The Networked Readiness Index: Measuring the Preparedness of Nations for the Networked World

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Overview

One of the central research objectives of the Center for International Development (CID) at Harvard University is to develop a better understanding of technology's pivotal role in economic development. In recent years, due to the dynamic evolution of information and communication technologies (ICTs) and the increasing importance of ICT diffusion in the process of economic growth, we recognized the need for a broad and systematic comparison of the ICT development of countries around the globe. To that end, this chapter presents the Networked Readiness Index (NRI), a major international assessment of countries' capacity to exploit the opportunities offered by ICTs, and the first global framework to map out factors that contribute to this capacity. Our short-term aim is for the information presented in the NRI to enhance business leaders' and public policymakers' understanding of the factors contributing to ICT advancement, so that business practice and public policy can be shaped in the most informed manner possible. In the longer term, we hope this information will help extend the benefits of a Networked World to a greater number of people, organizations, and communities worldwide.

To be sure, the NRI forms just one summary measure that helps to focus attention on overall levels of ICT development. We should stress that the NRI rankings are not meant to stand alone. We encourage readers to examine the underlying factors that contribute to the NRI rankings. Understanding ICT systems is a challenge that we are only beginning to tackle through the NRI.[1] The NRI analysis of national-level Networked Readiness is bolstered not only by the other authored chapters in the first part of this report, which examine specific thematic issues related to Networked Readiness, but also by the Country Profiles section, where we present discussion of subnational trends within each of the 75 countries included in the NRI.

The chapter proceeds in three sections. The first presents the overall Networked Readiness Index and rankings for 75 countries, representing more than 80 percent of the world's population and more than 90 percent of its economic output. The second presents the NRI's component indexes and corresponding subindexes, providing more detailed rankings of countries' relative strengths and weaknesses across numerous dimensions relevant to the Networked World. The third explores the relationships between the pillars of the NRI, with emphasis on the links between Enabling Factors and Network Use. A technical appendix describes in detail how the NRI was constructed.

The Networked Readiness Index 2001–2002

In previous work we defined Networked Readiness as "the degree to which a community is *prepared* to participate in the Networked World."[2] In this report, we expand that definition to include a community's *potential* to participate in the Networked World in the future. With this in mind, the NRI transforms the complex dynamics of Networked Readiness into more easily understood shorthand, not unlike the Human Development Index, published annually by our colleagues at the United Nations Development Programme (UNDP), or the Growth Competitiveness Index, published annually by CID in collaboration with the World Economic Forum.

While any attempt to narrow Networked Readiness down to a single measure is admittedly artificial, the research performed in the creation of the NRI has significantly improved our understanding of how different national environments affect the adoption and use of ICTs. Most previous indexes, analytical assessments, or national rankings relevant to Networked Readiness, including those we ourselves compiled, paid insufficient attention to how ICT indicator variables relate to one another. For instance, measures relating to speed and quality of network infrastructure are often measured as analytically equivalent to variables that reflect the degree of electronic government conducted within a community, or the number of Internet users.

The Networked Readiness Index marks an important step forward by distinguishing between factors that determine the usability of the Network (the Enabling Factors) and variables that reflect the extent of Network Use. Our perspective on Networked Readiness suggests that *the top-ranked country is the one with the most highly developed ICT networks and the greatest potential to exploit those networks' capacity.* To capture this relationship, we have constructed a Network Use component index that measures the extent of current network connectivity, and an Enabling Factors component index that measures a country's capacity to exploit existing networks and create new ones. The relationship between Network Use and Enabling Factors is a subject of ongoing research. The evidence gathered to date indicates that a high score on Enabling Factors contributes to high levels of Network Use. However, a high score on Enabling Factors also signals a country's ability to draw upon existing ICT networks. For conceptual simplicity, countries' overall Networked Readiness Index scores are calculated as the simple average of their scores on Network Use and Enabling Factors.

