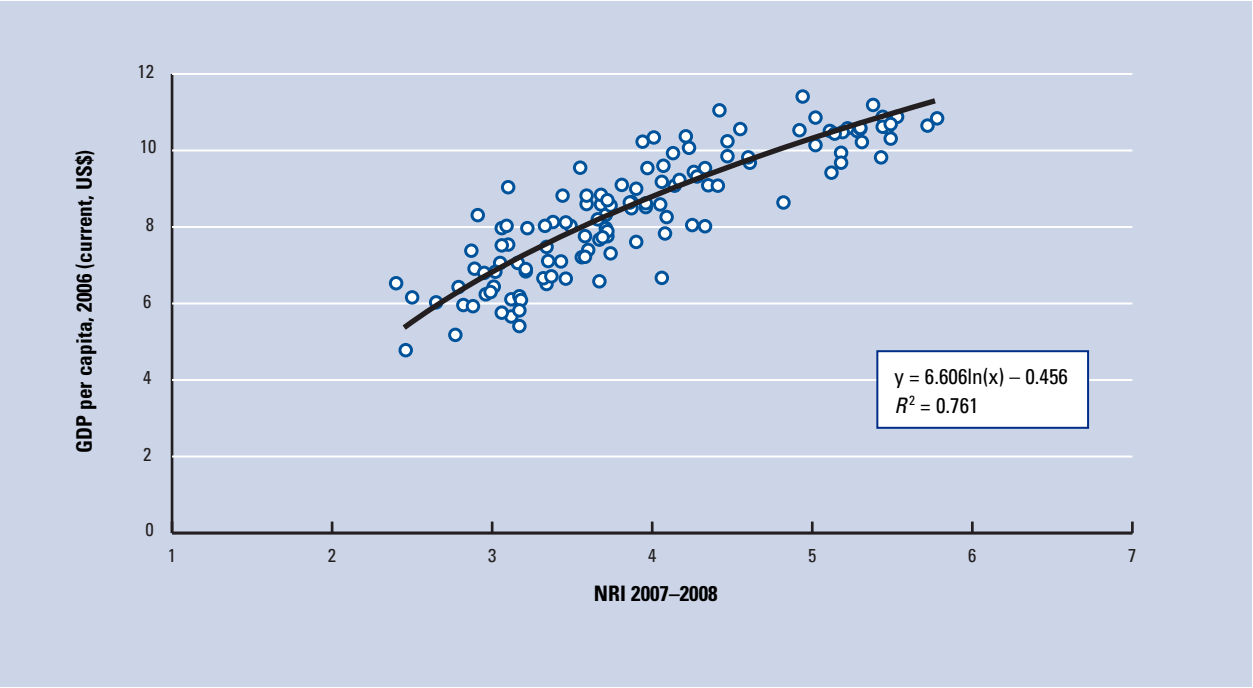
National competitiveness is a multifaceted phenomenon, driven by many diverse and interrelated factors. Among these, knowledge and the capacity to generate technology and/or absorb and adapt it to national needs have increasingly emerged as crucial elements. In particular, information and communication technologies (ICT) can significantly contribute to a country's overall competitiveness and sustained growth by impacting the efficiency of production processes across sectors and industries, accelerating the growth of knowledge-based services and industries, and empowering people to access to unprecedented sources of information and markets. Indeed, ICT has been found to have a noteworthy impact on economic performance,[1] and to account for a large part of total factor productivity increases that, in turn, have been associated with at least half of the growth in per capita income over the last 50 years.[2] Thus, it is not surprising to see many countries, even from developing regions, making significant investments in ICT.[3]

ICT has also radically transformed the way individuals live, work, and learn, improving lifestyles and creating social networks and virtual communities stretching across the globe and providing extraordinary opportunities of interaction.[4] For example, many organizations from the public and private sectors are reaping rich benefits from the use of broadband. The adoption of broadband to enable flexible work practices can enable significant financial benefits for multinational firms. For example, BT has approximately 8,500 workers who work flexibly via broadband from home. On average, they each save the company accommodation costs of approximately £6,000 per annum, they have an increased productivity rate averaging at 20 percent but recorded between 15 percent and 31 percent, they have on average only 3 days sick absence per annum against an industry average of 12 days. All of this adds up to an annual saving of in excess of £60 million per year.[5] The benefits of ICT and broadband also extend to small- and medium-sized enterprises (SMEs), for which faster access to online content and value-added applications improve the ability to drive productivity improvements.

Taking into account the centrality of innovation and technological readiness for national competitiveness, the World Economic Forum (the Forum) has undertaken, in cooperation with INSEAD since 2002, a research project aimed at identifying the factors enabling countries to fully leverage ICT in daily activities in order to effectively boost growth and prosperity. The main outcome of this project has been the *Global Information Technology Report* (GITR) series, published annually since 2001 and currently in its seventh edition.

The authors would like to thank Pearl Samandari and Thierry Geiger for their excellent research assistance for this chapter.

Figure 1: Networked readiness vs. GDP evolution



Source: IMF, *World Economic Outlook Database* (December 2007); NRI 2007–2008.

The Networked Readiness Index (NRI), featured in the GITR series, establishes an international framework by which the performance in networked readiness of a large number of economies can be assessed and benchmarked against one another and over time. In this way, relative competitive advantages and areas of weakness can be identified for each country, offering a unique platform to governments and civil society alike to prioritize policies and initiatives toward enhanced ICT penetration and leverage. At the same time, the NRI series, stretching back to 2001,[6] provides a invaluable instrument to monitor countries' progress over time.

Furthermore, over the years the GITR series has successfully contributed to raising general awareness of the close link existing between ICT prowess and continued growth and prosperity (see Figure 1), and has evolved into one of the world's most respected international assessments of countries' capacity to leverage technology for increased competitiveness.

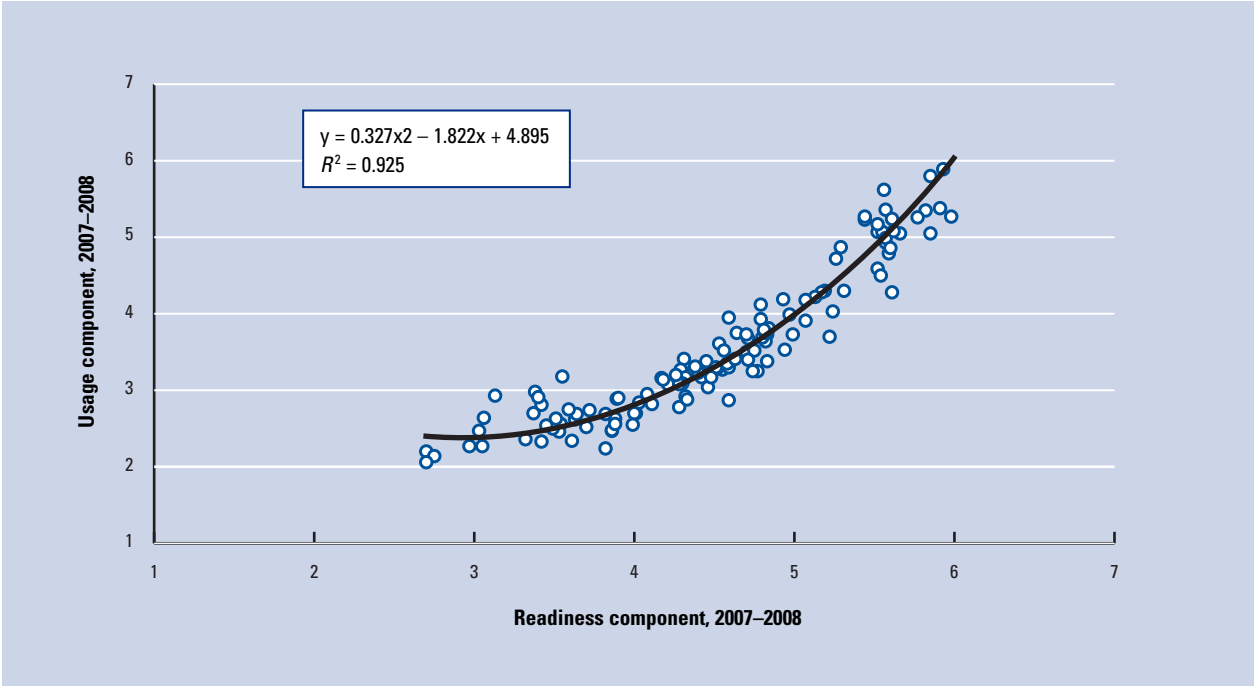
Very much in line with past editions of the *Report,* the *GITR 2007–2008* aims at furthering the understanding of ICT-enabling factors and at benchmarking countries' networked readiness, extending its coverage to a record number of 127 developed and developing economies worldwide and accounting for more than 95 percent of the global GDP. The rest of this chapter will be devoted to present the findings of the NRI 2007–2008. After briefly outlining the Networked Readiness framework used in this 2007–08 edition, its theoretical underpinning, and its main components, an in-depth analysis of the results of the NRI 2007–2008 computation will be conducted, with a special focus on the top 10 countries by overall ranking and on the principal regional features. A trend analysis of the entire time-series will be also performed in order to identify the countries and regions in the world that have moved particularly fast in the NRI rankings from 2001, proving themselves to be particularly dynamic in benefiting from ICT advances.

The Networked Readiness Index 2007–2008: The framework and the methodology

The NRI 2007–2008 rests, as in previous years, on the Networked Readiness Framework developed by INSEAD in 2002.[7] The framework aims at assessing the different degrees to which countries around the world leverage ICT for enhanced growth and competitiveness and is based on the following three theoretical underpinnings:

1. *Environment is key:* An essential precondition for a country to benefit fully from the opportunities offered by ICT is the presence or establishment of an environment that is conducive to the development of ICT and is ICT friendly. In this sense, the appropriate business environment, regulatory framework, and infrastructure must be in place for a country's stakeholders to use and leverage ICT for development. ICT development does not happen in a vacuum, but requires an enabling environment.

Figure 2: ICT readiness and usage



2. *Leveraging ICT depends on a multistakeholder effort:* The most successful networked economies show that ICT success is the result of the joint effort of multiple stakeholders—the government, businesses, and civil society. The government needs to take the lead in recognizing the importance of ICT penetration and innovation for overall competitiveness, by prioritizing it in its national agenda and facilitating the establishment of the necessary soft and hard infrastructure. However, this alone is not sufficient. The successful development experiences of Taiwan, Singapore, Israel, and Estonia emphasize the importance of involving the business sector and, more generally, mobilizing civil society from a very early stage in the implementation of the digital agenda.

3. *ICT readiness fosters ICT usage:* There is a strong correlation between the degree of preparedness and propensity to use ICT of the three main social actors mentioned above (government, businesses, and individuals) and their actual ICT usage, as displayed in Figure 2. The regression in Figure 2 not only demonstrates a very high value for R^2, but also shows that usage of ICT increases significantly as the readiness or preparedness to use ICT advances. Hence, a society that is well prepared and well disposed to use ICT will be more likely to successfully leverage the competitive and development potential of ICT.

Figure 3 provides a snapshot of the resulting networked readiness framework, with its three environment, readiness, and usage dimensions. While the environment component is broken down along market, regulatory, and infrastructure lines, the latter two include the readiness and usage of the three key stakeholder groups respectively—government, businesses, and individuals.

