The Global Information Technology Report
2003–2004

Towards an Equitable Information Society

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infoDev

The Networked Readiness Index Rankings

The Networked Readiness Index Rankings

NRI RANK	COUNTRY	SCO
1	USA	5.50
2	Singapore	5.40
3	Finland	5.23
4	Sweden	5.20
5	Denmark	5.19
6	Canada	5.07
7	Switzerland	5.06
8	Norway	5.03
9	Australia	4.88
10	Iceland	4.88
11	Germany	4.85
12	Japan	4.80
13	Netherlands	4.79
14	Luxembourg	4.76
15	United Kingdom	4.68
16	Israel	4.64
17	Taiwan	4.62
18	Hong Kong	4.61
19	France	4.60
20	Korea	4.60
21	Austria	4.56
22	Ireland	4.55
23	New Zealand	4.48
24	Belgium	4.43
25	Estonia	4.25
26	Malaysia	4.19
27	Malta	4.15
28	Italy	4.07
29	Spain	4.01
30	Slovenia	3.99
31	Portugal	3.94
32	Chile	3.94
33	Czech Republic	3.80
34	Greece	3.76
35	Latvia	3.74
36	Hungary	3.74
37	South Africa	3.72
38	Thailand	3.72
39	Brazil	3.67
40	Tunisia	3.67
41	Slovak Republic	3.66
42	Lithuania	3.63
43	Mauritius	3.62
44	Mexico	3.57
45	India	3.54
46	Jordan	3.53
47	Poland	3.51
48	Croatia	3.48
49	Costa Rica	3.46
50	Argentina	3.45
51	China	3.38

NRI RANK	COUNTRY	SCO
52	Trinidad and Tobago	3.37
53	Jamaica	3.36
54	Uruguay	3.35
55	Botswana	3.34
56	Turkey	3.32
57	Dominican Republic	3.32
58	Panama	3.31
59	Namibia	3.28
60	Colombia	3.28
61	Romania	3.26
62	El Salvador	3.22
63	Russian Federation	3.19
64	Morocco	3.19
65	Egypt	3.19
66	Sri Lanka	3.15
67	Bulgaria	3.15
68	Vietnam	3.13
69	Philippines	3.10
70	Peru	3.09
71	Tanzania	3.09
72	Venezuela	3.09
73	Indonesia	3.06
74	Ghana	3.06
75	Macedonia	3.05
76	Pakistan	3.03
77	Serbia	2.98
78	Ukraine	2.96
79	Nigeria	2.92
80	Uganda	2.90
81	Senegal	2.90
82	Gambia	2.85
83	Cameroon	2.82
84	Kenya	2.81
85	Zambia	2.80
86	Guatemala	2.76
87	Algeria	2.75
88	Malawi	2.71
89	Ecuador	2.68
90	Bolivia	2.66
91	Paraguay	2.62
92	Madagascar	2.60
93	Bangladesh	2.57
94	Nicaragua	2.56
95	Zimbabwe	2.53
96	Mali	2.52
97	Mozambique	2.51
98	Honduras	2.41
99	Angola	2.32
100	Haiti	2.27
101	Ethiopia	2.13
102	Chad	2.09

Chapter 1

The Networked Readiness Index 2003–2004: Overview and Analysis Framework

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Overview

The Networked Readiness Index (NRI) is deined as a nation's or community's degree of preparation to participate in and beneit from information and communication technology (ICT) developments. This is the third year that the NRI is being published. It represents a continuation of our efforts to better comprehend the impact of ICT on the competitiveness of nations. Building upon last year's collaboration between INSEAD, the World Bank (Infodev), and the World Economic Forum, the current research provides a continuity of data and analysis for the evaluation of prior decisions and actions, and for the enhancement of planning for the future.

The ICT based dot-com boom and thriving global economy of the late 1990s gave way to economic stagnation in 2001–2002, and we now see the irst few signs of recovery. In parallel, the perceived impact of ICT for companies and nations has also evolved. While the dot-com boom years were characterized by interest in the potential of ICT to transform industry business models, the focus in businesses over the last couple of years has shifted to productivity gains from ICT-enabled processes. Nevertheless, the fact remains that ICT forms the backbone ofmost industries such as banking, airlines, and publishing, and is an important value-adding component for others.

Governments and regulators also continue to see progress in ICT as fundamental to national progress. Policies are being put in place to increase ICT penetration in society and to reduce the digital divide. Tariffs continue to be reduced and levels of competition increased to provide incentives for businesses to invest effectively in ICT. Keeping this in mind, and realizing the value for decision makers of a reliable and consistent benchmark of networked readiness, the current research effort extends the set of 82 countries covered in the 2002–2003 study to a total of 102 countries.

This chapter presents the Networked Readiness Framework that has been used to assess the relative degree of networked readiness and compute the NRI of 102 countries. The discussion in this chapter is divided into ive main sections. First, there is a brief recapitulation of the Networked Readiness Framework. Second, the results of the research and analysis are presented in the form of a relative ranking of nations based on their degrees of networked readiness. Third, we take a closer look at the three component indexes (and their constituent subindexes) composing the NRI, and how various countries have fared on each of these dimensions. In the fourth section, some key relationships are investigated: the evolution of the relationship of Networked Readiness with GDP per capita; the link between ICT competition, the affordability of services and the NRI; the evolution of the NRI over the last three studies and a look at the evolution of the digital divide. In the ifth and concluding section, some of the key challenges faced while conducting the study are presented.

The Networked Readiness Framework 2003–2004

The Networked Readiness Index (NRI) is deined as "the degree of preparation of a nation or community to participate in and beneit from ICT developments". The NRI was introduced in 2001–2002 (Kirkman et al 2002) and was reined further in 2002–2003 (Dutta et al 2003). The Networked Readiness Framework used to compute the NRI rankings this year (2003–2004) remains identical to that used to compute the NRI rankings for 2002–2003

[1]. The Networked Readiness Framework and its components provide not only a model for evaluating a country's relative development and use of ICT, but also allow for a better understanding of a nation's strengths and weaknesses with respect to ICT.

Figure 1 depicts the structure of the Networked Readiness Framework used in this research. The Networked Readiness Framework is based upon the following premises:

- There are three important stakeholders to consider in the development and use of ICT: individuals, businesses, and governments;
- There is a general macroeconomic and regulatory *environment* for ICT in which the stakeholders play out their respective roles;
- The degree of *usage* of ICT by (and hence the impact of ICT on) the three stakeholders is linked to their degrees of *readiness* (or capability) to use and beneit from ICT.

As shown in Figure 1, the NRI is a composite of three components: the environment for ICT offered by a given country or community, the readiness of the community's key stakeholders (individuals, businesses, and governments) to use ICT, and inally the usage of ICT amongst these stakeholders. A discussion in greater detail on the structure of the framework is presented in a later section entitled, 'Disaggregating the Networked Readiness Index'.

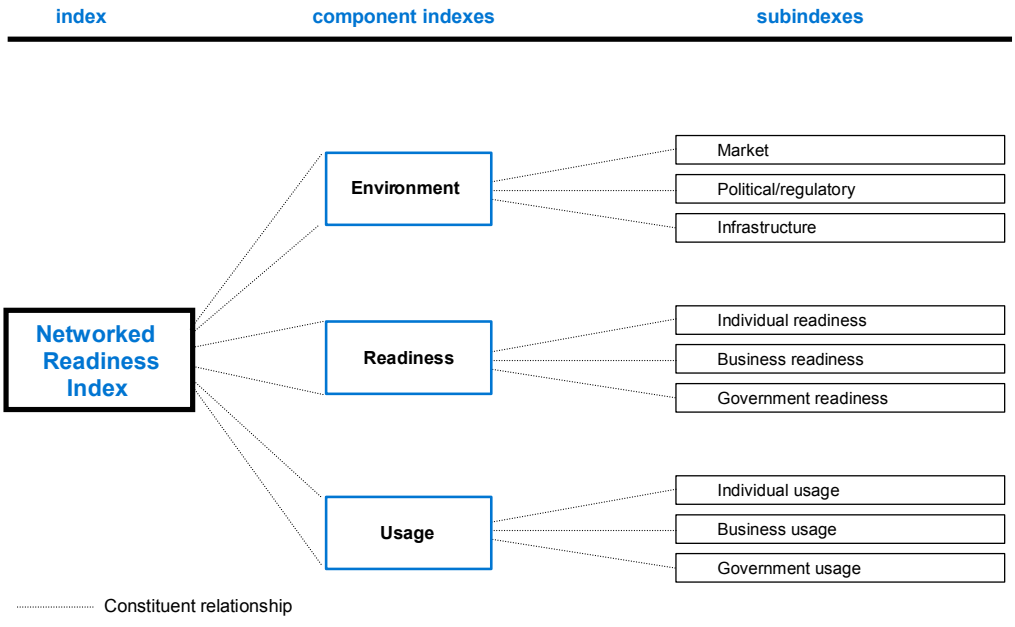
NRI Results for 2003–2004

The overall results for the Networked Readiness Index 2003–2004 are presented in Table 1. The United States comes out with the top rank, followed by Singapore. The rapid evolution of Singapore[2] from the 8th rank in 2001–2002 to the 3rd rank in the 2002–2003 study and inally to 2nd place in the current ranking analysis is the consequence of the government's proactive efforts to promote ICT penetration and usage. Finland, Sweden, and Denmark occupy the 3rd, 4th, and 5th places, respectively. Canada gets the 6th position, followed by Switzerland, Norway, and Australia. Iceland comes in 10th place. Of note also are:

- In the top ive places, three positions go to Scandinavian countries: Finland (3), Sweden (4), and Denmark (5).
- Luxembourg enters the top 25 moving from the 27th place in the 2002–2003 rankings to position (14).
- Korea, with its very high Internet penetration, and one of the highest usages of broadband in the world is ranked (20).
- Estonia is the leader amongst the eastern European countries with a rank of (25).