Results

Overall Networked Readiness Index results are presented in Table 1, where one sees that the United States ranks as the country best positioned to take advantage of the opportunities afforded by ICTs. Iceland ranks 2nd, just behind the U.S. Finland and Sweden are slightly further behind, followed by Norway and the Netherlands, the latter two with almost exactly the same NRI score. (Note that overall NRI scores are presented

Table 1: **Networked Readiness Index**

Country	Networked Readiness	NRI Rank
United States	6.05	1
Iceland	6.03	2
Finland	5.91	3
Sweden	5.76	4
Norway	5.68	5
Netherlands	5.68	6
Denmark	5.56	7
Singapore	5.47	8
Austria	5.32	9
United Kingdom	5.31	10
New Zealand	5.23	11
Canada	5.23	12
Hong Kong SAR	5.23	13
Australia	5.22	14
Taiwan	5.18	15
Switzerland	5.17	16
Germany	5.11	17
Belgium	4.90	18
Ireland	4.89	19
Korea	4.86	20
Japan	4.86	21
Israel	4.84	22
Estonia	4.73	23
France	4.71	24
Italy	4.70	25
Spain	4.62	26
Portugal	4.57	27
Czech Republic	4.38	28
Slovenia	4.24	29
Hungary	4.14	30
Greece	4.13	31
Argentina	4.01	32
Slovak Republic	4.01	33
Chile	4.00	34
Poland	3.85	35
Malaysia	3.82	36
Uruguay	3.80	37
Brazil	3.79	38
Latvia	3.78	39
South Africa	3.71	40
Turkey	3.67	41
Lithuania	3.59	42
Thailand	3.58	43
Mexico	3.58	44
Costa Rica	3.57	45
Trinidad and Tobago	3.52	46
Dominican Republic	3.52	47
Panama	3.42	48
Jordan	3.42	49
Venezuela	3.41	50
Mauritius	3.40	51
Peru	3.38	52
Bulgaria	3.38	53
India	3.32	54
El Salvador	3.30	55
Jamaica	3.29	56
Colombia	3.29	57
Philippines	3.27	58
Indonesia	3.24	59
Egypt	3.20	60
Russian Federation	3.17	61
Sri Lanka	3.15	62
Paraguay	3.15	63
China	3.10	64
Romania	3.10	65
Ukraine	3.05	66
Bolivia	3.04	67
Guatemala	3.00	68
Nicaragua	2.83	69
Zimbabwe	2.78	70
Ecuador	2.65	71
Honduras	2.64	72
Bangladesh	2.53	73
Vietnam	2.42	74
Nigeria	2.10	75

only to two decimal places in the tables, but the corresponding rankings are based on absolute values of greater specificity.) Another Northern European country, Denmark, ranks 7th, followed by Singapore in 8th, Austria in 9th and the United Kingdom in 10th place. Singapore's outstanding result on the NRI serves as testimony to that city-state's tremendous emphasis on ICT infrastructure as a centerpiece of its economic growth strategy.

Further down the list, one sees that Japan ranks 21st, only slightly ahead of Estonia (23rd), which is in turn ranked ahead of France, Italy, and Spain, ranked at 24th, 25th and 26th, respectively. That Estonia, a country under communist rule only a decade ago, is now equivalent in Networked Readiness to Japan, France, Italy, and Spain, underscores how far that country has come in a short period, and how well positioned it is to continue its recent history of economic growth. In the lower half of the rankings, one sees that Russia is struggling to develop its Networked Readiness, scoring 61st. Likewise, China, despite its phenomenal economic performance in recent years, rates poorly at 64th. Other relatively poorly positioned countries include the Philippines (58th), Egypt (60th), and Ukraine (66th). At the bottom of the Index stand Ecuador, Honduras, Bangladesh, Vietnam, and Nigeria, respectively.

The regional groupings of rankings are notable. Within the 25 countries that make up the top third of the NRI there are:

- 14 in Western Europe (with the best results from Scandinavia)
- Seven in Asia and Oceania (led by Singapore)
- Two in North America (the U.S. and Canada)
- One in the Middle East and North Africa (Israel)
- One in Central and Eastern Europe (Estonia)

Meanwhile, in the bottom third of the NRI there are:

- Ten in Latin America (led by Peru)
- Seven in Asia (led by India)
- Four in Eastern Europe/former Soviet Union (with a top score by Bulgaria)
- Three in sub-Saharan Africa (with Mauritius having the best showing)
- One in the Middle East and North Africa (Egypt)