In line with the above, the NRI is composed of three subindexes, assessing respectively ICT environment, readiness, and usage, for a total of 9 pillars and 68 variables, as follows:

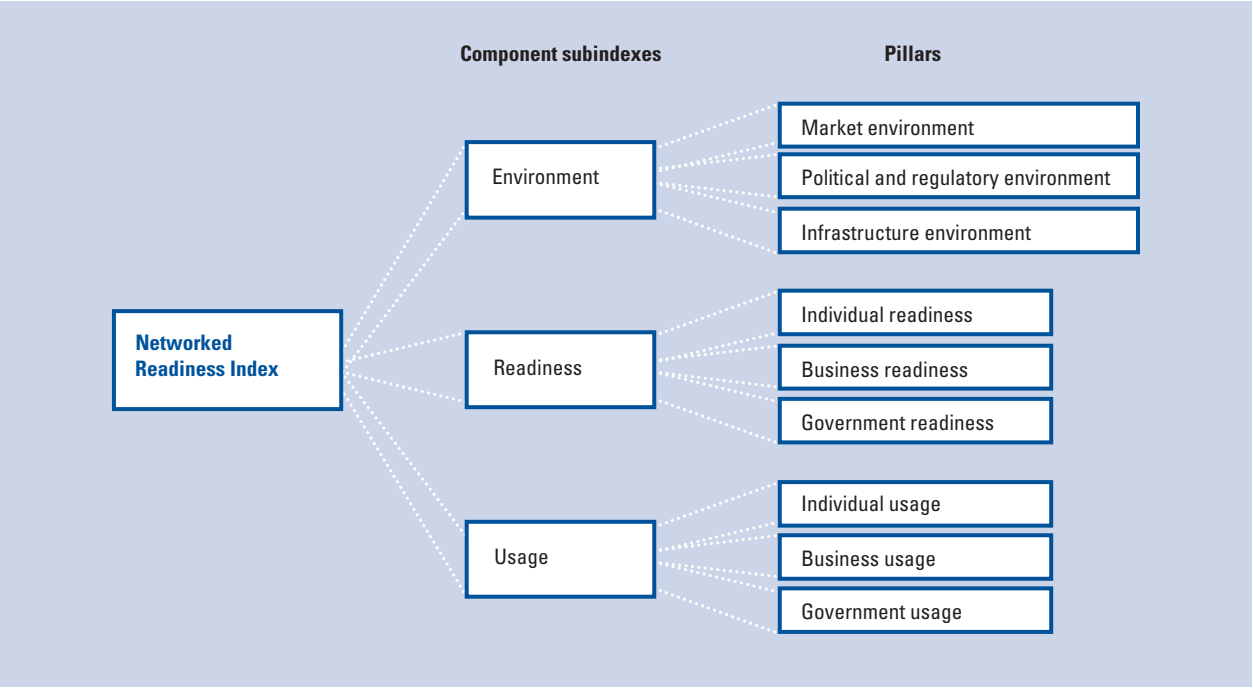
1. Environment subindex:
   — market environment
   — political and regulatory environment
   — infrastructure environment

2. Readiness subindex:
   — individual readiness
   — business readiness
   — government readiness

3. Usage subindex:
   — individual usage
   — business usage
   — government usage

All pillars are given the same weight in the calculation of the three subindexes, while the overall NRI is a simple average of the three subindexes; the underlying

Figure 3: The Networked Readiness Index 2007–2008: The framework



assumption is that all the Index components provide a similar contribution to the overall networked readiness of a country. Appendix A provides a more detailed description of the composition and computation of the NRI 2007–2008.

The different subindexes, pillars, and variables' scores offer important insights on the relative strengths and weakness of each economy in leveraging ICT, and can help governments to prioritize the areas in need of improvement in their national agendas.

Although the networked readiness framework remained constant after 2002–03, it is noteworthy that the number of variables included in the NRI has varied slightly from one year to the next. This has been made necessary by the rapid pace of innovation in the ICT sector and the need to ensure that the NRI is an updated and comprehensive instrument to gauge countries' networked readiness each year. This being said, the uniformity of the networked readiness framework guarantees an overall comparability of the NRI results over time.

Below is a brief description of each subindex and pillar composing the NRI.

Environment subindex

As stated earlier, governments, business communities, and individuals can fully leverage the competitive and development potential of ICT only if an appropriate environment is in place: the environment subindex aims at capturing the ICT conduciveness of the environment in a country by assessing a total of 30 variables related to the market environment, the general and ICT-specific regulatory framework, and the hard and soft (in terms of human resources) infrastructure for ICT development.

The *market environment pillar* (14 variables) gauges the friendliness of the business environment for ICT development, including aspects such as the presence of appropriate capital sources (notably venture capital), the degree of business sophistication (looking at cluster development and high-tech exports), and the innovation potential (measured by the number of utility patents), together with the ease of doing business (including the presence of red tape and fiscal charges), the freedom of exchanging information in the net (measured by the freedom of the press) and, for the first time this year, the extent of convergence of ITC industries and the related accessibility of digital content.

The *regulatory and political environment pillar* (9 variables), in turn, looks at the efficiency and transparency of the legal framework, taking into account such general aspects as the independence of the judiciary, the effectiveness of the law-making process, and the protection of the property rights, as well as ICT-specific elements such as the existence and development of appropriate legislation or the protection of intellectual property.

Last, the *infrastructure environment pillar* (7 variables) measures the degree of development of ICT-conducive soft as well as hard infrastructure. With regard to the former, quantitative aspects such as tertiary enrollment rates and, as of this year, education expenditure are blended with a qualitative assessment of the country's scientific

research institutions and the availability of scientists and engineers. The dimension of hard infrastructure is measured by a range of variables including the number of telephone lines and electricity production.

Readiness subindex

Once an ICT-conducive environment is in place, ICT usage can develop and thrive if a country's principal stakeholder groups are sufficiently prepared, interested, and enabled to use technology. The readiness subindex (23 variables) examines whether the appropriate human skills for using ICT are in place, the degree of access and affordability of ICT for businesses and citizens, and the extent to which the government prioritizes ICT and uses it in its daily activities and organization.

Accordingly, the *individual readiness pillar* (9 variables) measures the disposition and preparedness of citizens to use ICT through a range of variables, including the quality of the educational system (with a focus on math and science education), the availability of Internet access in schools, residential telephone connection charges, broadband and telephone subscription charges, and the cost of mobile telephone calls.

The *business readiness pillar* (10 variables) gauges companies' preparedness to fully incorporate ICT in their operations and processes, including the extent of training of the labor force, companies' spending on research and development (R&D), the degree of collaboration between academia and the industry (this is, incidentally, a precondition for a cluster's successful operations), the quantity and quality of suppliers in the economy, and the affordability of ICT for business and the levels of ICT imports.

Last but not least, the *government readiness pillar* (4 variables) measures the degree to which ICT is prioritized in the government's agenda and to which there is a clear vision on how to promote its use and penetration.

Usage subindex

The usage subindex (15 variables) assesses the actual ICT usage by the three main stakeholders of the networked readiness framework, providing insight on the potential efficiency and productivity gains associated with the adoption of ICT.

The *individual usage pillar* (5 variables) gauges ITC penetration at the individual levels, notably for personal computer (PC) and the Internet.

The *business usage pillar* (5 variables) examines the extent to which businesses generate and absorb technology, looking at variables such as the prevalence of foreign licensing and the capacity for innovation, together with the availability and usage of fixed telephone lines for business and Internet usage by businesses in their transactions and operations.

The *government usage pillar* (5 variables) deals with the extent to which the government's vision for ICT has been implemented successfully (by assessing government's success in promoting ICT penetration and the development of e-government services and e-democracy), as well as the government's own ICT usage (by measuring the improvement of government productivity as a consequence of ICT introduction and use, and ICT pervasiveness in public offices).

Computation methodology and data

Along the lines of the past editions and the Forum's general competitiveness methodology, the NRI 2007–2008 builds on a mix of hard and survey data to capture, in the most complete possible manner, all the determinants of networked readiness. In particular, 27 variables out of 68 are hard, quantitative data, collected from respected international organizations such as the International Telecommunication Union (ITU), the World Bank, and the United Nations. The remaining 41 variables capture dimensions that are more qualitative in nature and come from the Executive Opinion Survey (Survey), conducted annually by the Forum in all the economies covered by this *Report*.[8] The Survey data allow the Index to factor into the model dimensions that are very relevant for a country's networked readiness, but for which no hard data are available from international sources. For example, a government's vision for ICT and the extent to which it prioritizes ICT are important drivers of overall networked readiness in an economy. No hard data are available on these aspects in international datasets. However, these questions are included in the Survey and the results are used for the computation of the NRI's government readiness pillar. Appendix B provides methodological notes on the combining of hard and Survey data.

The inclusion of new countries in the NRI every year is driven by the Survey coverage: Table 1 shows the evolution of the NRI and the Survey's coverage from the GITR series' inception. Of the 131 economies covered by the Survey in 2007, four—Montenegro, Serbia, Timor Leste, and Uzbekistan—could not be retained in the NRI computation because of the scarcity of reliable hard data. At the same time, eight new economies entered the NRI rankings for the first time this year, namely: The Gambia, Libya, Oman, Puerto Rico, Saudi Arabia, Senegal, Syria. and Tajikistan.[9]

Table 1: Evolution of the coverage of the Networked Readiness Index

Year	Number of economies
2001–02	72
2002–03	82
2003–04	102
2004–05	104
2005–06	115
2006–07	122
2007–08	127

As highlighted earlier, the variables included in the NRI may experience some variation over time, given the dynamism of the ICT sector. In order for the NRI to provide an updated snapshot of countries' networked readiness, those time-sensitive variables included in past editions but that have not been recently updated by relevant international institutions may need to be dropped by the NRI structure and calculation at any given year. With respect to last year, four new variables have been introduced in the current NRI computation,[10] either to complement, with hard data, qualitative variables already included in the past, or to capture new qualitative dimensions. The hard data variables introduced this year are total tax rate and education expenditure levels; newly included Survey data are the accessibility of digital content and the quantity of suppliers.

Particular care has been taken, as usual, to make certain that the total set of variables used for the NRI this year ensures broad comparability of the current results with those for previous years.

The NRI 2007–2008: Results and regional highlights

This section will reference the main findings of the NRI 2007–2008, with a particular emphasis on the top performers globally as well as on a number of selected economies per region. Tables 2 displays the NRI rankings and scores for 2007–08, with 2006–07 comparisons, while Tables 3 and 4 provide some insights on the most networked economies in the world, by looking respectively at the best performers per pillar in the current NRI calculation, and the evolution in the top 10 rankings since 2001–02. In turn, Tables 5, 6, and 7 show the rankings and scores for each of the three subindexes and nine pillars composing the NRI.

As highlighted by Table 2, Denmark and Sweden continue to lead the world in networked readiness. The two countries share a similar emphasis on education and innovation as well as a coherent vision of their respective governments on the importance of ICT for enhancing overall competitiveness.

Denmark, in particular, occupies the top position for the second year consecutively, culminating an upward trend observed since 2003–04 (see Table 4). Among the drivers of Denmark's success in networked readiness, one can mention the supportive ICT environment (ranked 2nd), characterized by one of the best regulatory frameworks (2nd) for doing business and for ICT. Denmark is ranked 1st in the world for the development of its ICT legislation and for the efficiency of its legal framework to settle disputes. Also the country is showing the rest of the world the way in ICT usage, boasting the highest Internet bandwidth (349 mb/s per 10,000 population) and the highest broadband Internet penetration rates (31.7 percent) in the sample, together with extensive e-commerce and e-business practices (7th for the extent of business Internet usage). The remarkable ICT penetration rates have much to do with the government's clear vision on the importance of ICT diffusion, its consistent prioritization of the ICT sector from a very early stage, and its capacity to mobilize civil society in this regard.[11] This is reflected in the 2nd place for government readiness, complemented by a 1st place for government usage, demonstrating an excellent degree of implementation of the digital agenda, notably for what concerns the availability of online services (3rd) and e-participation (3rd). Other elements explaining Denmark's ICT preeminence are its well-functioning and developed internal market, which provided the national ICT industry with a large number of consumers at its early stages; its top-notch educational system; and the Danish people's cultural openness and talent for developing, pioneering, and using new technologies and applications.