One sees in the top twenty-ive rankings the following regional groupings:

Figure 1 The Networked Readiness Index Framework



Source: INSEAD

Table 1.The Networked Readiness Index Rankings

COUNTRY	SCORE	NRI R	COUNTRY	SCORE	NRI R	COUNTRY	SCORE	NRI R
USA	5.50	1	Latvia	3.74	35	Philippines	3.10	69
Singapore	5.40	2	Hungary	3.74	36	Peru	3.09	70
Finland	5.23	3	South Africa	3.72	37	Tanzania	3.09	71
Sweden	5.20	4	Thailand	3.72	38	Venezuela	3.09	72
Denmark	5.19	5	Brazil	3.67	39	Indonesia	3.06	73
Canada	5.07	6	Tunisia	3.67	40	Ghana	3.06	74
Switzerland	5.06	7	Slovak Republic	3.66	41	Macedonia	3.05	75
Norway	5.03	8	Lithuania	3.63	42	Pakistan	3.03	76
Australia	4.88	9	Mauritius	3.62	43	Serbia	2.98	77
Iceland	4.88	10	Mexico	3.57	44	Ukraine	2.96	78
Germany	4.85	11	India	3.54	45	Nigeria	2.92	79
Japan	4.80	12	Jordan	3.53	46	Uganda	2.90	80
Netherlands	4.79	13	Poland	3.51	47	Senegal	2.90	81
Luxembourg	4.76	14	Croatia	3.48	48	Gambia	2.85	82
United Kingdom	4.68	15	Costa Rica	3.46	49	Cameroon	2.82	83
Israel	4.64	16	Argentina	3.45	50	Kenya	2.81	84
Taiwan	4.62	17	China	3.38	51	Zambia	2.80	85
Hong Kong	4.61	18	Trinidad and Tobago	3.37	52	Guatemala	2.76	86
France	4.60	19	Jamaica	3.36	53	Algeria	2.75	87
Korea	4.60	20	Uruguay	3.35	54	Malawi	2.71	88
Austria	4.56	21	Botswana	3.34	55	Ecuador	2.68	89
Ireland	4.55	22	Turkey	3.32	56	Bolivia	2.66	90
New Zealand	4.48	23	Dominican Republic	3.32	57	Paraguay	2.62	91
Belgium	4.43	24	Panama	3.31	58	Madagascar	2.60	92
Estonia	4.25	25	Namibia	3.28	59	Bangladesh	2.57	93
Malaysia	4.19	26	Colombia	3.28	60	Nicaragua	2.56	94
Malta	4.15	27	Romania	3.26	61	Zimbabwe	2.53	95
Italy	4.07	28	El Salvador	3.22	62	Mali	2.52	96
Spain	4.01	29	Russian Federation	3.19	63	Mozambique	2.51	97
Slovenia	3.99	30	Morocco	3.19	64	Honduras	2.41	98
Portugal	3.94	31	Egypt	3.19	65	Angola	2.32	99
Chile	3.94	32	Sri Lanka	3.15	66	Haiti	2.27	100
Czech Republic	3.80	33	Bulgaria	3.15	67	Ethiopia	2.13	101
Greece	3.76	34	Vietnam	3.13	68	Chad	2.09	102

The Americas: two countries (the United States and Canada)
- Western Europe: fourteen countries, led by Scandinavia
- Asia and Oceania[3]: seven countries led by Singapore
- Middle-East and North Africa: one country (Israel)
- Central and Eastern Europe: one country (Estonia)

Furthermore, one can observe that
- The top ranked South American countries are Chile (32), Brazil (39), and Mexico (44).
- In Asia, Malaysia is ranked 26th and Thailand, 38th. India, with its immense pool of trained IT manpower, is ranked 45th. China is ranked 51st.
- Russia is ranked 63rd overall.

Interpreting the results

The NRI captures key factors relating to the environment, the readiness and the usage of the three stakeholders in the Networked Readiness Framework (individuals, businesses and governments), and can be used to understand the performance of a nation or a region with regards to ICT readiness and usage. The component index and subindex rankings serve to identify key areas where a nation is under- or overperforming. One would, for instance, be able to identify relative imbalances in development across the three component indexes of Environment, Readiness and Usage, or even go one level deeper.

We would like to emphasize that while rankings are useful as relative indicators of a nation's ICT excellence, there are several limitations to the analytic process. Caution should be exercised while comparing countries that are closely ranked. For instance, countries ranked close together can show very small variation in their index scores. Latvia (NRI score = 3,74, rank 35) and Hungary (NRI score = 3,74, rank = 36) even have the same overall scores. In this case, Latvia has an overall index score marginally higher than that of Hungary, but it is at the third decimal place. Additionally, small differences in the index may be outside the limits of statistical signiicance due to the fact that some missing observations were estimated using analytic techniques such as regression and clustering.

One must also keep in mind that while the number of countries included in the current study has increased from 82 in the 2002–2003 report to 102, a number of nations could not be included in the research due to limitations in the availability of reliable data. Ranking an even larger set of nations remains a challenge for the future. An overall global ranking needs to account for these missing countries, and any inferences drawn from the current analysis of 102 nations should be made with this limitation taken into consideration.

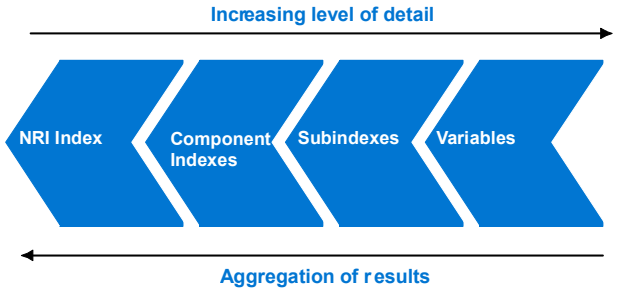
Finally, the complexity of ICT issues in a nation can get obscured behind the numerical score of the NRI. A country like India, for instance, shows enormous geographic and

demographic divides in ICT readiness and usage. It has one of the largest ICT workforces in the world. One can ind intense ICT usage in technology clusters such as Bangalore and Gurgaon (near New Delhi), or amongst the upper middle class. The other side of the story is that there is not even telephone connectivity in large parts of the country. Singapore, on the other hand, is a country where there is high ICT readiness and usage across all stakeholders—individuals, businesses, and governments.

Disaggregating the Networked Readiness Index

The NRI provides a relative benchmark of the overall success of a country in participating in and beneiting from ICT. While this is useful, one may need to gain further insights into areas of over- and underperformance of a nation, and to understand the key drivers determining the results. One can do so by looking at the component indexes: Environment, Readiness and Usage. Table 2 presents the overall results of each component index. Further insight may be obtained by looking at the subindexes composing each Component Index. The inal level of detail can be obtained by observing the 48 variables comprising the subindexes, which are presented in the Technical Appendix at the end of the chapter. Figure 2 gives a schematic diagram of the relationships between the various indexes, and how they add up to form the NRI.

Figure 2Disaggregating the Networked Readiness Index



Environment

The Environment component index is designed to measure the degree of conduciveness of the environment that a country provides for the development and use of ICT. As can be seen from Table 2, the top countries with regards to the Environment are the United States, Singapore, and Finland; and the results are consistent with the overall index. Singapore owes its excellent performance in the Environment component index to the pro-active policies and measures undertaken by the government to promote ICT, resulting in it being a unique center of excellence in the region.

Table 3 presents the detailed ranking and scores for each of the three subindexes comprising the Environment component index:

Market: This entails the assessment of the presence of the appropriate human resources and ancillary businesses to support a knowledge-based society. The forces that play an important role in determining the market environment for ICT are varied and include fundamental macroeconomic variables like GDP and import/export, commercial measures like availability of funding and skilled labor, and the level of development of the corporate environment. The leader for this subindex is Singapore, followed by the United States and Finland. Ireland and Israel, in the fourth and ifth positions, are notable for their performance on the Environment-Market subindex.

Political/Regulatory: The priorities of a nation are relected in its policies and laws that in turn inluence its rate of growth and direction of development. This component of the NRI measures the impact of a nation's polity, laws, and regulations, and their implementation on the development and use of ICT. The leaders from the Political/Regulatory perspective are Finland, Hong Kong, and Estonia. Iceland manifests an exceptional performance and is highly ranked at 4th place, whereas Singapore is ranked 5th, which is not surprising, given the priority its government places on ICT.

Infrastructure: Infrastructure is deined as the level of availability and quality of the key access infrastructure for ICT within a country. A quality ICT access infrastructure facilitates the adoption, usage, and impact of these technologies, which again promote investment in ICT infrastructure. Infrastructure thus plays a critical role in inluencing the networked readiness of a nation. The top ranks along this component go to Iceland, United States, and Switzerland. One notes that India at 67th place for Infrastructure has a very low rank compared to its overall 44th position in Environment component index—an indication of the heterogeneous proliferation of ICT across different socioeconomic and geographic segments of the country.

Readiness

The Readiness of a nation measures the capability of the principal agents of an economy (citizens, businesses, and governments) to leverage the potential of ICT. This capability is lent to the nation's community by a combination of factors like the presence of relevant skills for using ICT within individuals, access and affordability of ICT for corporations, and government use of ICT for its own services and processes. As shown in Table 2, Finland ranks highest on overall Readiness and shows a consistent performance across all three readiness subindexes. Sweden is in second place and is supported by a very strong performance in Individual and Business Readiness. Third ranked United States beneits from high scores in Readiness for each of the three stakeholders.

Table 2The Networked Readiness Index Component Indexes

ENVIRONMENT

COUNTRY	SCORE	RA
USA	5.17	1
Singapore	5.12	2
Finland	4.98	3
Switzerland	4.93	4
Iceland	4.84	5
Sweden	4.72	6
Canada	4.67	7
Taiwan	4.66	8
Luxembourg	4.64	9
Denmark	4.61	10
Hong Kong	4.56	11
Australia	4.56	12
Israel	4.54	13
United Kingdom	4.51	14
Netherlands	4.46	15
Norway	4.45	16
Germany	4.42	17
New Zealand	4.37	18
Japan	4.34	19
Korea	4.34	20
Austria	4.30	21
Ireland	4.28	22
France	4.27	23
Belgium	4.11	24
Estonia	4.00	25
Malaysia	3.95	26
Portugal	3.89	27
Italy	3.89	28
Malta	3.87	29
Spain	3.86	30
Chile	3.85	31
Greece	3.76	32
South Africa	3.68	33
Czech Republic	3.66	34

ENVIRONMENT

COUNTRY	SCORE	RAI
Brazil	3.66	35
Tunisia	3.63	36
Namibia	3.62	37
Latvia	3.61	38
Slovenia	3.60	39
Hungary	3.60	40
Thailand	3.57	41
Jordan	3.56	42
Botswana	3.49	43
India	3.45	44
Lithuania	3.41	45
Costa Rica	3.37	46
Mexico	3.36	47
Mauritius	3.36	48
Trinidad and Tobago	3.36	49
Poland	3.31	50
Slovak Republic	3.30	51
Uruguay	3.25	52
Panama	3.24	53
Dominican Republic	3.23	54
Croatia	3.22	55
Jamaica	3.20	56
Argentina	3.15	57
Turkey	3.14	58
Macedonia	3.11	59
Egypt	3.08	60
Morocco	3.07	61
El Salvador	3.07	62
China	3.03	63
Colombia	3.02	64
Tanzania	3.01	65
Sri Lanka	2.99	66
Ghana	2.97	67
Indonesia	2.92	68

ENVIRONMENT

COUNTRY	SCORE	RAI
Bulgaria	2.88	69
Gambia	2.85	70
Peru	2.83	71
Nigeria	2.82	72
Russian Federation	2.82	73
Vietnam	2.80	74
Romania	2.80	75
Pakistan	2.80	76
Senegal	2.79	77
Uganda	2.79	78
Serbia	2.78	79
Mali	2.77	80
Venezuela	2.75	81
Philippines	2.67	82
Cameroon	2.62	83
Guatemala	2.61	84
Bolivia	2.60	85
Zambia	2.59	86
Madagascar	2.59	87
Malawi	2.58	88
Bangladesh	2.57	89
Ecuador	2.57	90
Kenya	2.55	91
Paraguay	2.53	92
Ukraine	2.53	93
Algeria	2.48	94
Mozambique	2.44	95
Honduras	2.29	96
Zimbabwe	2.29	97
Nicaragua	2.23	98
Chad	2.19	99
Haiti	2.19	100
Angola	2.00	101
Ethiopia	1.99	102

READINESS

COUNTRY	SCORE	RA
Finland	6.07	1
Sweden	5.95	2
USA	5.95	3
Singapore	5.85	4
Denmark	5.81	5
Norway	5.71	6
France	5.66	7
Canada	5.66	8
Australia	5.56	9
United Kingdom	5.54	10
Japan	5.51	11
Germany	5.50	12
Switzerland	5.44	13
Netherlands	5.36	14
Austria	5.32	15
Iceland	5.28	16
Taiwan	5.25	17
Ireland	5.24	18
Korea	5.24	19
New Zealand	5.16	20
Belgium	5.16	21
Estonia	5.11	22
Israel	5.06	23
Spain	5.00	24
Luxembourg	4.96	25
Italy	4.91	26
Slovenia	4.90	27
Hong Kong	4.87	28
Malaysia	4.86	29
Chile	4.73	30
Malta	4.70	31
Lithuania	4.69	32
Czech Republic	4.68	33
Slovak Republic	4.67	34

READINESS

COUNTRY	SCORE	RAI
Portugal	4.65	35
Latvia	4.63	36
Thailand	4.59	37
Hungary	4.53	38
Greece	4.50	39
Brazil	4.49	40
Mauritius	4.47	41
Tunisia	4.47	42
Poland	4.44	43
Croatia	4.42	44
Colombia	4.34	45
South Africa	4.33	46
Mexico	4.29	47
Russian Federation	4.26	48
Argentina	4.24	49
India	4.23	50
Jordan	4.19	51
Dominican Republic	4.18	52
Uruguay	4.18	53
China	4.14	54
Costa Rica	4.14	55
Romania	4.13	56
Jamaica	4.11	57
Ukraine	4.08	58
El Salvador	4.08	59
Bulgaria	4.06	60
Turkey	4.05	61
Venezuela	4.02	62
Panama	4.01	63
Sri Lanka	3.98	64
Trinidad and Tobago	3.98	65
Peru	3.97	66
Vietnam	3.93	67
Botswana	3.91	68

READINESS

COUNTRY	SCORE	RAI
Indonesia	3.91	69
Morocco	3.87	70
Egypt	3.86	71
Philippines	3.84	72
Namibia	3.81	73
Ghana	3.81	74
Macedonia	3.80	75
Tanzania	3.70	76
Serbia	3.70	77
Pakistan	3.67	78
Cameroon	3.61	79
Algeria	3.59	80
Zambia	3.54	81
Nigeria	3.49	82
Guatemala	3.48	83
Bolivia	3.46	84
Senegal	3.45	85
Nicaragua	3.42	86
Paraguay	3.42	87
Malawi	3.42	88
Kenya	3.42	89
Uganda	3.32	90
Zimbabwe	3.24	91
Gambia	3.23	92
Ecuador	3.19	93
Madagascar	3.05	94
Bangladesh	3.00	95
Honduras	2.97	96
Angola	2.95	97
Haiti	2.92	98
Mali	2.86	99
Mozambique	2.80	100
Ethiopia	2.44	101
Chad	2.32	102

Table 2.The Networked Readiness Index Component Indexes (continued)

USAGE			USAGE			USAGE		
COUNTRY	SCORE	RA	COUNTRY	SCORE	RAN	COUNTRY	SCORE	RAN
USA	5.39	1	Czech Republic	3.06	35	Russian Federation	2.49	69
Singapore	5.21	2	Mexico	3.05	36	Venezuela	2.49	70
Denmark	5.15	3	Mauritius	3.04	37	Sri Lanka	2.49	71
Norway	4.94	4	Greece	3.03	38	Peru	2.48	72
Sweden	4.94	5	Slovak Republic	3.02	39	Colombia	2.48	73
Canada	4.88	6	Thailand	3.00	40	Gambia	2.47	74
Switzerland	4.82	7	Latvia	2.99	41	Nigeria	2.47	75
Luxembourg	4.67	8	Argentina	2.97	42	Kenya	2.46	76
Finland	4.63	9	China	2.97	43	Serbia	2.45	77
Germany	4.62	10	India	2.94	44	Senegal	2.45	78
Japan	4.56	11	Tunisia	2.90	45	Namibia	2.41	79
Netherlands	4.53	12	Costa Rica	2.87	46	Ghana	2.39	80
Australia	4.53	13	Brazil	2.85	47	Indonesia	2.35	81
Iceland	4.52	14	Romania	2.85	48	Mozambique	2.30	82
Hong Kong	4.39	15	Jordan	2.83	49	Ecuador	2.27	83
Israel	4.30	16	Philippines	2.80	50	Zambia	2.27	84
Korea	4.22	17	Croatia	2.79	51	Ukraine	2.26	85
Ireland	4.13	18	Poland	2.78	52	Cameroon	2.24	86
Austria	4.07	19	Lithuania	2.78	53	Macedonia	2.23	87
Belgium	4.02	20	Jamaica	2.78	54	Guatemala	2.19	88
United Kingdom	3.99	21	Trinidad and Tobago	2.76	55	Algeria	2.18	89
Taiwan	3.95	22	Turkey	2.76	56	Madagascar	2.17	90
New Zealand	3.90	23	Panama	2.68	57	Malawi	2.15	91
Malta	3.90	24	Vietnam	2.67	58	Bangladesh	2.14	92
France	3.87	25	Morocco	2.63	59	Zimbabwe	2.07	93
Malaysia	3.78	26	Botswana	2.63	60	Nicaragua	2.03	94
Estonia	3.65	27	Uruguay	2.63	61	Angola	2.01	95
Slovenia	3.47	28	Pakistan	2.62	62	Ethiopia	1.98	96
Italy	3.41	29	Egypt	2.62	63	Honduras	1.97	97
Portugal	3.29	30	Uganda	2.60	64	Mali	1.93	98
Chile	3.24	31	Tanzania	2.56	65	Bolivia	1.93	99
Spain	3.17	32	Dominican Republic	2.54	66	Paraguay	1.91	100
South Africa	3.15	33	El Salvador	2.52	67	Chad	1.75	101
Hungary	3.10	34	Bulgaria	2.50	68	Haiti	1.71	102

Detailed results for each of the subindexes used for measuring Readiness can be found in Table 4, and are listed below.

Individual Readiness: Individual Readiness measures the readiness of a nation's citizens to utilize and leverage ICT. Factors that are used to measure this include literacy rates, mode and locus of access to the Internet, and the degree of connectivity of individuals. This year's analysis leads to some interesting results; the top four positions on Individual Readiness go to the Scandinavian countries—Norway, Sweden, Denmark and Finland. Another northern European country, Iceland, comes in eighth.

Business Readiness:

Business Readiness measures the readiness of businesses to participate in and beneit from ICT. The aim is not to just focus on the largest corporations, but also to include small and medium-sized businesses and their willingness to exploit ICT and invest in the ICT skills of their employees. Finland and Sweden displace last year's leader, the United States, as the top two countries with regards to business readiness. The United States ranks third, followed by Singapore.

Government Readiness: Government Readiness measures the readiness of a government to employ ICT. It is relected in the policymaking machinery and internal processes of the government and in the availability of government services online. If the polity of a nation decides to make ICT a priority, this becomes visible in the short- and long-term policy measures and laws that help encourage ICT deployment and use. It is also relected in the government's own use of ICT and the extent to which it equips its people to do the same. Singapore leads on Government Readiness, followed by Finland and the United States. France and Canada follow in fourth and ifth places, respectively. Of note also are Malaysia, in sixth place, and Korea, in ninth. The entry of developing countries such as Malaysia and Korea in the upper ranks on the government readiness dimension is a relection of the policies and actions taken by member governments to diffuse ICT in the country and in particular in the government.

Usage

The Usage component aims to measure the degree of usage of ICT by the principal stakeholders of the NRI framework—Individuals, Businesses, and Governments. In the absence of reliable data about the speciic impacts of ICT on the key stakeholders, the Usage component provides an indication of the changes in behaviors, lifestyles, and other economic and non-economic beneits brought about by the adoption of ICT. The United States, Singapore, and Denmark are the top three performers with regards to overall Usage, as shown in Table 2. One can observe variances in country performance across the three sub-indices, relecting uneven impact across

Table 3Environment Subindexes
Environment Subindex = 1/3 Market + 1/3 Policy & Regulatory + 1/3 Infrastructure

MARKET

COUNTRY	SCORE	RA
Singapore	5.06	1
USA	4.76	2
Finland	4.59	3
Ireland	4.37	4
Israel	4.30	5
Taiwan	4.29	6
Japan	4.28	7
Luxembourg	4.27	8
Sweden	4.17	9
Switzerland	4.09	10
Canada	3.96	11
Netherlands	3.93	12
United Kingdom	3.88	13
Denmark	3.82	14
Germany	3.76	15
Belgium	3.75	16
France	3.74	17
Norway	3.74	18
Korea	3.61	19
Austria	3.61	20
Australia	3.57	21
Iceland	3.56	22
Hong Kong	3.50	23
Italy	3.35	24
Spain	3.29	25
Malaysia	3.25	26
India	3.22	27
Thailand	3.16	28
Tunisia	3.15	29
Portugal	3.04	30
Chile	3.04	31
Latvia	3.03	32
New Zealand	3.02	33
Brazil	3.02	34

MARKET

COUNTRY	SCORE	RA
Hungary	3.00	35
Greece	2.95	36
Czech Republic	2.94	37
Vietnam	2.91	38
Estonia	2.89	39
Lithuania	2.89	40
Malta	2.89	41
Costa Rica	2.88	42
Slovenia	2.87	43
China	2.86	44
South Africa	2.82	45
Poland	2.82	46
Jordan	2.78	47
Russian Federation	2.78	48
Egypt	2.77	49
Indonesia	2.72	50
Slovak Republic	2.71	51
Botswana	2.71	52
Mauritius	2.69	53
Sri Lanka	2.66	54
Mexico	2.66	55
Trinidad and Tobago	2.65	56
Turkey	2.64	57
Panama	2.64	58
Croatia	2.62	59
Morocco	2.60	60
Romania	2.59	61
Uganda	2.57	62
Kenya	2.56	63
Tanzania	2.54	64
Nigeria	2.50	65
Cameroon	2.46	66
Ukraine	2.45	67
Colombia	2.45	68

MARKET

COUNTRY	SCORE	RA
Serbia	2.45	69
Jamaica	2.44	70
Namibia	2.44	71
Ghana	2.41	72
Dominican Republic	2.40	73
Bulgaria	2.39	74
Pakistan	2.36	75
Macedonia	2.32	76
Argentina	2.31	77
Philippines	2.30	78
Algeria	2.27	79
Zimbabwe	2.26	80
Uruguay	2.24	81
Malawi	2.21	82
Venezuela	2.19	83
Madagascar	2.19	84
Bangladesh	2.18	85
Senegal	2.18	86
Mali	2.17	87
Zambia	2.15	88
Guatemala	2.15	89
Peru	2.11	90
Ecuador	2.09	91
El Salvador	2.09	92
Honduras	2.02	93
Gambia	2.01	94
Mozambique	2.00	95
Ethiopia	2.00	96
Nicaragua	1.94	97
Bolivia	1.87	98
Chad	1.86	99
Paraguay	1.82	100
Angola	1.75	101
Haiti	1.61	102

POLITICAL/REGULATORY

COUNTRY	SCORE	RA
Finland	5.74	1
Hong Kong	5.66	2
Estonia	5.43	3
Iceland	5.33	4
Singapore	5.22	5
Switzerland	5.21	6
Denmark	5.20	7
USA	5.20	8
United Kingdom	5.18	9
Luxembourg	5.17	10
Sweden	5.16	11
New Zealand	5.16	12
Australia	5.15	13
Netherlands	5.03	14
Israel	4.93	15
Taiwan	4.88	16
Germany	4.84	17
Chile	4.82	18
Austria	4.81	19
Malta	4.78	20
Canada	4.78	21
Norway	4.68	22
South Africa	4.67	23
Ireland	4.57	24
Korea	4.56	25
Jordan	4.56	26
Portugal	4.54	27
Botswana	4.50	28
India	4.47	29
Gambia	4.47	30
Malaysia	4.46	31
France	4.44	32
Latvia	4.43	33
Tunisia	4.42	34