Besides Denmark, the other **Nordic countries** confirm their prowess in leveraging ICT for increased competitiveness, with Sweden, Finland, Iceland, and Norway all among the most networked economies in the world, at 2nd, 6th, 8th, and 10th position, respectively. It is worth noticing that their continuous focus on education and innovation and high levels of technological readiness also drive their performance in general competitiveness, as witnessed by the top ranks occupied by the latter in the Forum's Global Competitiveness Index.[12]

Switzerland is up two places, at 3rd position, continuing last year's impressive upward trend (i.e., four positions up from 2005–06 to 2006–07). It is worth noting that Switzerland's remarkable performance in networked readiness seems to be driven mainly by businesses and individuals (readiness ranks of 1st and 3rd, respectively, and usage ranks of 4th for both), rather than by the strength of the government's specific ICT strategy and vision, as evidenced by the rather low ranking in government readiness and usage (20th and 18th, respectively). This is unique among the most networked economies in the world, in which a strong government leadership has often been a common feature of success. Switzerland's rise in the rankings is driven by its strength in the overall environment subindex (ranked 6th) as well as a world-class educational system.

Singapore, down two positions at 5th place, displays the most ICT-conducive market and regulatory environment and among the highest levels of government readiness (1st in the sample) and usage (4th) in the world, representing a textbook case of how governments can promote ICT—and thus general competitiveness—with a comprehensive ICT strategy, a continued focus on education and innovation, and savvy public-private partnerships. The successful e-strategy adopted by the government in Singapore is detailed in Chapter 2.1, "Singapore: Building an Intelligent Nation with ICT," of this *Report*.

The **United States** improves three ranks to 4th place, continuing to benefit from one of the most efficient

Table 2: The Networked Readiness Index 2007–2008 and 2006–2007 comparison

Economy	NRI 2007–2008 Rank	NRI 2007–2008 Score	NRI 2007–2008 rank (among 2006 countries)	NRI 2006–2007 Rank	NRI 2006–2007 Score
Denmark	1	5.78	1	1	5.71
Sweden	2	5.72	2	2	5.66
Switzerland	3	5.53	3	5	5.58
United States	4	5.49	4	7	5.54
Singapore	5	5.49	5	3	5.60
Finland	6	5.47	6	4	5.59
Netherlands	7	5.44	7	6	5.54
Iceland	8	5.44	8	8	5.50
Korea, Rep.	9	5.43	9	19	5.14
Norway	10	5.38	10	10	5.42
Hong Kong SAR	11	5.31	11	12	5.35
United Kingdom	12	5.30	12	9	5.45
Canada	13	5.30	13	11	5.35
Australia	14	5.28	14	15	5.24
Austria	15	5.22	15	17	5.17
Germany	16	5.19	16	16	5.22
Taiwan, China	17	5.18	17	13	5.28
Israel	18	5.18	18	18	5.14
Japan	19	5.14	19	14	5.27
Estonia	20	5.12	20	20	5.02
France	21	5.11	21	23	4.99
New Zealand	22	5.02	22	22	5.01
Ireland	23	5.02	23	21	5.01
Luxembourg	24	4.94	24	25	4.90
Belgium	25	4.92	25	24	4.93
Malaysia	26	4.82	26	26	4.74
Malta	27	4.61	27	27	4.52
Portugal	28	4.60	28	28	4.48
United Arab Emirates	29	4.55	29	29	4.42
Slovenia	30	4.47	30	30	4.41
Spain	31	4.47	31	32	4.35
Qatar	32	4.42	32	36	4.21
Lithuania	33	4.41	33	39	4.18
Chile	34	4.35	34	31	4.36
Tunisia	35	4.33	35	35	4.24
Czech Republic	36	4.33	36	34	4.28
Hungary	37	4.28	37	33	4.33
Barbados	38	4.26	38	40	4.18
Puerto Rico	39	4.25	n/a	n/a	n/a
Thailand	40	4.25	39	37	4.21
Cyprus	41	4.23	40	43	4.12
Italy	42	4.21	41	38	4.19
Slovak Republic	43	4.17	42	41	4.15
Latvia	44	4.14	43	42	4.13
Bahrain	45	4.13	44	50	3.89
Jamaica	46	4.09	45	45	4.05
Jordan	47	4.08	46	57	3.74
Saudi Arabia	48	4.07	n/a	n/a	n/a
Croatia	49	4.06	47	46	4.00
India	50	4.06	48	44	4.06
South Africa	51	4.05	49	47	4.00
Kuwait	52	4.01	50	54	3.80
Oman	53	3.97	n/a	n/a	n/a
Mauritius	54	3.96	51	51	3.87
Turkey	55	3.96	52	52	3.86
Greece	56	3.94	53	48	3.98
China	57	3.90	54	59	3.68
Mexico	58	3.90	55	49	3.91
Brazil	59	3.87	56	53	3.84
Costa Rica	60	3.87	57	56	3.77
Romania	61	3.86	58	55	3.80
Poland	62	3.81	59	58	3.69
Egypt	63	3.74	60	77	3.44
Panama	64	3.74	61	65	3.58
Uruguay	65	3.72	62	60	3.67
El Salvador	66	3.72	63	61	3.66
Azerbaijan	67	3.72	64	71	3.53
Bulgaria	68	3.71	65	72	3.53
Colombia	69	3.71	66	64	3.59
Ukraine	70	3.69	67	75	3.46
Kazakhstan	71	3.68	68	73	3.52
Russian Federation	72	3.68	69	70	3.54
Vietnam	73	3.67	70	82	3.40
Morocco	74	3.67	71	76	3.45
Dominican Republic	75	3.66	72	66	3.56
Indonesia	76	3.60	73	62	3.59
Argentina	77	3.59	74	63	3.59
Botswana	78	3.59	75	67	3.56
Sri Lanka	79	3.58	76	86	3.27
Guatemala	80	3.58	77	79	3.41
Philippines	81	3.56	78	69	3.55
Trinidad and Tobago	82	3.55	79	68	3.55
Macedonia, FYR	83	3.49	80	81	3.41
Peru	84	3.46	81	78	3.43
Senegal	85	3.46	n/a	n/a	n/a
Venezuela	86	3.44	82	83	3.32
Mongolia	87	3.43	83	90	3.18
Algeria	88	3.38	84	80	3.41
Pakistan	89	3.37	85	84	3.31
Honduras	90	3.35	86	94	3.09
Georgia	91	3.34	87	93	3.12
Kenya	92	3.34	88	95	3.07
Namibia	93	3.33	89	85	3.28
Nigeria	94	3.32	90	88	3.23
Bosnia and Herzegovina	95	3.22	91	89	3.20
Moldova	96	3.21	92	92	3.13
Mauritania	97	3.21	93	87	3.25
Tajikistan	98	3.18	n/a	n/a	n/a
Mali	99	3.17	94	101	2.96
Tanzania	100	3.17	95	91	3.13
Gambia, The	101	3.17	n/a	n/a	n/a
Guyana	102	3.16	96	98	3.01
Burkina Faso	103	3.12	97	99	2.97
Madagascar	104	3.12	98	102	2.95
Libya	105	3.10	n/a	n/a	n/a
Armenia	106	3.10	99	96	3.07
Ecuador	107	3.09	100	97	3.05
Albania	108	3.06	101	107	2.87
Uganda	109	3.06	102	100	2.97
Syria	110	3.06	n/a	n/a	n/a
Bolivia	111	3.05	103	104	2.93
Zambia	112	3.02	104	112	2.75
Benin	113	3.01	105	109	2.83
Kyrgyz Republic	114	2.99	106	105	2.90
Cambodia	115	2.96	107	106	2.88
Nicaragua	116	2.95	108	103	2.95
Suriname	117	2.91	109	110	2.82
Cameroon	118	2.89	110	113	2.74
Nepal	119	2.88	111	108	2.83
Paraguay	120	2.87	112	114	2.69
Mozambique	121	2.82	113	115	2.64
Lesotho	122	2.79	114	116	2.61
Ethiopia	123	2.77	115	119	2.55
Bangladesh	124	2.65	116	118	2.55
Zimbabwe	125	2.50	117	117	2.60
Burundi	126	2.46	118	121	2.40
Chad	127	2.40	119	122	2.16

(Cont'd.)

Table 3: Top performer on each pillar of the Networked Readiness Index 2007–2008

Country/Economy	Market environment	Regulatory environment	Infrastructure environment	Individual readiness	Business readiness	Government readiness	Individual usage	Business usage	Government usage
Singapore	**1**	**1**	26	2	12	**1**	18	15	4
Iceland	10	9	**1**	8	22	15	10	10	21
Finland	5	4	7	**1**	3	9	14	6	20
Switzerland	4	8	9	3	**1**	20	4	4	18
Netherlands	12	5	16	19	16	16	**1**	12	19
Sweden	9	11	3	9	10	4	3	**1**	6
Denmark	11	2	4	6	6	2	2	5	**1**

Table 4: Evolution of the Networked Readiness Index since 2001–02

Country/Economy	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08
(Number of economies)	72	82	102	104	115	122	127
Denmark	7	8	5	4	3	1	1
Sweden	4	4	4	6	8	2	2
Switzerland	16	13	7	9	9	5	3
United States	1	2	1	5	1	7	4
Singapore	8	3	2	1	2	3	5
Finland	3	1	3	3	5	4	6
Netherlands	6	11	13	16	12	6	7
Iceland	2	5	10	2	4	8	8
Korea, Rep.	20	14	20	24	14	19	9
Norway	5	17	8	13	13	10	10

market environments and ICT-related infrastructures in the world. In particular, the well-qualified and large pool of human resources (12th for availability of scientists and engineers), as well as the top-notch research institutions (ranked 2nd), provide an excellent infrastructure for innovation to flourish and for the development of the ICT industry. This has resulted in the country's undisputed role as the world's innovation powerhouse, witnessed by the 1st position obtained by the United States for the number of registered utility patents.

On a less positive note, some red tape and rigidities seem to hinder the US business environment, notably with respect to the burden of government regulation and the relatively high tax rates (67th). Moreover, the regulatory framework, assessed at 22nd, presents a number of relatively problematic features with respect to the independence of the judiciary (37th), the efficiency of the legal framework for disputes (30th), and protection of property rights (30th), among others.

Korea, at 9th place, realizes one of the most impressive improvements (10 places) from last year among the 127 economies covered by the *Report*. This reflects the country's comparative advantages in the quality of its higher educational system, availability of qualified labor force (13th for the availability of scientists and engineers), and leading research institutions (11th). This, combined with a very dynamic and sophisticated business sector,[13] has fostered remarkable degrees of innovation (as reflected in Korea's 8th place in the world for the number of registered utility patents) and the emergence of world-class multinationals, notably in the high-tech sector, whose exports amounted in 2005 to 25 percent of total exports (7th place overall). Last but not least, the coherent and continued role of the government in making ICT and, more generally, innovation a cornerstone of Korea's development strategy must be highlighted (3rd in government readiness), as well as its success in promoting ICT diffusion and in using ICT as an engine of increased productivity and efficiency (3rd in government usage).

A look at Tables 3 and 4 complements the observations just made on the most notable networked economies this year, by showing the top performer in each of the nine pillars composing the NRI, and the evolution of the top-10 ranked countries since 2001–02, respectively.

Table 3 highlights Singapore as the country topping the largest number of pillars, notably market environment, regulatory framework, and government readiness. Singapore's showing is even more impressive when

compared with the top performers in the remaining pillars—each topping only one. This reflects Singapore's continuous advances in enhancing and fine-tuning the networked readiness enablers to increasingly leverage ICT for competitiveness.