POLITICAL/REGULATORY

COUNTRY	SCORE	RA
Spain	4.37	35
Belgium	4.36	36
Japan	4.34	37
Thailand	4.30	38
Ghana	4.25	39
El Salvador	4.21	40
Czech Republic	4.21	41
Italy	4.17	42
Brazil	4.16	43
Namibia	4.16	44
Dominican Republic	4.13	45
Hungary	4.09	46
Trinidad and Tobago	4.08	47
Greece	4.08	48
Malawi	4.07	49
Jamaica	4.05	50
Slovenia	4.04	51
Tanzania	4.00	52
Uruguay	3.93	53
Mauritius	3.90	54
Zambia	3.90	55
Poland	3.90	56
Costa Rica	3.89	57
Lithuania	3.88	58
Mexico	3.84	59
Colombia	3.83	60
Slovak Republic	3.82	61
Sri Lanka	3.79	62
Philippines	3.78	63
Panama	3.76	64
Nigeria	3.75	65
Egypt	3.72	66
Uganda	3.69	67
China	3.68	68

POLITICAL/REGULATORY

COUNTRY	SCORE	RA
Morocco	3.68	69
Mali	3.65	70
Indonesia	3.64	71
Senegal	3.64	72
Turkey	3.58	73
Pakistan	3.58	74
Kenya	3.56	75
Peru	3.55	76
Argentina	3.50	77
Vietnam	3.43	78
Macedonia	3.42	79
Croatia	3.41	80
Nicaragua	3.35	81
Bolivia	3.34	82
Cameroon	3.30	83
Bangladesh	3.28	84
Bulgaria	3.28	85
Mozambique	3.28	86
Paraguay	3.27	87
Romania	3.23	88
Madagascar	3.20	89
Honduras	3.20	90
Guatemala	3.18	91
Serbia	3.16	92
Ecuador	3.15	93
Algeria	3.10	94
Russian Federation	3.02	95
Venezuela	2.97	96
Angola	2.95	97
Ukraine	2.84	98
Haiti	2.81	99
Zimbabwe	2.81	100
Chad	2.54	101
Ethiopia	2.49	102

Table 3Environment Subindexes (continued)
Environment Subindex = 1/3 Market + 1/3 Policy & Regulatory + 1/3 Infrastructure

	INFRASTRUCTURE	
COUNTRY	SCORE	RA
Iceland	5.61	1
USA	5.55	2
Switzerland	5.48	3
Canada	5.26	4
Singapore	5.09	5
Australia	4.95	6
Norway	4.93	7
New Zealand	4.93	8
Korea	4.85	9
Taiwan	4.83	10
Sweden	4.83	11
Denmark	4.80	12
Germany	4.65	13
France	4.63	14
Finland	4.62	15
Hong Kong	4.53	16
Austria	4.49	17
Luxembourg	4.48	18
United Kingdom	4.47	19
Netherlands	4.43	20
Japan	4.42	21
Israel	4.38	22
Namibia	4.27	23
Greece	4.24	24
Belgium	4.23	25
Italy	4.15	26
Malaysia	4.14	27
Portugal	4.10	28
Malta	3.94	29
Spain	3.91	30
Slovenia	3.90	31
Ireland	3.89	32
Czech Republic	3.84	33
Brazil	3.82	34

	INFRASTRUCTURE	
COUNTRY	SCORE	RA
Hungary	3.72	35
Chile	3.69	36
Estonia	3.68	37
Argentina	3.64	38
Croatia	3.62	39
Macedonia	3.60	40
Uruguay	3.59	41
Mexico	3.59	42
South Africa	3.55	43
Mauritius	3.48	44
Lithuania	3.45	45
Latvia	3.39	46
Slovak Republic	3.36	47
Jordan	3.35	48
Costa Rica	3.34	49
Trinidad and Tobago	3.34	50
Panama	3.32	51
Tunisia	3.31	52
Botswana	3.26	53
Thailand	3.25	54
Turkey	3.20	55
Poland	3.20	56
Dominican Republic	3.16	57
Jamaica	3.12	58
Venezuela	3.09	59
Bulgaria	2.97	60
Morocco	2.93	61
El Salvador	2.91	62
Peru	2.82	63
Colombia	2.80	64
Egypt	2.76	65
Serbia	2.74	66
India	2.65	67
Russian Federation	2.64	68

	INFRASTRUCTURE	
COUNTRY	SCORE	RAN
Bolivia	2.59	69
Romania	2.58	70
Senegal	2.57	71
China	2.54	72
Sri Lanka	2.51	73
Guatemala	2.51	74
Paraguay	2.51	75
Tanzania	2.49	76
Mali	2.48	77
Pakistan	2.46	78
Ecuador	2.46	79
Indonesia	2.40	80
Madagascar	2.38	81
Ukraine	2.29	82
Ghana	2.25	83
Bangladesh	2.24	84
Nigeria	2.20	85
Chad	2.19	86
Haiti	2.14	87
Uganda	2.11	88
Cameroon	2.08	89
Gambia	2.07	90
Algeria	2.06	91
Vietnam	2.06	92
Mozambique	2.03	93
Philippines	1.92	94
Zimbabwe	1.81	95
Zambia	1.72	96
Honduras	1.67	97
Kenya	1.54	98
Ethiopia	1.46	99
Malawi	1.45	100
Nicaragua	1.40	101
Angola	1.30	102

the three principal stakeholders. For example, Singapore ranks high for Business Usage (2) and Government Usage (1) but relatively low for Individual Usage (18). Another notable example is Estonia, with high Government Readiness (15) and Usage (13) but relatively low positions for Individual (26) and Business (39) Usage.

Table 5 gives the detailed results and scores for each of the three subindexes used for measuring Usage. These are listed below.

Individual Usage: Individual Usage gives an indication of the level of adoption and usage of ICT technologies by a nation's citizens. This is done by assessing the deployment of connectivity-enhancing technologies like telephones and Internet connections, levels of Internet usage, and money spent online. The Individual Usage rankings differ signiicantly from those of Individual Readiness. The top performers here are Luxembourg, Norway, the Netherlands, Switzerland, and Denmark.

Business Usage Business Usage measures the level of deployment and use of ICT across businesses in a nation. Business usage is determined by factors such as the level of business-to-business and business-to-consumer e-commerce, the use of ICT for activities like marketing, and levels of online transactions. The top ive performers are the United States, Singapore, Australia, Sweden, and Denmark.

Government Usage Government Usage is the level of use of ICT technologies by the government of a given country. The government, besides making ICT a priority, can also beneit from the usage of ICT itself. This usage can help the government streamline services to its citizens and improve its overall functioning. Factors used to measure this include the volume of transactions that businesses have with governments and the presence of government services online. The top ranking countries on this measure are Singapore, the United States, Canada, Hong Kong, and Denmark. Of note is Malaysia at 7th place and Estonia at 13th place, relecting the fact that these country's governments are taking active steps to promote ICT usage in their own functions.

Understanding Networked Readiness

The degree of networked readiness of a nation is the result of a multitude of effects. Our research started with a set of over 90 different variables or indicators for evaluating networked readiness. These 90 variables were narrowed down by statistical analysis to a set of 48 variables (see chapter entitled "The Networked Readiness Index: Methodology" later in this book). These 48 variables were grouped amongst the 9 subindexes of the NRI framework. This provides us with an opportunity to study some of the inter-relationships across the variables and the components/subindexes of the NRI framework.

Table 4.Readiness Subindexes
Readiness component index = 1/3 Individual Readiness + 1/3 Business Readiness + 1/3 Government Readiness

INDIVIDUAL

COUNTRY	READINESS	RA
Norway	6.53	1
Sweden	6.41	2
Denmark	6.05	3
Finland	5.98	4
USA	5.89	5
Australia	5.71	6
United Kingdom	5.66	7
Iceland	5.63	8
Canada	5.59	9
Switzerland	5.56	10
France	5.53	11
Netherlands	5.48	12
Austria	5.47	13
Japan	5.44	14
New Zealand	5.37	15
Belgium	5.29	16
Taiwan	5.26	17
Estonia	5.21	18
Germany	5.21	19
Ireland	5.19	20
Korea	5.18	21
Singapore	5.15	22
Italy	5.13	23
Hong Kong	5.12	24
Latvia	5.08	25
Israel	5.07	26
Greece	5.06	27
Luxembourg	5.04	28
Spain	5.01	29
Slovenia	4.99	30
Russian Federation	4.92	31
Lithuania	4.86	32
Hungary	4.81	33
Czech Republic	4.79	34

INDIVIDUAL

COUNTRY	READINESS	RA
Malta	4.74	35
Ukraine	4.73	36
Slovak Republic	4.73	37
Portugal	4.70	38
Poland	4.62	39
Bulgaria	4.62	40
Romania	4.57	41
Uruguay	4.53	42
Croatia	4.52	43
Thailand	4.47	44
Argentina	4.46	45
Chile	4.45	46
Malaysia	4.43	47
Trinidad and Tobago	4.39	48
Costa Rica	4.37	49
Macedonia	4.34	50
Panama	4.25	51
Colombia	4.25	52
Mexico	4.22	53
Jordan	4.21	54
Mauritius	4.19	55
Tunisia	4.18	56
Serbia	4.17	57
Turkey	4.16	58
Brazil	4.13	59
Venezuela	4.12	60
Jamaica	4.12	61
China	4.06	62
Peru	4.02	63
Dominican Republic	3.98	64
Philippines	3.98	65
Bolivia	3.98	66
South Africa	3.97	67
Sri Lanka	3.96	68

INDIVIDUAL

COUNTRY	READINESS	RA
El Salvador	3.96	69
Zimbabwe	3.95	70
Indonesia	3.94	71
Egypt	3.91	72
Vietnam	3.90	73
Botswana	3.87	74
Paraguay	3.84	75
Algeria	3.79	76
Namibia	3.76	77
Morocco	3.68	78
Honduras	3.66	79
India	3.65	80
Ecuador	3.65	81
Ghana	3.62	82
Zambia	3.54	83
Kenya	3.54	84
Guatemala	3.52	85
Cameroon	3.51	86
Nicaragua	3.50	87
Angola	3.49	88
Pakistan	3.26	89
Nigeria	3.20	90
Bangladesh	3.19	91
Haiti	3.19	92
Malawi	3.19	93
Tanzania	3.12	94
Senegal	3.12	95
Madagascar	3.08	96
Uganda	2.80	97
Mozambique	2.74	98
Mali	2.67	99
Gambia	2.53	100
Chad	2.45	101
Ethiopia	2.37	102

BUSINESS

COUNTRY	READINESS	RA
Finland	6.49	1
Sweden	6.35	2
USA	6.34	3
Singapore	6.23	4
Switzerland	6.22	5
Japan	6.15	6
Denmark	6.02	7
Norway	5.97	8
Germany	5.94	9
Canada	5.90	10
France	5.89	11
Australia	5.88	12
Belgium	5.78	13
United Kingdom	5.77	14
Netherlands	5.75	15
Iceland	5.62	16
Austria	5.55	17
New Zealand	5.47	18
Taiwan	5.40	19
Ireland	5.39	20
Israel	5.37	21
Spain	5.28	22
Korea	5.28	23
Slovenia	5.22	24
Luxembourg	5.19	25
Estonia	5.11	26
Slovak Republic	4.91	27
Chile	4.89	28
Italy	4.89	29
Portugal	4.88	30
Hong Kong	4.82	31
Lithuania	4.77	32
South Africa	4.72	33
Greece	4.72	34

BUSINESS

COUNTRY	READINESS	RA
Tunisia	4.72	35
Czech Republic	4.70	36
Hungary	4.69	37
Malaysia	4.68	38
Brazil	4.66	39
Malta	4.63	40
Latvia	4.63	41
Jordan	4.62	42
Russian Federation	4.61	43
Thailand	4.57	44
Poland	4.46	45
Morocco	4.43	46
India	4.43	47
Dominican Republic	4.40	48
Mauritius	4.39	49
Mexico	4.38	50
Argentina	4.35	51
Colombia	4.34	52
Croatia	4.34	53
Uruguay	4.31	54
El Salvador	4.25	55
Turkey	4.25	56
Jamaica	4.25	57
Costa Rica	4.19	58
China	4.13	59
Egypt	4.10	60
Peru	4.09	61
Indonesia	4.09	62
Venezuela	4.07	63
Panama	4.05	64
Guatemala	4.05	65
Sri Lanka	4.04	66
Namibia	4.02	67
Trinidad and Tobago	3.98	68

BUSINESS

COUNTRY	READINESS	RA
Romania	3.96	69
Bulgaria	3.95	70
Macedonia	3.95	71
Ukraine	3.88	72
Botswana	3.87	73
Vietnam	3.85	74
Ghana	3.85	75
Senegal	3.81	76
Pakistan	3.79	77
Malawi	3.61	78
Gambia	3.61	79
Philippines	3.59	80
Nigeria	3.56	81
Zimbabwe	3.55	82
Algeria	3.51	83
Tanzania	3.48	84
Bolivia	3.48	85
Zambia	3.46	86
Paraguay	3.42	87
Serbia	3.40	88
Kenya	3.30	89
Cameroon	3.26	90
Ecuador	3.25	91
Nicaragua	3.23	92
Uganda	3.16	93
Honduras	2.92	94
Angola	2.87	95
Bangladesh	2.84	96
Madagascar	2.80	97
Mali	2.74	98
Haiti	2.71	99
Ethiopia	2.50	100
Chad	2.40	101
Mozambique	2.36	102

Table 4.Readiness Subindexes (continued)
Readiness component index = 1/3 Individual Readiness + 1/3 Business Readiness + 1/3 Government Readiness

COUNTRY	GOVERNMENT READINESS	RA
Singapore	6.17	1
Finland	5.72	2
USA	5.62	3
France	5.57	4
Canada	5.49	5
Malaysia	5.46	6
Denmark	5.37	7
Germany	5.36	8
Korea	5.25	9
United Kingdom	5.19	10
Ireland	5.14	11
Taiwan	5.10	12
Sweden	5.10	13
Australia	5.09	14
Estonia	5.00	15
Austria	4.95	16
Japan	4.92	17
Chile	4.86	18
Netherlands	4.85	19
Mauritius	4.82	20
Israel	4.75	21
Thailand	4.74	22
Malta	4.72	23
Italy	4.72	24
Spain	4.71	25
Brazil	4.70	26
Hong Kong	4.69	27
Luxembourg	4.65	28
New Zealand	4.65	29
Norway	4.64	30
India	4.62	31
Iceland	4.60	32
Switzerland	4.55	33
Czech Republic	4.53	34

COUNTRY	GOVERNMENT READINESS	RA
Slovenia	4.51	35
Tanzania	4.50	36
Tunisia	4.50	37
Lithuania	4.44	38
Colombia	4.44	39
Belgium	4.41	40
Croatia	4.40	41
Portugal	4.38	42
Slovak Republic	4.36	43
South Africa	4.31	44
Mexico	4.27	45
Poland	4.25	46
China	4.23	47
Latvia	4.19	48
Dominican Republic	4.16	49
Hungary	4.10	50
Cameroon	4.07	51
Vietnam	4.03	52
El Salvador	4.02	53
Botswana	4.00	54
Uganda	3.99	55
Philippines	3.96	56
Pakistan	3.96	57
Ghana	3.95	58
Jamaica	3.95	59
Sri Lanka	3.93	60
Argentina	3.90	61
Romania	3.87	62
Venezuela	3.86	63
Costa Rica	3.85	64
Peru	3.79	65
Turkey	3.74	66
Jordan	3.73	67
Panama	3.71	68

COUNTRY	GOVERNMENT READINESS	RA
Greece	3.71	69
Nigeria	3.71	70
Uruguay	3.70	71
Indonesia	3.69	72
Ukraine	3.64	73
Namibia	3.64	74
Zambia	3.62	75
Bulgaria	3.61	76
Egypt	3.57	77
Trinidad and Tobago	3.57	78
Gambia	3.54	79
Nicaragua	3.53	80
Serbia	3.52	81
Morocco	3.49	82
Algeria	3.48	83
Malawi	3.46	84
Senegal	3.43	85
Kenya	3.41	86
Mozambique	3.30	87
Madagascar	3.26	88
Russian Federation	3.26	89
Mali	3.17	90
Macedonia	3.12	91
Paraguay	2.99	92
Bangladesh	2.97	93
Bolivia	2.92	94
Guatemala	2.88	95
Haiti	2.85	96
Ecuador	2.69	97
Angola	2.49	98
Ethiopia	2.45	99
Honduras	2.33	100
Zimbabwe	2.22	101
Chad	2.12	102

GDP and Networked Readiness

Any attempt to use a single measure to approximate the Networked Readiness of a nation would be a simpliication. An interesting link to explore is that between NRI and the gross domestic product (GDP) per capita of a country. If one has a closer look at the NRI results, one would ind that India, with a GDP per capita of USD 483, has an NRI score of 3,54 and is ranked 45 overall. Nicaragua, with a very similar GDP per capita of USD 485, has, on the other hand, a score of 2.56 and an overall ranking of 94. One thus sees a wide spread in the NRI score for a given GDP per capita. This is only one of many examples that could be cited.

Nevertheless, one can look at the relation between the NRI and GDP per capita in order to obtain a better understanding of trends, and also to identify over- and underperformers with respect to the trend. Figure 3 gives a plot between GDP per capita and the NRI. The partial log regression plot presents a projected trend line. One can note immediately the following points:

- For a given GDP per capita, there is a spread in the NRI scores around the regression plot as presented in Figure 3.
- The impact of GDP seems to be very high at low GDP values, and the NRI score increases rapidly with small increases in GDP.
- Around a GDP per capita of USD 6000 to 9000 the curve tapers off and the effect of increasing GDP is much less pronounced. Other factors become more relevant to the NRI score at higher values of GDP per capita.

Countries widely distanced from the regression plot could be examples of underperforming or overperforming countries. Thus one sees that the United States leads the NRI ranking, whereas Luxembourg, with a signiicantly higher GDP per capita, relatively underperforms on the overall NRI score. Similarly India and Estonia would be overperforming on their NRI scores with respect to their GDP per capita.

Does increased competition increase NRI?

Figure 4 shows the effect of increasing competition in the ICT sector on the ISP (Internet Service Provider) access charges. Intensity of competition in the ICT Sector is plotted against the ISP access charges, and one sees that there is a decrease in the cost of services with increasing competition. Thus the affordability of ICT services would tend to increase with increased competition.

One would expect that increased affordability of ICT services would stimulate the adoption and usage of ICT by the key stakeholders of the Networked Readiness Framework. Figure 5 plots the number of Internet users per 1,000 inhabitants

Table 5.Usage Subindexes

Usage component index = 1/3 Individual Usage + 1/3 Business Usage + 1/3 Government Usage

INDIVIDUAL

COUNTRY	SCORE	RAN
Luxembourg	6.00	1
Norway	5.80	2
Netherlands	5.44	3
Switzerland	5.40	4
Denmark	4.98	5
Germany	4.75	6
Sweden	4.66	7
USA	4.63	8
Iceland	4.40	9
Finland	4.19	10
Canada	4.12	11
Japan	4.12	12
Belgium	4.07	13
Australia	3.59	14
Korea	3.56	15
Ireland	3.54	16
Austria	3.53	17
Singapore	3.32	18
Slovenia	3.30	19
Malta	3.26	20
United Kingdom	3.16	21
Hong Kong	3.10	22
Israel	3.03	23
France	2.85	24
New Zealand	2.70	25
Estonia	2.59	26
Taiwan	2.53	27
Portugal	2.51	28
Italy	2.49	29
Hungary	2.35	30
Malaysia	2.29	31
Greece	2.19	32
Slovak Republic	2.15	33
Czech Republic	2.08	34

INDIVIDUAL

COUNTRY	SCORE	RAN
Spain	2.06	35
Argentina	2.06	36
Uruguay	2.02	37
Latvia	1.98	38
Chile	1.97	39
Costa Rica	1.90	40
Mauritius	1.86	41
Poland	1.81	42
Bulgaria	1.80	43
Trinidad and Tobago	1.73	44
Lithuania	1.68	45
Romania	1.65	46
Jamaica	1.50	47
Croatia	1.50	48
Russian Federation	1.48	49
Panama	1.47	50
Peru	1.45	51
Dominican Republic	1.44	52
Venezuela	1.43	53
Mexico	1.41	54
China	1.37	55
Tunisia	1.36	56
South Africa	1.32	57
Brazil	1.32	58
Macedonia	1.28	59
Ukraine	1.27	60
El Salvador	1.25	61
Ecuador	1.25	62
Turkey	1.23	63
Colombia	1.22	64
Thailand	1.21	65
Guatemala	1.20	66
Botswana	1.20	67
Namibia	1.19	68

INDIVIDUAL

COUNTRY	SCORE	RAN
India	1.17	69
Jordan	1.17	70
Serbia	1.17	71
Philippines	1.16	72
Paraguay	1.13	73
Algeria	1.13	74
Bolivia	1.12	75
Morocco	1.12	76
Egypt	1.11	77
Zimbabwe	1.10	78
Vietnam	1.10	79
Nicaragua	1.08	80
Madagascar	1.08	81
Cameroon	1.08	82
Honduras	1.07	83
Indonesia	1.07	84
Haiti	1.07	85
Senegal	1.06	86
Gambia	1.06	87
Kenya	1.05	88
Pakistan	1.04	89
Sri Lanka	1.04	90
Tanzania	1.03	91
Zambia	1.02	92
Angola	1.02	93
Nigeria	1.02	94
Uganda	1.01	95
Ghana	1.01	96
Mozambique	1.01	97
Bangladesh	1.01	98
Mali	1.01	99
Malawi	1.01	100
Chad	1.00	101
Ethiopia	1.00	102

BUSINESS

COUNTRY	SCORE	RAN
USA	6.02	1
Singapore	5.87	2
Australia	5.85	3
Sweden	5.71	4
Denmark	5.44	5
Switzerland	5.42	6
Israel	5.40	7
Norway	5.37	8
Iceland	5.32	9
Japan	5.20	10
Finland	5.20	11
Canada	5.12	12
New Zealand	5.08	13
Hong Kong	4.79	14
Netherlands	4.75	15
Germany	4.69	16
Ireland	4.67	17
Korea	4.62	18
Luxembourg	4.62	19
United Kingdom	4.60	20
Taiwan	4.50	21
Malaysia	4.48	22
France	4.45	23
South Africa	4.40	24
Austria	4.37	25
Belgium	4.36	26
Chile	4.18	27
Italy	4.15	28
Malta	4.14	29
Czech Republic	4.11	30
Brazil	4.08	31
Mexico	4.05	32
Thailand	4.05	33
Spain	4.04	34