Among the other pillars, Iceland displays the best ICT infrastructure in the sample, with notable marks registered for the number of telephone lines (3rd), secure Internet servers, and electricity production (both 1st out of 127 countries).

Two Nordic countries, Finland and Sweden, top the individual readiness and business usage pillars, respectively. While Finland displays the highest degree of individual readiness in the world, mainly in view of its top-class educational system (notably in math and science), Sweden's business sector appears to be the most effective in using ICT, thanks to the excellent innovation potential of its firms.

Switzerland is in turn the best performer in the business readiness pillar, scoring among the top countries in the world in most of the variables included in the pillar.

Last, the Netherlands ranks 1st for individual usage, and has Internet and PC penetration rates that are among the highest in the world.

Interestingly enough, Denmark—despite being ranked top country in the overall NRI—is outperforming the rest of the sample in only one pillar (government usage), but is consistent in being ranked among the best in the world in all three component subindexes—it is 1st, 2nd, and 2nd for the usage, environment, and readiness, respectively.

The rest of this section will be devoted to highlighting the main findings of the NRI 2007–2008 per region, namely Europe and North America, Asia and the Pacific, Latin America and the Caribbean, and sub-Saharan Africa and Middle East and North Africa (MENA).

Europe and North America

Europe remains an important player in networked readiness this year: indeed, not only Denmark tops the NRI rankings, but 10 other European countries are among the top 20, as follows: Sweden (2nd), Switzerland (3rd), Finland (6th), the Netherlands (7th), Iceland (8th), Norway (10h), the United Kingdom (12th), Austria (15th), Germany (16th), and Estonia (20th).

As shown in Table 4, the **Nordic countries** have featured consistently among the top 10 over the last seven years, with impressive ICT penetration and diffusion rates. The reasons for this remarkable performance have been detailed above and have much to do with a few common features: a continuous focus on education, which resulted in top-class national educational systems; a culture for innovation with an outstanding public and private disposition to create and adopt new technologies; and a business-friendly market and regulatory environment.

As in previous years, the networked readiness picture for the **EU15** is more mixed in nature.[14] The Nordic countries, the Netherlands, the United Kingdom, Germany, Austria, **France** (21st), **Ireland** (23rd), and **Belgium** (25th) present satisfactory levels of networked readiness and benefit from ICT advances. However, countries such as **Greece** (56th) and, to a lesser extent, **Italy** (42nd) continue to lag behind and even seem to be losing speed with respect to the 2006–07 rankings.

Among the **EU accession 12,**[15] countries such as **Estonia** (20th), **Slovenia** (30th), **Lithuania** (33rd), the **Czech Republic** (36th), and **Hungary** (37th) have made remarkable progress in networked readiness, as well as general competitiveness, over the last two decades. Among these countries, Estonia, the tiny homeland of Skype, has benefited from a savvy e-leadership from the government that fostered innovation and universal ICT access as a platform for improved competitiveness.[16] Another Baltic state, Lithuania, realizes one of the biggest improvements (six positions) in Europe from last year.

Poland (62nd) and **Bulgaria** (68th) struggle, even if it must be noted that the latter posted a very large improvement (seven positions in a constant sample)[17] from 2006–07, boosted by better levels of usage, especially from its citizens (46th vs. 53rd last year). Poland, in turn, continues to show notable weaknesses specifically in government readiness (96th) and usage (103rd), as well as in the regulatory environment (90th), indicating the unsatisfactory role of the government as an engine of ICT diffusion.

Turkey is broadly stable at 55th, with a rather even performance across the three NRI components and much room for improvement especially in the readiness subindex (61st), typically in the accessibility of ICT, the quality of education, and the government's vision and e-leadership in ICT diffusion.

Russia positions itself, largely unchanged, at 72nd place this year. Its networked readiness rests on the country's good-quality education and research institutions as well as on firms' innovative potential. Nevertheless, the poor quality of the market (88th) and regulatory (92nd) environments, coupled with a lack of focus on ICT in the government's agenda (as highlighted in the poor marks for government readiness and usage, at 89th and 101st, respectively), remain reasons for concern.

Within **North America,** the United States and **Canada** continue to feature, at 4th and 13th respectively, among the leading networked economies in the world. The United States' performance has already been analyzed early in this paper. With respect to Canada, the NRI points out the readiness component (20th) as an area in need of relative improvement, especially of the business sector (19th) and of the government (25th).

Table 5: Environment component subindex

ENVIRONMENT COMPONENT			Market environment		Political and regulatory environment		Infrastructure environment	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Iceland	5.69	10	5.15	9	5.80	1	6.12
2	Denmark	5.51	11	5.14	2	5.96	4	5.44
3	Finland	5.50	5	5.45	4	5.89	7	5.17
4	Sweden	5.50	9	5.15	11	5.76	3	5.58
5	United States	5.46	3	5.49	22	5.29	2	5.60
6	Switzerland	5.43	4	5.49	8	5.80	9	5.02
7	Norway	5.30	19	4.89	13	5.73	6	5.29
8	Canada	5.30	16	5.08	19	5.42	5	5.40
9	Singapore	5.23	1	5.58	1	6.13	26	3.98
10	United Kingdom	5.22	13	5.12	12	5.73	11	4.80
11	Germany	5.17	17	5.01	3	5.93	14	4.57
12	Australia	5.17	21	4.80	7	5.84	10	4.86
13	Netherlands	5.14	12	5.13	5	5.86	16	4.43
14	New Zealand	5.07	27	4.64	15	5.53	8	5.03
15	Ireland	5.01	15	5.09	17	5.46	15	4.49
16	Hong Kong SAR	5.01	2	5.51	10	5.77	33	3.74
17	Korea, Rep.	4.99	7	5.18	20	5.37	17	4.42
18	Japan	4.97	14	5.12	14	5.55	21	4.24
19	Israel	4.97	8	5.18	25	5.06	13	4.66
20	Austria	4.96	22	4.78	6	5.84	20	4.25
21	Taiwan, China	4.84	6	5.36	42	4.42	12	4.72
22	France	4.83	25	4.68	16	5.46	18	4.35
23	Luxembourg	4.67	20	4.86	18	5.44	35	3.71
24	Estonia	4.66	23	4.78	24	5.18	24	4.02
25	Belgium	4.64	26	4.67	23	5.19	22	4.07
26	Malaysia	4.57	18	4.97	21	5.32	41	3.42
27	Barbados	4.36	59	3.91	27	4.89	19	4.27
28	Portugal	4.34	32	4.36	30	4.84	27	3.83
29	Malta	4.34	34	4.33	28	4.87	29	3.81
30	Cyprus	4.21	40	4.18	33	4.65	30	3.80
31	Puerto Rico	4.19	28	4.59	34	4.63	43	3.36
32	Hungary	4.18	38	4.27	40	4.46	28	3.83
33	Spain	4.15	43	4.13	36	4.54	31	3.79
34	Lithuania	4.12	47	4.10	37	4.50	32	3.75
35	Chile	4.10	30	4.43	31	4.71	50	3.16
36	Kuwait	4.09	29	4.46	51	4.22	37	3.60
37	Slovenia	4.07	58	3.93	48	4.26	23	4.03
38	Tunisia	4.07	41	4.16	29	4.84	47	3.22
39	United Arab Emirates	4.05	24	4.73	45	4.35	56	3.08
40	South Africa	4.05	35	4.28	26	5.00	66	2.86
41	Thailand	4.02	31	4.39	35	4.61	58	3.04
42	Czech Republic	4.01	46	4.12	54	4.19	34	3.72
43	Qatar	4.00	48	4.09	32	4.65	46	3.25
44	Latvia	4.00	45	4.12	43	4.40	40	3.47
45	Saudi Arabia	3.93	37	4.27	53	4.19	45	3.34
46	Greece	3.93	77	3.64	55	4.17	25	3.98
47	Slovak Republic	3.90	36	4.27	50	4.23	48	3.20
48	Mauritius	3.90	33	4.34	41	4.45	62	2.90
49	Jordan	3.85	54	4.00	38	4.49	57	3.06
50	Bahrain	3.80	42	4.15	57	4.16	54	3.09
51	Turkey	3.79	51	4.06	44	4.35	60	2.96
52	Croatia	3.73	61	3.87	63	3.97	44	3.36
53	Jamaica	3.73	39	4.19	52	4.20	73	2.80
54	India	3.73	49	4.09	47	4.26	71	2.82
55	Italy	3.72	71	3.74	75	3.79	36	3.63
56	Oman	3.72	44	4.12	46	4.30	76	2.73
57	Panama	3.62	50	4.07	66	3.94	69	2.83
58	Poland	3.61	74	3.72	90	3.58	38	3.54
59	Kazakhstan	3.58	72	3.74	67	3.92	55	3.09
60	Egypt	3.57	66	3.85	61	4.01	64	2.86
61	Costa Rica	3.57	70	3.78	71	3.80	52	3.13
62	Mexico	3.54	57	3.96	70	3.83	67	2.84
63	Romania	3.53	60	3.90	77	3.78	61	2.91
64	Russian Federation	3.53	88	3.52	92	3.54	39	3.53
65	Botswana	3.52	63	3.86	49	4.25	93	2.44
66	China	3.51	69	3.79	58	4.15	86	2.58
67	Morocco	3.50	65	3.85	65	3.95	78	2.70
68	Namibia	3.48	85	3.53	39	4.46	92	2.45
69	Uruguay	3.48	83	3.58	60	4.02	68	2.84
70	Ukraine	3.46	94	3.45	94	3.52	42	3.40
71	Bulgaria	3.43	82	3.59	89	3.58	53	3.13
72	Mongolia	3.37	95	3.44	97	3.51	51	3.16
73	Vietnam	3.37	80	3.60	59	4.03	91	2.46
74	Indonesia	3.36	52	4.03	81	3.68	99	2.35
75	Sri Lanka	3.36	64	3.85	72	3.80	95	2.41
76	Azerbaijan	3.34	81	3.60	74	3.79	83	2.62
77	Philippines	3.33	56	3.96	80	3.72	101	2.32
78	El Salvador	3.33	53	4.02	76	3.79	106	2.18
79	Georgia	3.32	68	3.83	91	3.56	85	2.58
80	Colombia	3.32	96	3.43	79	3.75	74	2.78
81	Trinidad and Tobago	3.31	67	3.84	108	3.26	70	2.83
82	Macedonia, FYR	3.27	93	3.46	101	3.39	59	2.97
83	Dominican Republic	3.27	62	3.86	68	3.85	108	2.09
84	Kenya	3.24	98	3.41	88	3.59	77	2.72
85	Mali	3.22	78	3.63	73	3.80	103	2.23
86	Brazil	3.22	116	3.12	86	3.64	63	2.89
87	Tanzania	3.19	90	3.51	62	3.99	110	2.06
88	Honduras	3.17	76	3.66	85	3.65	104	2.21
89	Moldova	3.17	114	3.16	82	3.66	79	2.70
90	Guatemala	3.17	55	3.98	95	3.52	115	2.02
91	Nigeria	3.15	73	3.72	78	3.76	120	1.98
92	Argentina	3.15	118	3.08	115	3.18	49	3.18
93	Uganda	3.14	101	3.30	87	3.59	88	2.52
94	Gambia, The	3.14	103	3.28	56	4.17	122	1.96
95	Burkina Faso	3.13	92	3.47	69	3.85	109	2.07
96	Tajikistan	3.11	121	2.97	64	3.95	97	2.40
97	Algeria	3.09	117	3.09	96	3.51	80	2.67
98	Peru	3.08	79	3.62	109	3.25	98	2.37
99	Zambia	3.07	87	3.52	83	3.66	113	2.04
100	Armenia	3.07	102	3.29	107	3.26	81	2.67
101	Pakistan	3.07	75	3.68	93	3.54	118	2.00
102	Lesotho	3.06	113	3.22	114	3.19	75	2.77
103	Senegal	3.04	84	3.58	110	3.25	102	2.30
104	Kyrgyz Republic	3.03	115	3.15	103	3.33	84	2.60
105	Syria	3.03	107	3.26	106	3.31	87	2.52
106	Madagascar	3.02	91	3.49	99	3.39	105	2.19
107	Guyana	2.99	112	3.24	112	3.22	89	2.51
108	Benin	2.97	109	3.25	84	3.66	117	2.01
109	Libya	2.97	123	2.77	102	3.33	72	2.81
110	Nepal	2.96	86	3.53	100	3.39	121	1.97
111	Bosnia and Herzegovina	2.95	104	3.28	116	3.13	94	2.44
112	Mauritania	2.90	108	3.26	98	3.43	116	2.01
113	Bolivia	2.88	120	2.99	120	3.02	82	2.63
114	Paraguay	2.87	89	3.51	125	2.77	100	2.34
115	Albania	2.87	106	3.26	111	3.24	107	2.10
116	Nicaragua	2.86	97	3.43	117	3.12	114	2.03
117	Venezuela	2.85	124	2.74	121	2.97	65	2.86
118	Ethiopia	2.80	105	3.27	113	3.20	124	1.94
119	Cambodia	2.79	99	3.39	105	3.31	127	1.66
120	Mozambique	2.77	111	3.24	104	3.33	126	1.73
121	Ecuador	2.76	110	3.24	119	3.04	119	1.99
122	Zimbabwe	2.72	125	2.71	122	2.96	90	2.50
123	Bangladesh	2.70	100	3.39	124	2.77	123	1.95
124	Cameroon	2.69	122	2.95	118	3.08	112	2.04
125	Suriname	2.68	119	3.04	127	2.61	96	2.41
126	Burundi	2.50	126	2.58	123	2.85	111	2.06
127	Chad	2.30	127	2.49	126	2.61	125	1.79

(Cont'd.)

Table 6: Readiness component subindex

READINESS COMPONENT			Individual readiness		Business readiness		Government readiness	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Singapore	5.98	2	6.52	12	5.52	1	5.89
2	Denmark	5.93	6	6.36	6	5.67	2	5.77
3	Korea, Rep.	5.91	7	6.36	11	5.62	3	5.76
4	Sweden	5.85	9	6.29	10	5.64	4	5.63
5	Finland	5.85	1	6.52	3	5.74	9	5.29
6	Switzerland	5.82	3	6.46	1	5.96	20	5.04
7	United States	5.77	14	6.17	4	5.72	5	5.41
8	Austria	5.66	10	6.28	5	5.71	23	4.98
9	Taiwan, China	5.62	12	6.27	17	5.40	11	5.20
10	Norway	5.61	17	6.14	20	5.34	6	5.37
11	Malaysia	5.61	22	6.10	18	5.38	7	5.36
12	Japan	5.60	27	6.01	9	5.64	14	5.14
13	Germany	5.59	21	6.10	2	5.83	27	4.85
14	Israel	5.57	18	6.12	13	5.52	17	5.08
15	Hong Kong SAR	5.57	4	6.42	21	5.24	19	5.05
16	France	5.57	15	6.17	15	5.47	18	5.06
17	Netherlands	5.56	19	6.11	16	5.45	16	5.12
18	Iceland	5.55	8	6.31	22	5.22	15	5.13
19	Ireland	5.54	16	6.15	8	5.66	28	4.80
20	Canada	5.52	11	6.27	19	5.35	25	4.95
21	United Kingdom	5.52	23	6.09	14	5.47	22	4.99
22	Belgium	5.52	5	6.37	7	5.66	35	4.52
23	Estonia	5.44	26	6.03	31	4.93	8	5.36
24	Australia	5.44	13	6.23	24	5.16	26	4.93
25	United Arab Emirates	5.31	33	5.90	37	4.80	10	5.22
26	Luxembourg	5.29	24	6.07	38	4.79	21	5.01
27	New Zealand	5.26	20	6.10	26	5.05	30	4.63
28	Qatar	5.24	28	5.99	41	4.78	24	4.96
29	Tunisia	5.22	25	6.05	32	4.90	29	4.69
30	Malta	5.19	30	5.98	49	4.45	13	5.14
31	Portugal	5.17	45	5.62	44	4.71	12	5.18
32	Slovenia	5.13	29	5.98	29	4.96	37	4.44
33	Czech Republic	5.07	31	5.95	25	5.08	49	4.18
34	Spain	5.07	36	5.73	27	5.01	36	4.46
35	Thailand	4.99	40	5.69	43	4.73	32	4.56
36	Chile	4.97	53	5.53	35	4.81	33	4.56
37	India	4.94	46	5.62	28	4.97	45	4.23
38	Lithuania	4.93	35	5.81	48	4.53	38	4.43
39	Hungary	4.84	42	5.67	47	4.61	44	4.26
40	Barbados	4.83	34	5.88	65	4.27	39	4.35
41	Oman	4.83	49	5.57	46	4.68	46	4.22
42	Croatia	4.82	44	5.65	45	4.70	54	4.11
43	Puerto Rico	4.82	60	5.39	23	5.17	72	3.90
44	Slovak Republic	4.81	39	5.69	42	4.74	62	4.01
45	Cyprus	4.80	32	5.94	60	4.33	52	4.13
46	Italy	4.79	47	5.61	39	4.78	64	3.98
47	Bahrain	4.79	41	5.67	79	4.12	31	4.57
48	Costa Rica	4.77	52	5.54	34	4.83	66	3.95
49	Saudi Arabia	4.75	71	5.13	40	4.78	40	4.34
50	Mauritius	4.74	54	5.51	57	4.36	41	4.34
51	South Africa	4.71	72	5.12	30	4.96	59	4.06
52	Jordan	4.71	55	5.47	77	4.13	34	4.53
53	Latvia	4.70	37	5.73	50	4.43	67	3.94
54	China	4.70	59	5.42	58	4.35	42	4.32
55	Brazil	4.64	77	5.07	36	4.81	61	4.04
56	Romania	4.63	43	5.66	61	4.32	69	3.92
57	Greece	4.59	50	5.56	63	4.29	70	3.92
58	Indonesia	4.59	38	5.71	33	4.86	111	3.20
59	Jamaica	4.59	65	5.26	54	4.38	55	4.11
60	Kuwait	4.58	48	5.57	53	4.38	80	3.79
61	Turkey	4.56	63	5.31	52	4.41	65	3.96
62	Azerbaijan	4.55	78	5.07	56	4.38	47	4.20
63	Mexico	4.53	67	5.20	64	4.27	53	4.12
64	Colombia	4.52	74	5.12	55	4.38	57	4.07
65	Poland	4.51	51	5.55	59	4.35	96	3.62
66	Vietnam	4.48	80	4.98	74	4.17	43	4.28
67	Russian Federation	4.46	56	5.45	69	4.23	89	3.70
68	El Salvador	4.45	70	5.14	78	4.13	56	4.09
69	Bulgaria	4.45	61	5.38	84	4.05	71	3.92
70	Egypt	4.42	83	4.89	73	4.19	48	4.19
71	Panama	4.42	64	5.29	71	4.20	82	3.78
72	Ukraine	4.40	58	5.42	80	4.09	91	3.69
73	Uruguay	4.38	73	5.12	82	4.08	68	3.92
74	Argentina	4.37	66	5.26	51	4.42	106	3.42
75	Macedonia, FYR	4.33	69	5.14	81	4.09	84	3.75
76	Morocco	4.32	79	5.04	76	4.14	79	3.79
77	Botswana	4.32	62	5.34	90	3.91	88	3.72
78	Kazakhstan	4.31	96	4.57	72	4.20	50	4.16
79	Dominican Republic	4.31	82	4.93	92	3.85	51	4.15
80	Sri Lanka	4.30	88	4.85	87	3.97	58	4.07
81	Guatemala	4.29	84	4.89	70	4.21	83	3.76
82	Trinidad and Tobago	4.28	57	5.42	99	3.67	86	3.73
83	Algeria	4.28	81	4.97	86	3.99	74	3.87
84	Venezuela	4.26	75	5.11	83	4.07	97	3.62
85	Peru	4.21	89	4.84	67	4.24	101	3.56
86	Senegal	4.18	94	4.62	75	4.15	81	3.78
87	Philippines	4.17	87	4.86	88	3.95	90	3.70
88	Mongolia	4.11	92	4.75	103	3.53	60	4.04
89	Pakistan	4.08	103	4.13	68	4.24	73	3.87
90	Honduras	4.03	95	4.61	89	3.93	102	3.55
91	Bosnia and Herzegovina	4.01	68	5.17	97	3.72	114	3.15
92	Georgia	4.00	76	5.09	109	3.44	104	3.47
93	Guyana	3.99	91	4.76	95	3.76	105	3.44
94	Nigeria	3.90	108	3.73	62	4.30	92	3.68
95	Kenya	3.89	107	3.73	66	4.25	93	3.68
96	Tajikistan	3.88	99	4.40	104	3.52	87	3.72
97	Ecuador	3.88	90	4.79	94	3.82	122	3.03
98	Libya	3.86	93	4.70	98	3.71	113	3.17
99	Albania	3.86	86	4.87	119	3.22	103	3.48
100	Namibia	3.82	98	4.41	91	3.87	112	3.17
101	Suriname	3.82	85	4.87	85	4.01	124	2.57
102	Moldova	3.72	102	4.14	107	3.46	100	3.56
103	Armenia	3.70	101	4.16	101	3.57	107	3.38
104	Madagascar	3.64	112	3.55	102	3.55	77	3.82
105	Bolivia	3.63	100	4.34	110	3.43	116	3.14
106	Kyrgyz Republic	3.61	97	4.42	115	3.32	119	3.08
107	Tanzania	3.59	114	3.31	100	3.65	78	3.80
108	Mauritania	3.55	117	3.16	105	3.49	63	3.99
109	Cambodia	3.54	110	3.66	114	3.33	94	3.64
110	Cameroon	3.53	109	3.70	93	3.82	120	3.08
111	Syria	3.51	111	3.62	117	3.28	95	3.63
112	Nicaragua	3.49	105	4.06	121	3.12	110	3.29
113	Zambia	3.45	106	3.94	113	3.35	121	3.06
114	Burkina Faso	3.42	120	2.99	96	3.72	99	3.57
115	Paraguay	3.42	104	4.10	116	3.29	123	2.86
116	Mali	3.40	118	3.07	118	3.28	75	3.85
117	Gambia, The	3.38	115	3.23	124	3.08	76	3.84
118	Benin	3.37	119	3.06	108	3.45	98	3.61
119	Nepal	3.32	113	3.52	112	3.36	118	3.08
120	Uganda	3.13	126	2.19	106	3.47	85	3.73
121	Mozambique	3.06	125	2.69	120	3.13	108	3.38
122	Lesotho	3.05	116	3.18	126	2.83	117	3.14
123	Ethiopia	3.03	124	2.69	123	3.09	109	3.32
124	Bangladesh	2.97	121	2.85	125	2.92	115	3.14
125	Chad	2.75	123	2.69	122	3.11	127	2.46
126	Zimbabwe	2.70	127	2.17	111	3.41	126	2.52
127	Burundi	2.70	122	2.74	127	2.81	125	2.54

(Cont'd.)