BUSINESS

COUNTRY	SCORE	RAN
Slovenia	4.02	35
Costa Rica	4.01	36
Croatia	3.97	37
Portugal	3.96	38
Estonia	3.92	39
India	3.92	40
Poland	3.88	41
Latvia	3.86	42
Greece	3.86	43
Panama	3.85	44
Slovak Republic	3.85	45
Tunisia	3.81	46
Trinidad and Tobago	3.77	47
Dominican Republic	3.77	48
Turkey	3.72	49
Lithuania	3.72	50
Hungary	3.71	51
Jordan	3.69	52
Vietnam	3.69	53
Botswana	3.64	54
Argentina	3.61	55
Nigeria	3.59	56
Venezuela	3.58	57
Tanzania	3.58	58
Philippines	3.57	59
El Salvador	3.55	60
Mauritius	3.52	61
Senegal	3.52	62
Namibia	3.50	63
Morocco	3.50	64
Uganda	3.50	65
Kenya	3.48	66
Sri Lanka	3.46	67
Romania	3.44	68

BUSINESS

COUNTRY	SCORE	RAN
China	3.43	69
Zimbabwe	3.41	70
Colombia	3.39	71
Egypt	3.39	72
Ghana	3.35	73
Peru	3.33	74
Jamaica	3.32	75
Pakistan	3.29	76
Gambia	3.28	77
Uruguay	3.27	78
Russian Federation	3.17	79
Mozambique	3.14	80
Guatemala	3.09	81
Serbia	3.05	82
Ecuador	3.05	83
Zambia	3.04	84
Bangladesh	3.03	85
Cameroon	3.01	86
Bulgaria	3.00	87
Malawi	3.00	88
Indonesia	2.99	89
Macedonia	2.99	90
Nicaragua	2.98	91
Ukraine	2.98	92
Algeria	2.97	93
Honduras	2.86	94
Madagascar	2.85	95
Angola	2.79	96
Paraguay	2.66	97
Bolivia	2.65	98
Haiti	2.59	99
Chad	2.59	100
Ethiopia	2.58	101
Mali	2.55	102

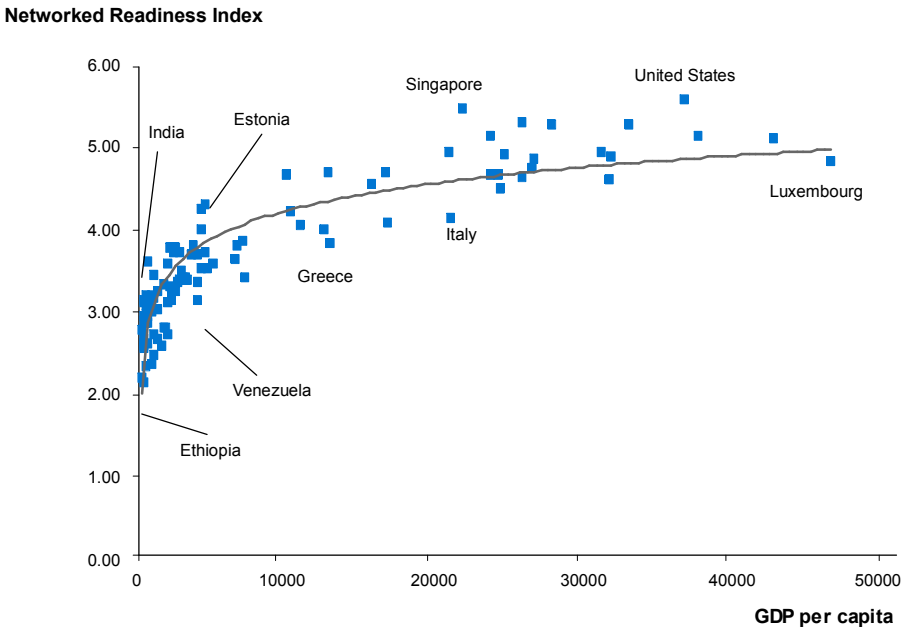
Table 5.Usage Subindexes (continued)
Usage component index = 1/3 Individual Usage + 1/3 Business Usage + 1/3 Government Usage

COUNTRY	GOVERNMENT SCORE	RAN
Singapore	6.45	1
USA	5.51	2
Canada	5.38	3
Hong Kong	5.29	4
Denmark	5.05	5
Taiwan	4.83	6
Malaysia	4.56	7
Finland	4.51	8
Israel	4.49	9
Korea	4.48	10
Sweden	4.45	11
Germany	4.43	12
Estonia	4.42	13
Japan	4.36	14
Austria	4.32	15
France	4.29	16
Malta	4.29	17
United Kingdom	4.20	18
Ireland	4.17	19
Australia	4.16	20
China	4.12	21
New Zealand	3.92	22
Iceland	3.84	23
Thailand	3.76	24
Mauritius	3.75	25
India	3.73	26
South Africa	3.72	27
Mexico	3.70	28
Philippines	3.68	29
Norway	3.64	30
Switzerland	3.64	31
Belgium	3.64	32
Jordan	3.64	33
Italy	3.59	34

COUNTRY	GOVERNMENT SCORE	RAN
Chile	3.58	35
Tunisia	3.55	36
Pakistan	3.53	37
Jamaica	3.51	38
Romania	3.45	39
Netherlands	3.42	40
Spain	3.41	41
Luxembourg	3.40	43
Portugal	3.40	42
Egypt	3.37	44
Turkey	3.33	45
Uganda	3.30	46
Morocco	3.27	47
Argentina	3.25	48
Hungary	3.22	49
Vietnam	3.22	50
Brazil	3.16	51
Serbia	3.13	52
Latvia	3.11	53
Slovenia	3.08	54
Gambia	3.08	55
Tanzania	3.07	56
Slovak Republic	3.06	57
Botswana	3.04	58
Greece	3.04	59
Indonesia	3.00	60
Czech Republic	3.00	61
Sri Lanka	2.97	62
Lithuania	2.96	63
Croatia	2.89	64
Kenya	2.85	65
Russian Federation	2.84	66
Ghana	2.82	67
Colombia	2.82	68

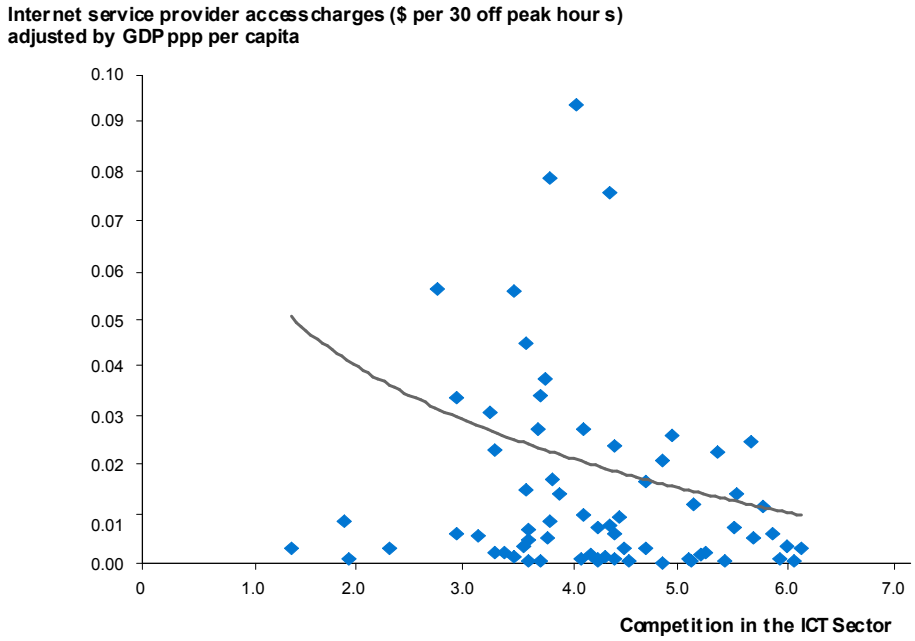
COUNTRY	GOVERNMENT SCORE	RAN
Nigeria	2.79	69
Trinidad and Tobago	2.79	70
Senegal	2.77	71
El Salvador	2.76	72
Mozambique	2.76	73
Zambia	2.74	74
Bulgaria	2.71	75
Panama	2.71	76
Costa Rica	2.69	77
Poland	2.67	78
Peru	2.65	79
Cameroon	2.62	80
Uruguay	2.59	81
Madagascar	2.58	82
Namibia	2.55	83
Ecuador	2.53	84
Ukraine	2.52	85
Venezuela	2.47	86
Malawi	2.44	87
Macedonia	2.43	88
Algeria	2.42	89
Dominican Republic	2.40	90
Bangladesh	2.37	91
Ethiopia	2.36	92
Guatemala	2.27	93
Mali	2.24	94
Angola	2.23	95
Bolivia	2.02	96
Nicaragua	2.02	97
Honduras	1.99	98
Paraguay	1.94	99
Zimbabwe	1.71	100
Chad	1.67	101
Haiti	1.48	102

Figure 3.Networked Readiness 2003–2004 versus Gross Domestic Product per Capita, Partial Log Regression



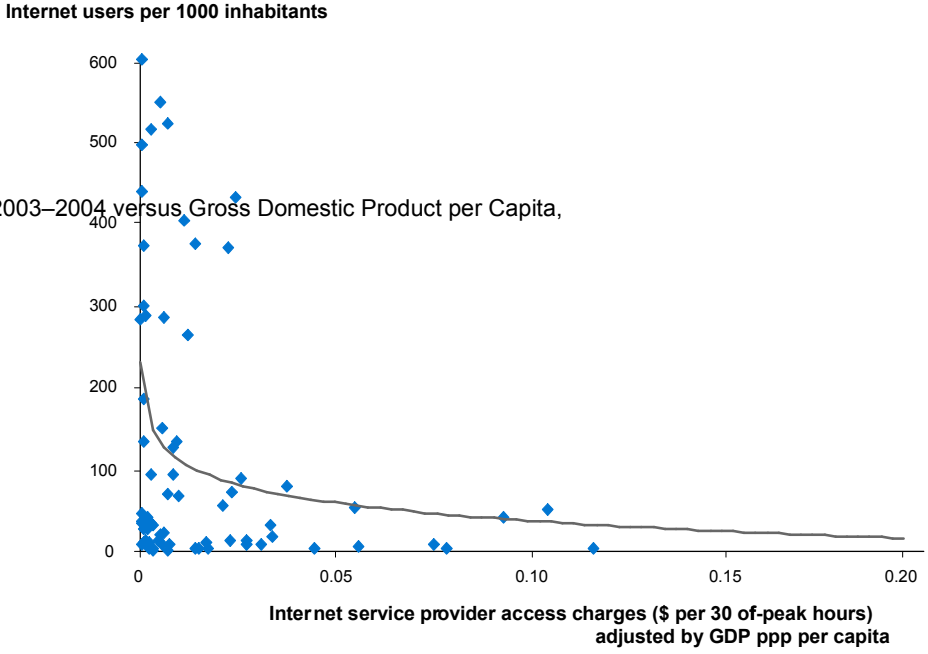
Source: Authors Analysis of data from The World Bank

Figure 4.Competition in the ICT Sector Gives Rise to Affordability of Services, Partial Logarithmic Regression



Source: Authors' analysis of data from World Economic Forum, The World Bank

Figure 5.Internet Users per 1,000 inhabitants and Networked Readiness, Partial Logarithmic Regression



Source: Authors' analysis of data from the World Bank

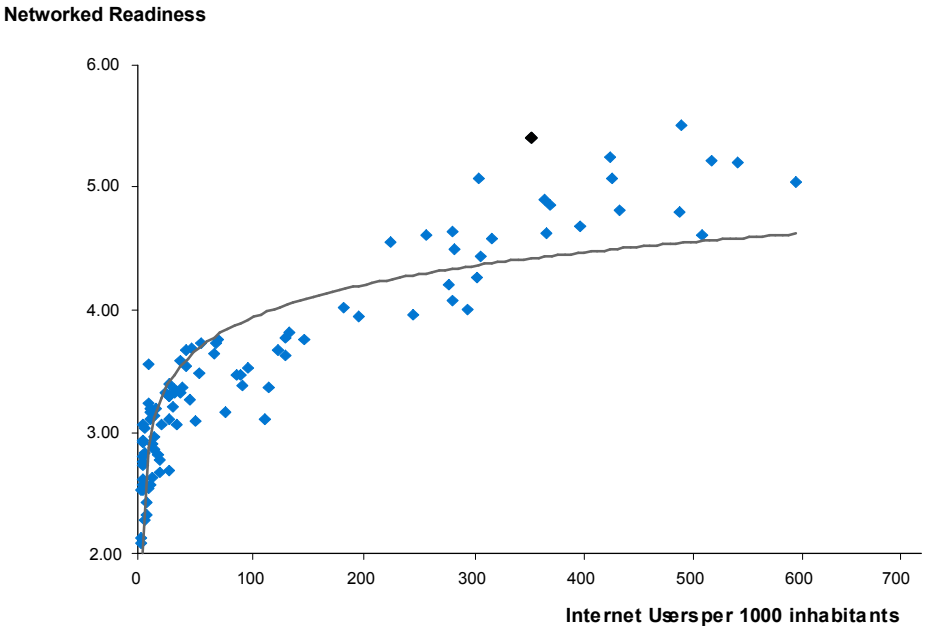
Figure 3.Networked Readiness 2003–2004 versus Gross Domestic Product per Capita, Partial Log Regression

as a function of the ISP access charge adjusted by GDP per capita. One sees a decrease in the number of Internet users with increasing ISP access charges. Thus nations with more affordable ICT services would tend to have higher levels of ICT readiness and usage for their key stakeholders. This should lead to a higher level of NRI for the nation.

In igure 6, the number of Internet Users per 1,000 inhabitants is plotted against the overall NRI of a country. One sees that as the number of Internet users increases, there is a trend towards an increase in the NRI.

Plotting the intensity of ICT competition against the NRI provides a very interesting plot, as can be seen in

Figure 6Internet Users per 1,000 inhabitants and Networked Readiness, Partial Logarithmic Regression



Source: Authors' analysis of data from World Economic Forum, The World Bank

igure 7. The NRI is seen to increase steadily as the degree of competition in the ICT sector increases. Thus one impact of policy on the NRI is clear. Competition in the ICT sector makes services more affordable, and the more affordable a service becomes, the more it is used by the key stakeholders—individuals, businesses, and governments. The increased readiness and usage of ICT increases the NRI of a country.

Our research provides empirical support for policymakers seeking to enhance their ICT competitiveness and overall levels of NRI; a key is to promote competition in the local ICT sector. An example of a country having followed this route is Japan. Japan's incumbent operator NTT actively promoted ISDN service, and reached signiicant penetration. At that moment, the government encouraged competition for entry by unbundling the local loop and, as a result, numerous players entered with DSL service. The result was a sharp decline in prices to half that of the incumbent NTT's initial offering, and a rapid take-off in the adoption of DSL. Japan today has one of the world's most competitive and cheapest broadband services. The uptake has grown exponentially since DSL was introduced.

Is there a threshold for Usage to take off?

One would expect the Readiness and Usage scores of a nation to move hand-in-hand. A country having a high degree of Readiness should be able to transform this ICT capability into usage statistics, and hence show a consequent high score on the Usage component index. For instance, the United States is among the highest in terms of Readiness component index scores, and one sees this readiness translating into real ICT usage, as represented by high Usage scores (see Figure 8).

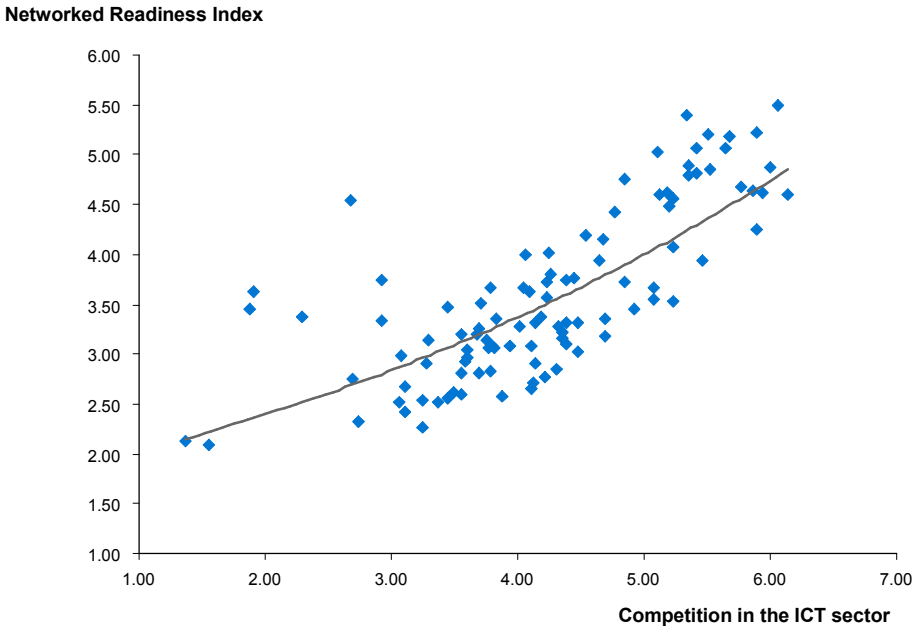
If one has a closer look at the trend of readiness versus usage at lower values of Readiness, one sees that Usage remains rather lat with initial increases in Readiness. This leads us to believe that there is a threshold to Readiness: a country needs to have a certain level of Readiness with regards to ICT before there can be an effective usage of ICT, and a consequent impact. A certain critical mass in terms of number of users, or the availability of narrowband and broadband services, or of services online is essential before this is relected in usage metrics. This is relected in Figure 8.

- Haiti, with a Readiness Score of 2.92, has a low Usage score of 1.71 and has still to increase its Readiness before Usage starts increasing signiicantly.
- Uganda is an over performer below the threshold level. It has a Readiness score of 3.32 and a corresponding Usage level of 2.60.
- Luxembourg and France ind themselves above the threshold level. While Luxembourg overperforms, France has a lower Usage level than expected.

Evolution of the NRI over time

The Networked Readiness of a nation is a dynamic measure, and it evolves over time as a result of policy measures taken by government and business leaders, and as a result of changes occurring in the global environment. Looking at the changes in NRI rankings over time (see Table 6), one observes that 15 countries have shared the 10 top positions.

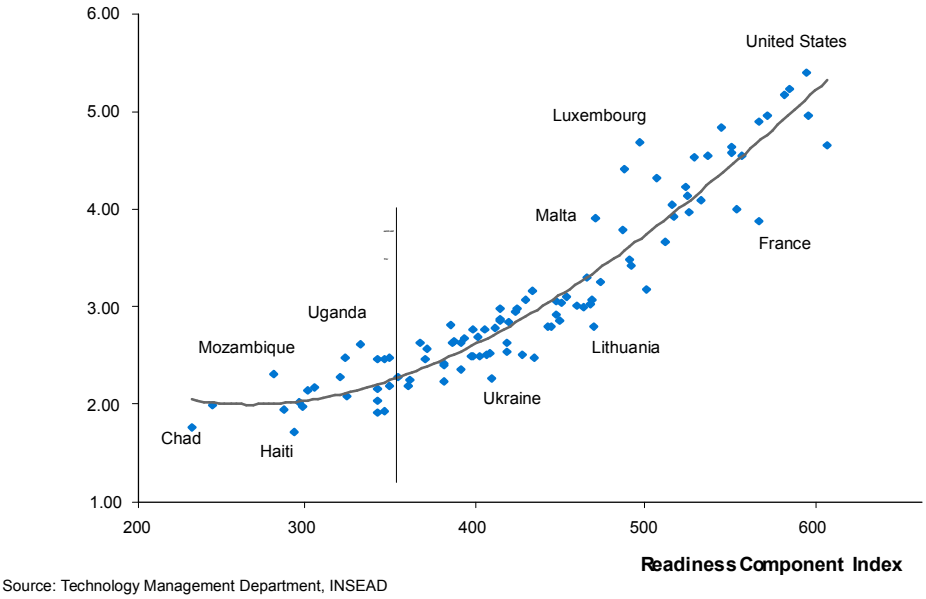
Figure 7Competition Promotes Networked Readiness, Partial Logarithmic Regression



Source: Authors' analysis of data from World Economic Forum, The World Bank

Source: Authors' analysis of data from World Economic Forum, The World Bank

Figure 8Usage vs Readiness Component Indexes



Source: Technology Management Department, INSEAD

Table 6.Evolution of Networked Readiness from 2001 to 2003

Country	2003–2004	2002–2003	2001–2002
United States	1	2	1
Singapore	2	3	8
Finland	3	1	3
Sweden	4	4	4
Denmark	5	8	7
Canada	6	6	12
Switzerland	7	13	16
Norway	8	17	5
Australia	9	15	14
Iceland	10	5	2

The United States and Finland have consistently been in the top three positions, whereas Singapore has rapidly progressed from 8th place in 2001–2002, to 3rd place in 2002–2003, and is currently in 2nd place.

Another constant is the performance of the northern European countries, with Finland, Sweden, Denmark, Norway, and Iceland present in the top ten places in each of the three years.

One must add a note of caution to this analysis because the results of the three different research efforts are not directly comparable. The framework used in the 2001–2002 study

is different (see Schwab et al 2002). Moreover, while the framework and methodology of analysis of the 2002–2003 and the 2003–2004 studies are identical, the underlying data variables used differ to a certain extent. This is in order to accomodate the larger set of countries considered in the current analysis and the availability of reliable and up-to-date information.

The Digital Divide—Increasing or Decreasing?

The subject of digital divides across and within nations has received a lot of attention over the last years. Since ICT is seen as an important enabler of productivity and growth, leaders from business and government have embarked upon several plans to increase the adoption and usage of ICT among the key stakeholders—individuals, businesses, and governments.

In this context, frequently evoked questions have concerned changes in the digital divide: are the differences in the levels of digital development amongst nations increasing or decreasing? Is there a convergence or divergence in the digital divide?

Figure 9 shows the plot of the NRIs for the years 2002–2003 and 2003–2004 in descending order of NRI. The trend lines for the two sets of NRI are plotted also. The spread (distance between the higher and lower ends of the trend line) of the NRI is seen to decrease from the year 2002–2003 to the year 2003–2004, and this indicates a decrease in the digital divide across nations.

Figure 10 plots the weighted average NRI by region, normalized by taking the score of Africa (the region with the lowest NRI each year as 1). One sees that from 2001–2002 to the current study of 2003–2004, the weighted average NRI scores are tending to converge, indicating that the NRI of major regions of the world are converging over time.

Research Challenges

Finding the Facts

Lack of accurate and reliable data can pose seemingly insurmountable roadblocks to the implementation of even the best laid out frameworks. The goal of our research and analysis has been to provide a scientiic and credible interpretation of reality. Thus, an important step in our research has been to collect a complete and high quality set of data relating to ICT. We used two types of data in our research: soft data, which is subjective data gathered from questionnaires (managed by the World Economic Forum as part of their research for the Global Competitiveness Report), and hard data, which is driven by statistics collected by international multi-lateral agencies (such as the World Bank and ITU). Both these sets of data play a crucial role in the overall analysis. The soft data is critical in determining the opinion of the decision makers and inluencers who are intimately familiar with a nation's economy and ICT usage. On the other hand, the hard data captures fundamental elements related to the development of infrastructure, human capital and ICT.