Table 7: Usage component subindex

USAGE COMPONENT			Individual usage		Business usage		Government usage	
Rank	Country/Economy	Score	Rank	Score	Rank	Score	Rank	Score
1	Denmark	5.89	2	5.71	5	5.96	1	5.99
2	Sweden	5.80	3	5.69	1	6.14	6	5.58
3	Netherlands	5.62	1	6.20	12	5.76	19	4.89
4	Korea, Rep.	5.38	15	4.30	7	5.87	3	5.96
5	Hong Kong SAR	5.36	5	5.04	19	5.51	7	5.54
6	Switzerland	5.35	4	5.14	4	6.00	18	4.90
7	Singapore	5.27	18	4.16	15	5.71	4	5.94
8	Estonia	5.27	11	4.56	23	5.29	2	5.96
9	United States	5.26	17	4.21	8	5.87	5	5.70
10	Norway	5.24	8	4.81	14	5.73	12	5.16
11	Australia	5.23	7	4.94	21	5.38	9	5.37
12	United Kingdom	5.17	6	5.01	11	5.76	22	4.73
13	Taiwan, China	5.08	19	4.15	17	5.67	8	5.42
14	Iceland	5.07	10	4.59	10	5.81	21	4.80
15	Canada	5.07	12	4.46	16	5.69	15	5.05
16	Finland	5.05	14	4.33	6	5.93	20	4.89
17	Austria	5.05	16	4.22	13	5.76	13	5.16
18	Israel	4.99	13	4.43	9	5.86	26	4.67
19	France	4.93	23	3.88	18	5.54	10	5.36
20	Luxembourg	4.87	9	4.72	27	5.18	25	4.70
21	Japan	4.86	22	4.02	3	6.03	31	4.52
22	Germany	4.79	21	4.06	2	6.06	38	4.26
23	New Zealand	4.72	24	3.86	24	5.26	14	5.05
24	Belgium	4.59	20	4.09	20	5.49	41	4.19
25	Ireland	4.50	26	3.67	28	5.12	24	4.71
26	Malta	4.30	39	2.77	37	4.91	11	5.22
27	United Arab Emirates	4.30	36	2.97	32	5.00	17	4.92
28	Malaysia	4.28	45	2.52	22	5.36	16	4.97
29	Portugal	4.28	33	3.02	29	5.10	23	4.71
30	Slovenia	4.22	27	3.56	34	4.94	42	4.16
31	Lithuania	4.19	30	3.25	42	4.81	32	4.51
32	Spain	4.18	29	3.43	40	4.83	37	4.27
33	Italy	4.12	25	3.68	45	4.68	47	4.00
34	Qatar	4.03	40	2.75	46	4.66	27	4.67
35	Chile	3.99	48	2.34	31	5.01	28	4.62
36	Jamaica	3.95	28	3.49	58	4.50	52	3.85
37	Czech Republic	3.91	31	3.20	25	5.23	92	3.29
38	Hungary	3.81	38	2.81	41	4.81	54	3.81
39	Bahrain	3.80	43	2.64	56	4.52	39	4.25
40	Slovak Republic	3.79	34	3.01	38	4.88	78	3.47
41	Brazil	3.75	64	1.84	36	4.91	33	4.51
42	Puerto Rico	3.75	52	2.15	30	5.02	45	4.07
43	Thailand	3.73	70	1.74	35	4.93	30	4.53
44	Latvia	3.73	35	2.98	55	4.52	61	3.68
45	Tunisia	3.70	66	1.80	33	4.97	35	4.33
46	Cyprus	3.69	37	2.86	54	4.54	63	3.66
47	Jordan	3.68	63	1.85	39	4.87	36	4.30
48	Croatia	3.64	41	2.69	52	4.56	62	3.67
49	Mexico	3.61	62	1.89	63	4.39	29	4.55
50	Barbados	3.60	32	3.12	66	4.33	87	3.36
51	India	3.53	109	1.20	26	5.18	40	4.21
52	Turkey	3.52	57	2.00	43	4.80	56	3.77
53	Saudi Arabia	3.52	56	2.02	49	4.59	51	3.95
54	China	3.50	80	1.60	59	4.47	34	4.45
55	Romania	3.41	44	2.58	80	4.11	73	3.55
56	Dominican Republic	3.41	72	1.74	62	4.41	44	4.08
57	South Africa	3.40	67	1.79	44	4.72	60	3.68
58	El Salvador	3.38	77	1.62	64	4.37	43	4.16
59	Oman	3.38	69	1.78	67	4.32	46	4.04
60	Kuwait	3.35	47	2.36	51	4.57	97	3.13
61	Uruguay	3.31	55	2.07	73	4.26	70	3.60
62	Greece	3.30	50	2.31	69	4.29	91	3.31
63	Poland	3.30	42	2.66	70	4.28	103	2.96
64	Colombia	3.29	65	1.81	74	4.23	53	3.84
65	Guatemala	3.27	81	1.59	47	4.61	69	3.61
66	Azerbaijan	3.27	90	1.45	65	4.36	48	3.99
67	Argentina	3.26	51	2.19	82	4.10	76	3.51
68	Bulgaria	3.25	46	2.52	97	3.80	82	3.44
69	Costa Rica	3.25	61	1.90	76	4.20	64	3.65
70	Mauritius	3.25	59	1.91	71	4.27	72	3.57
71	Ukraine	3.23	54	2.09	90	3.96	67	3.63
72	Egypt	3.22	94	1.35	57	4.52	55	3.79
73	Venezuela	3.20	60	1.90	83	4.10	71	3.59
74	Mauritania	3.18	98	1.32	72	4.27	50	3.95
75	Vietnam	3.17	92	1.40	79	4.13	49	3.99
76	Panama	3.17	85	1.57	53	4.55	84	3.39
77	Morocco	3.17	71	1.74	68	4.30	77	3.47
78	Philippines	3.16	88	1.52	60	4.45	75	3.51
79	Kazakhstan	3.14	76	1.67	86	4.05	58	3.70
80	Senegal	3.14	101	1.29	61	4.41	57	3.72
81	Sri Lanka	3.09	104	1.25	50	4.59	83	3.43
82	Peru	3.08	75	1.69	77	4.19	88	3.36
83	Trinidad and Tobago	3.08	49	2.34	89	4.00	106	2.89
84	Russian Federation	3.04	53	2.09	87	4.04	101	2.99
85	Gambia, The	2.98	103	1.25	85	4.06	65	3.64
86	Pakistan	2.95	102	1.27	75	4.21	85	3.38
87	Uganda	2.93	119	1.08	84	4.07	68	3.63
88	Botswana	2.92	87	1.52	96	3.81	80	3.44
89	Mali	2.91	118	1.08	91	3.95	59	3.69
90	Nigeria	2.90	107	1.23	81	4.10	86	3.37
91	Kenya	2.89	105	1.25	78	4.18	95	3.24
92	Macedonia, FYR	2.88	58	2.00	102	3.65	100	2.99
93	Indonesia	2.87	97	1.32	48	4.59	112	2.70
94	Honduras	2.84	100	1.30	94	3.87	89	3.34
95	Mongolia	2.82	91	1.41	105	3.58	79	3.47
96	Burkina Faso	2.81	121	1.06	98	3.74	66	3.64
97	Algeria	2.78	79	1.61	108	3.54	96	3.20
98	Tanzania	2.75	115	1.12	93	3.88	94	3.24
99	Moldova	2.74	83	1.58	104	3.59	99	3.06
100	Georgia	2.70	89	1.46	99	3.73	105	2.92
101	Bosnia and Herzegovina	2.70	68	1.79	100	3.69	116	2.61
102	Benin	2.70	110	1.19	113	3.39	74	3.51
103	Namibia	2.69	93	1.35	88	4.03	113	2.69
104	Madagascar	2.69	120	1.06	107	3.56	81	3.44
105	Mozambique	2.64	117	1.10	106	3.58	93	3.25
106	Syria	2.63	99	1.32	95	3.86	110	2.72
107	Ecuador	2.63	73	1.72	112	3.40	109	2.76
108	Bolivia	2.62	96	1.32	121	3.21	90	3.33
109	Cambodia	2.56	122	1.06	109	3.50	98	3.13
110	Tajikistan	2.56	125	1.03	101	3.67	102	2.98
111	Zambia	2.54	111	1.16	92	3.91	120	2.55
112	Armenia	2.52	106	1.24	103	3.62	111	2.70
113	Nicaragua	2.50	95	1.33	116	3.29	107	2.89
114	Guyana	2.50	78	1.62	119	3.23	114	2.65
115	Libya	2.48	84	1.58	117	3.28	117	2.57
116	Albania	2.47	82	1.59	118	3.27	119	2.56
117	Ethiopia	2.47	127	1.00	110	3.45	104	2.95
118	Cameroon	2.46	114	1.13	114	3.36	108	2.87
119	Nepal	2.36	124	1.03	111	3.44	115	2.62
120	Kyrgyz Republic	2.34	112	1.16	115	3.34	122	2.52
121	Paraguay	2.33	86	1.53	124	3.04	125	2.41
122	Lesotho	2.27	113	1.14	122	3.13	121	2.54
123	Bangladesh	2.27	116	1.11	120	3.22	124	2.47
124	Suriname	2.24	74	1.71	123	3.07	127	1.95
125	Burundi	2.20	126	1.01	125	3.02	118	2.57
126	Chad	2.14	123	1.03	127	2.88	123	2.50
127	Zimbabwe	2.06	108	1.22	126	2.95	126	2.02

(Cont'd.)

Asia and the Pacific

The networked readiness assessment for Asia and the Pacific, as a region, is once again extremely diverse, pointing to very different capacities for leveraging ICT advances. While six Asian and Pacific economies are ranked in the top 20—namely **Singapore** (5th), **Korea** (9th), **Hong Kong** (11th), **Australia** (14th), **Taiwan** (17th), and **Japan** (19th)—countries such as **Cambodia** (115th), **Nepal** (119th), and **Bangladesh** (124th) continue to fall toward the end of the NRI rankings, displaying serious shortcomings in their networked readiness enablers.

Comments about the performances of Singapore and Korea have been made in earlier sections of this chapter. **Hong Kong,** broadly stable from last year, continues to benefit from high levels of ICT usage (5th overall), especially for citizens (5th) and the government (7th), and one the most ICT-friendly market environment in the world (2nd).

Taiwan, although losing some ground this year (four places),[18] is still ranked at a satisfactory 17th place overall, showing its resilience as one of the world's largest ICT exporters and producers (1st for the high-tech exports as a percentage of total exports) and a leading innovator (3rd for the number of registered utility patents). Taiwan's development story is textbook example of how a resource-poor rural economy can transform itself in the short span of three decades thanks to coherent e-leadership from the government in fostering ICT penetration, innovation, and education.[19]

Japan is down five positions at 19th, mainly because of deterioration in the market environment conditions (from 7th in 2006–07 to 14th this year) and in the individual readiness pillar (from 14th last year to 27th this year). In particular, the fall in the market environment can be explained, among other elements, by the inclusion of new hard data capturing the tax rate, for which the country ranks a dismal 91st. Nevertheless, the country benefits from a sophisticated and innovative business sector, displaying high ranks in readiness (9th) and usage (3rd). The government has also played a major role in promoting ICT diffusion (15th in the government prioritization of ICT variable), by constantly prioritizing the latter in the national strategy and adopting a comprehensive digital agenda from an early stage.[20]

India, at 50th, loses four positions in a constant sample from 2006–07. Although the country scores well for the sophistication of its business environment, availability of qualified labor force (an impressive 4th place for the availability scientists and engineers), and innovation potential, the poor state of the ICT infrastructure (71st) and the extremely low levels of ICT penetration among individuals (109th for individual usage) present severe obstacles for the country to fully use and leverage ICT in its economic and social activities.

China is up five positions in a constant sample at 57th,[21] presenting similar weaknesses as India, notably in its underdeveloped ICT infrastructure (86th) and scarce individual usage (80th). On a more positive note, ICT penetration seems to occupy a rather central position in the government agenda (42nd for government readiness). Moreover, the government's ICT strategy appears to have already borne some fruit in the form of ICT promotion, e-government services, and the government's productivity and efficiency improvements (34th for government usage).

Azerbaijan, at 67th, retains its predominance in Central Asia; it is followed closely by **Kazakhstan,** up five places from last year in a constant sample to 71st place. Notwithstanding this improvement, Kazakhstan continues to present a number of weaknesses, especially in individual readiness (96th) and usage (76th) and in business usage (86th).

Tajikistan re-enters the rankings at 98th this year.

Latin America and the Caribbean

The networked readiness snapshot offered by the NRI 2007–2008 for Latin America and the Caribbean appears less positive than last year, when a generalized upward trend was observed. This highlights the dynamism of the ICT sector, and the importance of economies making continuous progress in ICT diffusion, as well as innovation adoption, to maintain their competitive advantages.

At 34th (down three positions from 2006–07), **Chile** is again leading the region in networked readiness, with a relatively homogeneous performance across the three NRI subindexes, boosted by a strong focus of the government on ICT penetration and by the early adoption of a comprehensive digital agenda. This agenda has resulted in the establishment of world-class e-government services (ranked 12th) and in sophisticated e-commerce practices.[22]

Among the regional top performers this year, a handful of Caribbean economies—**Barbados** (38th), new entrant **Puerto Rico** (39th), and **Jamaica** (46th)—seem to be benefiting from ICT advances. Barbados is an interesting case of networked readiness driven mainly by its citizens (34th and 32nd for individual readiness and usage respectively) and by an ICT-conducive regulatory framework (27th) and infrastructure (19th). The relative degree of prioritization of ICT in the government agenda has failed so far to translate into higher levels of government usage (87th).

Mexico and **Brazil** drop a few places each this year, to 58th and 59th place, respectively. In both cases, the fall in ranking does not correspond to a dramatic fall in the absolute performance of the country vis-à-vis last year,[23] but rather to the fact other countries have progressed more rapidly. Although the two countries have realized significant progress in business as well as government readiness and usage, and they both show a high degree of ICT prioritization in their national agendas, their overregulated market environments, the poor quality of their educational systems, and low R&D

investments remain serious hindrances to achieving higher levels of networked readiness.

In the middle of the rankings, **Panama,** at 64th, is up four positions in a constant sample, while **Colombia,** at 69th, is down two positions in a constant sample. **Argentina** is down to 77th place, experiencing a fall of 11 rankings in a constant sample. A note of caution must be introduced here, since the country's absolute score is unchanged from last year. Nevertheless, the poor assessment of the market (118th) and regulatory (115th) environments in the country, as well as the perceived lack of focus on ICT penetration in the government agenda (106th), are all important shortcomings that need to be addressed as priorities by the new administration.

Peru (84th) and **Venezuela** (86th) follow, while **Bolivia** (111th), **Nicaragua** (116th), and **Paraguay** (120th) continue to lag behind the rest of the region, and most of the world, in networked readiness.

Sub-Saharan Africa and MENA

Despite the outstanding advances in ICT penetration that **sub-Saharan Africa** experienced in the last decade or so, which led the region to narrow the telecommunications access gap from 10 percent of the global average in 1991 to 19 percent in 2004,[24] the large majority of the region continues to lag in the global rankings of the NRI. Only **South Africa** (51st) and **Mauritius** (54th) feature in the first half of the rankings this year. In particular, South Africa, down two positions in a constant sample from 2006–07, continues to rest its ICT prowess on its conducive ICT market (35th) and regulatory (26th) environments and on a sophisticated business sector that has taken the lead in ICT penetration and usage, as confirmed by the good marks registered in business readiness (30th) and usage (44th).

Botswana, one of the traditional ICT champions in the region, is down eight positions in a constant sample to a disappointing 78th place. Again, in line with the earlier comments about Argentina, this drop in rankings should be taken with caution since it corresponds to an actually small 0.03 improvement in the absolute score from last year. **Senegal** enters the rankings this year at 85th position, just above **Kenya** (92nd), **Nigeria** (94th), and **Mauritania** (97th).

As in the past, the bottom ranks of the NRI 2007–2008 are occupied by sub-Saharan countries, notably **Cameroon** (118th), **Mozambique** (121st), **Lesotho** (122nd), **Ethiopia** (123rd), **Zimbabwe** (125th), **Burundi** (126th), and **Chad** (127th), highlighting once again the magnitude of the challenges involved for the region to benefit from the development and competitive potential of ICT. A lack of extensive and well-functioning infrastructure, overregulated and inefficient business environments, and poor governance and educational standards are all important hindrances in these countries.

The assessment given by the NRI 2007–2008 for **North Africa** is more positive, with **Egypt** and **Morocco** posting an impressive 17-place (the highest in the sample) and 5-place improvement, respectively, in a constant sample, and climbing to 63rd and 74th; only **Algeria** (at 88th) lost some ground. Egypt has advanced notably in the environment component (from 74th in 2006–07 to 60th this year), especially in the regulatory environment (from 77th to 61st this year), as well as in government readiness (from 81st to 48th this year), pointing to an increased emphasis on ICT penetration in the national development strategy.

The top performer in North Africa, **Tunisia,** is stable at 35th place. Its performance is boosted by an ICT-friendly regulatory environment (29th), a significant degree of preparedness and inclination to use ICT by all social actors (29th), and satisfactory usage levels by the business sector (33rd) and the government (35th). The satisfactory marks obtained in government readiness and usage point to the importance accorded to ICT in the national agenda, and to the successes realized by the government in ICT promotion and diffusion.

Last but not least, the networked readiness picture for the **Middle East** this year is very encouraging, with significant progress in ICT spearheaded by the Gulf States. Indeed, the latter are increasingly emphasizing the role of ICT for national development, both as a key infrastructure and as a promising sector in view of diversifying their economies away from oil.

Most of the countries in the region posted important improvements in the rankings, with **Qatar** (32nd), **Bahrain** (45th), and **Jordan** (47st) being at the forefront, with a remarkable 4-, 6-, and 11-place rise, respectively, in a constant sample. Qatar's promising government's e-strategy and initiatives are the subject of Chapter 2.2, "Qatar: Leveraging Technology to Create a Knowledge-Based Economy in the Middle East," in this *Report*. Also **Kuwait** (52nd) climbed four positions in a constant sample from last year.

Israel, unchanged at 18th place, continues to lead the Middle East in networked readiness, displaying outstanding levels of technological sophistication and innovation, world-class research institutions and educational system, and excellent ICT penetration. The country represents another success story of a resource-poor economy turned into an ICT powerhouse in the short span of three decades, thanks to visionary e-leadership from the government and its highly educated and entrepreneurial citizens.[25]

The **United Arab Emirates (UAE),** unchanged from last year at 29th place, continues to lead the Gulf States in networked readiness, owing to a leading government role in ICT promotion as witnessed by the excellent marks the country obtains in government readiness (10th) and usage (17th). Dubai's e-Government Initiative, initiated in 2000 and fostering ICT implementation in the UAE, has been recognized as a success story by practitioners and is an integral part of Dubai Vision 2010, which aims to establish Dubai as a

knowledge-based economy by leveraging tourism, ICT, media, trade, and services.

One must also note that of the four newly included countries from the region this year, **Saudi Arabia** and **Oman** enter the rankings in fairly high positions: they are 48th and 53rd, respectively, while **Libya** (105th) and **Syria** (110th) seem to have still a long way to go to catch up the rest of the region in networked readiness.

More details on the performance of countries from the Middle East are presented in the following section.

Some historical trends on networked readiness: The most dynamic countries from 2001 to 2007

A unique feature of the NRI is that it has been computed for the last seven years and hence provides a rich source of longitudinal data about the evolution of countries in networked readiness. As the number of countries has increased from 72 in the first year (2001–02) to 127 this year, we have performed an analysis of the movement of countries across the years based upon deciles. Countries included in the NRI rankings each year have been assigned a decile score and we have analyzed the variations in their decile scores over the last seven years.

Table 8 presents a summary of the countries that have moved up in their decile score by more than two ranks over the last seven years. Note that this table does not list countries that were already in the highest decile groups in 2001–02 and have stayed stable in that decile group (this would typically include countries from developed regions such as North America and Western Europe). As evident from Table 8, three BRIC countries —**China, India,** and **Russia**—have made important upward movements in their networked readiness over the last seven years. The advances made by India and China, in particular, are very impressive; this is line with the progress observed in both countries, especially in the domain of ICT services and goods, respectively. India has occupied a prime position in global ICT services, with exports totaling around $60 billion and the emergence of global players in the sector such as Infosys and Wipro. China has also emerged rapidly as the biggest exporter of ICT goods in the world, eclipsing the United States and Europe, driven by its growing domestic market and its success in global manufacturing.

Lithuania, too—influenced by the successes of neighboring Estonia and Finland—has made important progress in networked readiness. Also of note are the important steps taken forward by other emerging economies such as **Vietnam** and **Ukraine,** as well as Jordan and Egypt in the Middle East. As GDP evolution shows a good correlation with networked readiness (Figure 1), the future development prospects of these economies look good.

Table 9 presents a historical analysis of the evolution of networked readiness across different regions of the world.[26] The advanced economies of the world show little movement, as noted earlier. Several parts of the world—such as Central and Eastern Europe and Developing Asia—have made good progress over the last seven years. The progress of Central and Eastern Europe has been influenced by the ongoing expansion of the European Union. As countries in this region join the European Union, they are required to make deep changes in their market and policy environments and also get support for improving their infrastructures. In the Developing Asia region, China, India, and Vietnam are clearly the drivers of progress and improvement.

However, the **Middle East** stands out as having made the largest progress in networked readiness over the last seven years, improving as a region across three decile groups. During the past six years, the region recorded the largest growth in Internet users among the major world areas as the number of Middle Eastern citizens accessing the Web soared by more than 600 percent, three times the world's average increase. Some Gulf countries, such as the UAE, stand out in their efforts to promote and leverage ICT. Since 2000, UAE policymakers have promoted building the Emirates into information-rich societies. The UAE has also launched

Table 8: Variations in decile ranks of countries from 2001–02 to 2007–08

	DECILE		
Country/Economy	Earliest	Latest	Difference
China	9	5	4
Egypt	8	5	3
Guatemala	10	7	3
India	8	4	4
Jamaica	8	4	4
Jordan	7	4	3
Lithuania	6	3	3
Romania	9	5	4
Russian Federation	9	6	3
Ukraine	9	6	3
Vietnam	10	6	4

Table 9: Variations in decile ranks of regions from 2001–02 to 2007–08

	DECILE		
Region	Earliest	Latest	Difference
Advanced economies	2	2	0
Africa	8.5	8	0.5
Central and Eastern Europe	5.5	4	1.5
Commonwealth of Independent States and Mongolia	9	7.5	1.5
Developing Asia	8	6.5	1.5
Middle East	7.5	4.5	3
Western Hemisphere	7	6.5	0.5

several technology-intensive innovation initiatives, such as Dubai Media City (DMC), launched in November 2000; next to DMC are Dubai Internet City (DIC) and Knowledge Village (KV). The major goal of the multi-billion dollar DMC, DIC, and KV complex is to create a cluster of innovation comprising educators, incubators, logistic companies, multimedia businesses, telecommunications companies, remote service providers, software developers, and venture capitalists in one place. Dubai Internet City is the region's first technology innovation zone and is viewed by decision makers in the UAE as an economic driver not only to Dubai's economy, but to the country's as a whole. Today, hundreds of high-tech firms are housed in the DIC. The DMC houses more than 550 media companies, including global giants, along with regional companies and new startups. Companies in this high-tech corridor employ more than 7,000 knowledge workers from all around the world.