Absence of Key Usage Metrics: Key ICT areas such as mobile telephony and the Internet are still undergoing rapid development. Owing to this, accurate and up-to-date usage metrics are dificult to obtain. For example, metrics on cost savings realized, on key measures of policy and regulation, and on the use of ICT by governments remain elusive.

Selection of countries: The use of objective and reliable data is critical in preparing a report of this type. Availability of data has in fact been a key factor in selecting the 102 countries that form part of this study. As a consequence, regions suffering from a chronic lack of reliable statistics such as Africa and Central Asia ind themselves underrepresented in the NRI index.

Ensuring Statistical Signiicance: Once solid and reliable facts had been accumulated, a comprehensive statistical analysis was conducted. Following the classic steps of any such analysis, correlation and factor analyses were conducted to determine inter-relationships amongst variables and to drop variables if necessary. The variables were then classiied along the lines of the NRI framework.

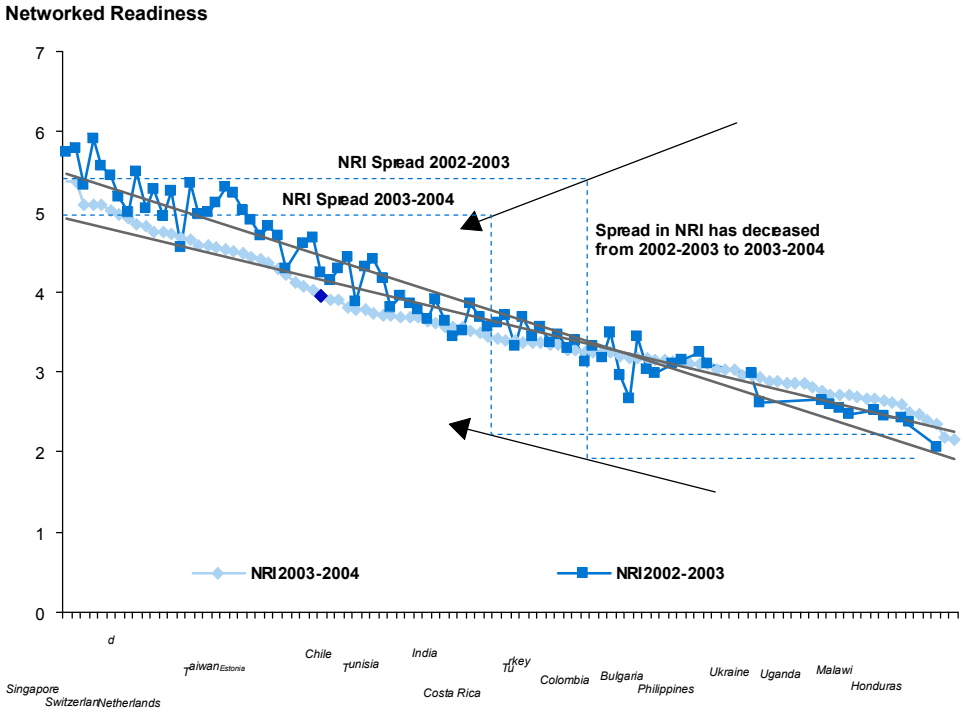
Data Estimation: Despite our best efforts to collect data from all major international sources, it has been necessary at times to cope with incomplete sets of data for the countries under consideration. In order to compensate for this, statistical procedures have been used to estimate missing data: mainly regression and clustering techniques. Control procedures and checks have been devised to ensure that estimations were reasonable and not overly favorable or disadvantageous in their representation of the countries in question.

Calculating the Index: In order to calculate the index, the data was irst transformed on a scale of 1 to 7, in order that each piece of information would have an equal weight. Next, each of the sub-indices was computed as the mathematical average of the variables composing it. The same approach was used to calculate the component indexes, averaging the subindexes. Finally, the NRI was computed as an average of the three component indexes. Details are provided in the technical appendix and in the later chapter titled "The Networked Readiness Index: Methodology".

Summary

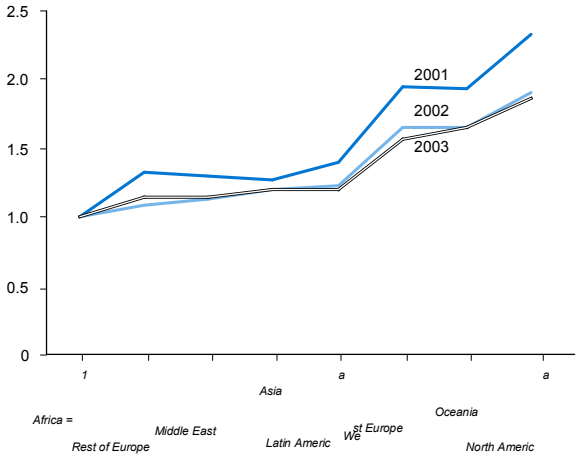
Networked Readiness is a complex phenomena and the sum of diverse and interrelated forces. Measuring a country's Networked Readiness remains a signiicant challenge, and any framework or model representing Networked Readiness is a simpliied representation at best. Further, limitations in the availability of reliable and current data restrict the measurement of the phenomena to a subset of countries, and also to a small number of the underlying forces.

Figure 9Digital Convergence or Divergence?



Source: Technology Management Department, INSEAD

Figure 10Regional Weighted NRI, 3 year trend with Africa = 1



The weighted average NRI is calculated as per the following formula: Weighted average NRI of Region = (∑(NRI of Country*Population of country))/ Population of the region) over all the countries in the given region.

Source: Technology Management Department,

Nevertheless the Networked Readiness Framework and Index are useful tools for key policy decision makers charting a country's strategic direction in order to enhance national competitiveness. The NRI Framework attempts to interpret the underlying complexity of the development and use of ICT in an intuitive and easy-to-comprehend model. The Overall NRI is a summary measure of a nation's ability to participate in and beneit from ICT developments. The NRI provides guidance to business leaders and public policymakers for enhancing the impact of ICT on important stakeholders—individuals, businesses and governments.

Governments and policymakers can have signiicant impact on the adoption and usage of ICT. For example, our research has demonstrated that promoting competition and deregulation in the ICT sector leads to decreasing service costs, and that lowered costs result in an increase in consumption of services.

The NRI allows a nation to benchmark its ICT performance, and to determine the effectiveness of policy. It also permits a country to learn from the policy and performance of other countries with similar proiles, and to identify best practice. The NRI serves to highlight the areas of over- and underperformance of a given country as compared to a similar set of countries, and to provide best practice examples.

Overperforming countries have put ICT on the national agenda, and have striven to make it an area of excellence, whereas other underperforming nations have not done so. The former countries have succeeded in going beyond individual measures of national income, or National ICT spending, in an effort to provide an optimal Environment for ICT development, thus promoting high levels of Readiness and Usage within all three key stakeholders. The United States, Singapore, and Finland are such leaders, and can serve as role models for other nations in their quest for ICT excellence.

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Endnotes

1 For more information on the development of the Networked Readiness framework and other efforts in the domain, refer to Dutta and Jain, “Networked Readiness of Nations” in Dutta et al 2003.

2 While Networked Readiness Framework for 2003–2004 is identical to that used in 2002–2003, it is important to note that the underlying variables have evolved. The increase in the number of countries included in the NRI rankings from 82 in 2002–2003 to 102 this year limits the number of variables that can be considered. The research methodology imposes a 65 percent observation rate for each variable over the 102 countries. Variables with fewer observations than this have been dropped.

3 Oceania includes Australia and New Zealand.

4 For example, overall second ranked Singapore does well on the Readiness (4) component index, supported by a strong Government Readiness (1) and Business Readiness (4), even though it has a relatively modest performance on Individual Readiness (22). See Table 4.

Technical Appendix

Constructing the Networked Readiness Index:

Deinitions of the Networked Readiness Index, Component Indexes, and Subindexes

The Networked Readiness Index 2002–2003 separates Environmental factors from ICT Readiness and Usage, and hence there are three component indexes for each. Starting from a set of over 90 ICT related variables, we have divided these variables amongst the nine subindexes. We then eliminated variables on the basis of number of countries for which data was available and used analytical procedures such as correlation analysis. Our inal index computation is based on a set of 48 variables.†

The Networked Readiness Index is deined as follows:

Networked Readiness Index = 1/3 Environment + 1/3 Network Readiness + 1/3 Network Usage

I. The Environment component index is deined as follows:

Environment = 1/3 Market + 1/3 Political/Regulatory + 1/3 Infrastructure

I.1. Market is deined by the following variables:

1.01 State of cluster development, 2003
1.02 Venture capital availability, 2003
1.03 Subsidies for irm-level research and development, 2003
1.04 Quality of scientiic research institutions, 2003
1.05 Availability of scientists and engineers, 2003
1.06 Brain drain, 2003
1.07 Utility patents, 2002
1.08 ICT manufactured exports, 2001
1.09 ICT service exports, 2001

I.2. Political/regulatory is deined by the following variables:

1.01 Overall administrative burden, 2003
1.02 Quality of the legal system, 2003
1.03 Laws relating to ICT, 2003
1.04 Competition in the ISP sector, 2003
1.05 Foreign ownership restrictions, 2003
1.06 Eficiency of the tax system, 2003
1.07 Freedom of the press, 2003

I.3. Infrastructure is deined by the following variables:

1.01 Overall infrastructure quality, 2003
1.02 Waiting time for telephone lines, 2000
1.03 Telephone mainlines, 2001
1.04 Public pay phones, 2001
1.05 Internet servers, 2001

† Our research used the most recent data available from the concerned sources e.g., the Global Competitiveness Survey 2003–2004 questionnaire from the World Economic Forum and data from World Bank and ITU.

II. The Network Readiness component index is deined as follows:

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

II.1. Individual readiness is deined by the following variables:

1.01 Public expenditure on education, 2000
1.02 Adult illiteracy, 2001
1.03 Tertiary enrolment, 2001
1.04 Radios, 2001
1.05 Television sets, 2001
1.06 Households online, 2001
1.07 Quality of math and science education, 2003
1.08 Affordability of local ixed line calls, 2001
1.09 Affordability of Internet telephone access, 2001
1.10 Affordability of Internet Service Provider fees, 2001

II.2. Business readiness is deined by the following variables:

1.01 Ease of obtaining phone lines, 2003
1.02 Cost of business telephone subscription, 2002
1.03 Extent of staff training, 2003
1.04 Quality of business schools, 2003
1.05 Scientists and engineers in R&D, 2000

II.3. Government readiness is deined by the following variables:

1.01 Government prioritization of ICT, 2003
1.02 Government procurement of ICT, 2003
1.03 Government online presence, 2003

III. The Network Usage component index is deined as follows:

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

III.1. Individual usage is deined by the following variables:

1.01 Personal computers, 2001
1.02 ISDN subscribers, 2001
1.03 Cable TV subscribers, 2001
1.04 Internet users, 2001

III.2. Business usage is deined by the following variables:

1.01 Computers installed in businesses, 2001
1.02 Firm-level technology absorption, 2003
1.03 Prevalence of foreign technology licensing, 2003

III.3. Government usage is deined by the following variables:

1.01 Government success in ICT promotion, 2003
1.02 Government online services, 2003