Similar examples of ICT excellence can be found in other countries in the Middle East, including the richer Gulf States (see Chapter 2.2 on Qatar in this *Report*), as well as less rich economies such as Jordan and Egypt. Jordan has championed innovation in its educational system through the use of ICT. Through the Jordan Education Initiative (JEI), the country's main objectives are to enable its students to compete globally in the knowledge economy, to train teachers and administrators to use technology in the classroom, and to guide students through critical thinking and analysis. Today, the JEI is being replicated in Rajasthan, India (launched in November 2005); the Palestinian Territories; Bahrain; and, most recently, Egypt (launched in May 2006), as well as other countries.

Of great concern is the relative stagnation of **African countries** at the bottom of the decile rankings. Though some African countries in North Africa, such as Tunisia, are performing well and others such as Egypt and Morocco are improving their positions, the continent as a whole (with the exception of South Africa) is not succeeding in keeping up with the rapid pace of change in ICT in other regions of the world. Note that the stagnation in the decile rankings for African countries does not indicate that they have not made progress in leveraging ICT. Many are heavily investing in ICT and have a clear digital strategy in place, as is the case of Ethiopia, previously highlighted. However, the progress being made is slower in relative terms than the progress being made by other regions of the world.

Conclusions

More important than rising Internet access or ringing mobile phones is awareness among public and private stakeholders and decision makers that it is no longer possible to relegate ICT policies to an administrative sideshow. A country's ICT capabilities can profoundly affect its capacity to innovate and its global competitiveness, as well as improve the socioeconomic prospects of its less-advantaged citizens. Senior-level attention to ICT as a key enabler of innovation has been expressed in different ways in different countries, but a fundamental and salutary change is that these issues now rank as top agenda items.

Efforts such as the Networked Readiness Framework and the NRI serve as important tools for leaders from the public and private sectors to use in enhancing their understanding of the links between ICT investment and improvements in competitiveness and development. They also serve to provide an objective basis for comparing the achievements of specific countries or regions in networked readiness and in identifying best practices. Although the limitations of the NRI and its underlying data have to be noted, the *Global Information Technology Report* series over the last seven years provides a valuable repository of longitudinal data on networked readiness. Case studies included in the various *Global Information Technology Reports* complement the empirical data with qualitative analyses of specific best practices.

Notes

1 See Kusakabe and Moffatt 2004.

2 See Trajtenberg 2006.

3 A notable example in this area is Ethiopia, whose government is investing 10 percent of the country's GDP into modern ICT over the next five years. This investment is justified, Ethiopian officials believe, if they are to make investments in education, agriculture, health care, and the economy pay off. To make dreams come true, Ethiopia is looking to Cisco to help build one of the most sophisticated IP networks in all of Africa. Ultimately, Ethiopia hopes to provide 450 secondary schools with email and Internet connectivity, and connect 600 local administrations with 11 regional government offices and the federal government. Also, Ethiopia aims at rolling out broadband to some 16,000 villages across the country—enough so that every citizen will be within five kilometers from an access point. For further information, see http://emergingtimes.typepad.com/bestoftimes/country_transformation/index.html.

4 See Farnsworth et al. 2007.

5 BSG 2004.

6 A note of caution must be introduced when comparing the last six years of NRI results with the one featured in the very first edition of the *Report* in 2001–02. Since the NRI framework, in its current form, was developed by INSEAD in 2002, it is not strictly comparable to the one used in the first edition. For more information on the 2001–02 theoretical framework, see Kirkman et al. 2002.

7 For further details on the networked readiness framework and its theoretical conception, see Dutta and Jain 2003.

8 For a more in depth analysis of the Survey's process and methodology, see Browne and Geiger 2007.

9 Tajikistan, in particular, was included in the Survey and in the NRI computation for the first time in 2005–06, but could not be included in the *Report* last year because of the many missing hard data points.

10 Until the 2005–06 GITR edition, factor analytical techniques were used to select the variables used to compute the NRI from a larger set of possible variables, Although this was a technically rigorous approach, it reduced the ability to easily explain the underlying logic for including specific variables and to make strict comparisons over time. As a consequence, starting from 2006–07, expert opinion has played a predominant role in selecting the variables, obviously with the benefit of previous experience in identifying appropriate variables for computing the NRI,

thus aligning the NRI's to the Forum's general competitiveness methodology. In this sense, the treatment of missing variables has also changed: whereas until 2005–06, those were estimated using analytical techniques such as regression and clustering, beginning in 2006–07 they are indicated with "n/a" and not taken in consideration in the calculation of the specific pillar to which they belong. Moreover, the scale used to compute the NRI and the variables that compose it has been aligned to the Forum's (increasing) 1–7 scale, changing with respect to the scale used previously for a couple of years (i.e., positive and negative scores around a standardized mean of 0). For more detailed information on the old computation methodology and on the changes introduced in 2006–07, see Dutta and Jain 2006 and Mia and Dutta 2007.

11 An important element of the government far-sightedness in promoting ICT diffusion has been the early liberalization of the telecommunications sector in 1996, well ahead most of the European Union. Incidentally, this also greatly contributed to the development of a world-class local high-tech industry, whose exports accounted in 2005 for 9.38 percent of total exports, representing 25th place in the sample.

12 See Sala-i-Martin et al. 2007.

13 Indeed, Korea displays one of the most developed cluster system in the world (3rd), characterized by an important degree of cooperation between academia and industry (5th) and by companies investing heavily in R&D (6th) and with a high innovation potential (7th).

14 Countries in the EU15 are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

15 The 12 EU accession countries are Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia.

16 For a full analysis of Estonia's ICT development story, see Dutta 2007.

17 By referring to a country's performance in a "constant sample," we mean its ranking with respect to the same countries included in the GITR 2006–2007—that is, excluding the ones covered for the first time this year.

18 In particular, the regulatory environment seems to have experienced some deterioration from last year (from 31st in 2006–07 to 42nd this year), as well as individual readiness (which dropped from 7th to 12th), notably with respect to some elements of ICT accessibility, for which Taiwan does not seem to have progressed as rapidly as other economies.

19 For a more detailed analysis of Taiwan's story, see Dahl and Lopez-Claros 2006.

20 See Shimizu et al. 2007.

21 As in previous years, one must keep in mind that India and China show both large regional disparities in general competitiveness as well as in the extent of ICT penetration and usage; disparities which tend to be partially hidden by the overall national NRI assessment.

22 For a full account of Chile's digital agenda, see Alvarez Voullième et al. 2005.

23 In this sense, Mexico and Brazil's respective 6- and 3-place drops in a constant sample correspond to a minor negative delta of 0.01 for Mexico and to a modest positive delta of 0.03 for Brazil in the respective scores.

24 Haacker 2007. The author also points out how the number of mobile telephone subscribers has grown at an impressive 91 percent annual average rate, while the total telephone subscribers has grown at a rate of 21 percent from 1991 to 2004 and at 31 percent from 1999 to 2004.

25 For a full account of Israel's inspiring development story, see Lopez-Claros and Mia 2006.

26 The classification of countries by the International Monetary Fund (IMF) has been used as a basis for assigning countries to specific regions.

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Appendix A: Technical composition and computation of the Networked Readiness Index 2007–2008

The Networked Readiness Index 2007–2008 separates environmental factors from ICT readiness and usage, and is composed of three subindexes. Each subindex is further divided into three pillars. The 68 ICT-related variables used in the computation of the NRI are then distributed among the nine pillars.

NETWORKED READINESS INDEX

Networked Readiness Index = 1/3 Environment component subindex + 1/3 Readiness component subindex + 1/3 Usage component subindex

Environment subindex

Environment subindex = 1/3 Market environment + 1/3 Political and regulatory environment + 1/3 Infrastructure environment

1st pillar: Market environment
- 1.01 Venture capital availability
- 1.02 Financial market sophistication
- 1.03 Availability of latest technologies
- 1.04 State of cluster development
- 1.05 Utility patents (hard data)
- 1.06 High-tech exports (hard data)
- 1.07 Burden of government regulation
- 1.08 Extent and effect of taxation
- 1.09 Total tax rate (hard data)
- 1.10 Time required to start a business (hard data)
- 1.11 Number of procedures required to start a business (hard data)
- 1.12 Intensity of local competition
- 1.13 Freedom of the press
- 1.14 Accessibility of digital content

2nd pillar: Political and regulatory environment
- 2.01 Effectiveness of law-making bodies
- 2.02 Laws relating to ICT
- 2.03 Judicial independence
- 2.04 Intellectual property protection
- 2.05 Efficiency of legal framework for disputes
- 2.06 Property rights
- 2.07 Quality of competition in the ISP sector
- 2.08 Number of procedures to enforce a contract (hard data)
- 2.09 Time to enforce a contract (hard data)

3rd pillar: Infrastructure environment
- 3.01 Telephone lines (hard data)
- 3.02 Secure Internet servers (hard data)
- 3.03 Electricity production (hard data)
- 3.04 Availability of scientists and engineers
- 3.05 Quality of scientific research institutions
- 3.06 Tertiary enrollment (hard data)
- 3.07 Education expenditure (hard data)

Readiness subindex

Readiness = 1/3 Individual readiness + 1/3 Business readiness + 1/3 Government readiness

4th pillar: Individual readiness
- 4.01 Quality of math and science education
- 4.02 Quality of the educational system
- 4.03 Internet access in schools
- 4.04 Buyer sophistication
- 4.05 Residential telephone connection charge (hard data)
- 4.06 Residential monthly telephone subscription (hard data)
- 4.07 High-speed monthly broadband subscription (hard data)
- 4.08 Lowest cost of broadband (hard data)
- 4.09 Cost of mobile telephone call (hard data)

5th pillar: Business readiness
- 5.01 Extent of staff training
- 5.02 Local availability of specialized research and training services
- 5.03 Quality of management schools
- 5.04 Company spending on R&D
- 5.05 University-industry research collaboration
- 5.06 Business telephone connection charge (hard data)
- 5.07 Business monthly telephone subscription (hard data)
- 5.08 Local supplier quality
- 5.09 Local supplier quantity
- 5.10 Computer, communications, and other services imports (hard data)

6th pillar: Government readiness
- 6.01 Government prioritization of ICT
- 6.02 Government procurement of advanced technology products
- 6.03 Importance of ICT to government vision of the future
- 6.04 E-Government Readiness Index (hard data)

Usage subindex

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

7th pillar: Individual usage
- 7.01 Mobile telephone subscribers (hard data)
- 7.02 Personal computers (hard data)
- 7.03 Broadband Internet subscribers (hard data)
- 7.04 Internet users (hard data)
- 7.05 Internet bandwidth (hard data)

8th pillar: Business usage
- 8.01 Prevalence of foreign technology licensing
- 8.02 Firm-level technology absorption
- 8.03 Capacity for innovation
- 8.04 Availability of new telephone lines
- 8.05 Extent of business Internet use

9th pillar: Government usage
- 9.01 Government success in ICT promotion
- 9.02 Availability of government online services
- 9.03 ICT use and government efficiency
- 9.04 Presence of ICT in government offices
- 9.05 E-Participation Index (hard data)

Appendix B: Methodological notes

Combining hard data and Survey data

The responses to the Executive Opinion Survey (Survey) constitute the "Survey data." Responses to the Survey range from 1 to 7.

The hard data were collected from various sources, as described in the Technical Notes and Sources at the end of the *Report*. All of the data used in the calculation of the NRI can be found in the Data Tables section of the *Report*. The standard formula for converting each hard data variable to the 1-to-7 scale is:

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

The sample minimum and sample maximum are the lowest and highest values of the overall sample, respectively. For some variables, a higher value indicates a worse outcome (e.g., higher mobile phone subscription costs are worse than lower costs). In this case, we "reverse" the series by subtracting the normalized variable from 8. In some instances, adjustments were made to account for extreme outliers in the data.