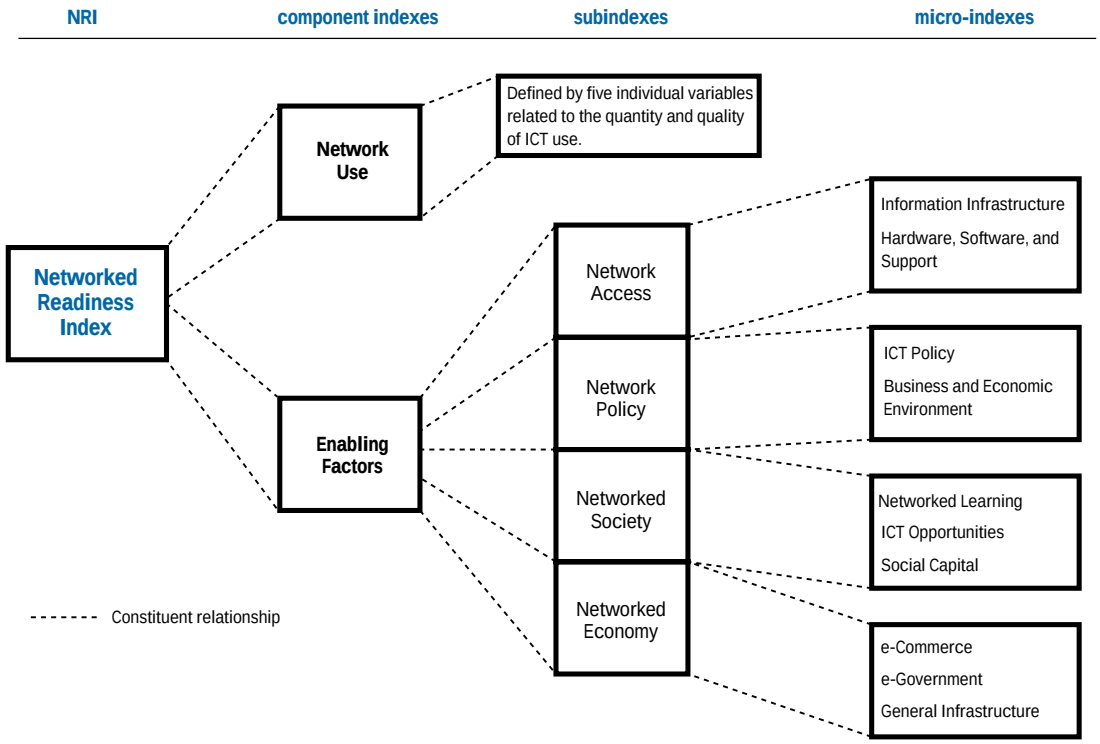
Clearly, some regions—most notably the Andean nations, much of Central America, the Middle East, sub-Saharan Africa, and South Asia—are lagging behind the rest of the world. Yet even these regions show exceptions, with nations such as Costa Rica, South Africa, and Turkey providing global leadership in many areas. Furthermore, in spite of their poor overall scores on the NRI, a number of countries within these lower-ranked regions, such as Bolivia, India, and Bangladesh, perform better than one might expect given their average levels of economic development. There are uneven levels of Networked Readiness throughout the nations of Central and Eastern Europe, East and Southeast Asia, and South America; these areas have both global leaders, such as Estonia and Korea, and those who do not fare as well, such as Russia, Romania, and Ecuador. Within the top tier of leaders in our findings, there are nations (most notably France and Japan) that, given their wealth and level of human development, perform worse than expected.

How to use the Index

The NRI has been designed as a macrolevel tool for policymakers and global leaders. The Index signals broad trends, flags opportunities and deficits, and makes a unique contribution to the understanding of how nations are performing relative to one another with regard to their participation in the Networked World. Profiles that explore the detailed Networked Readiness situation of each nation in the Index can be found in the second part of the *Global Information Technology Report*; these country-specific profiles provide an excellent companion to the broad findings of the NRI. Readers and researchers are also encouraged to refer to this report's Data Rankings section, where results are presented for all of the individual variables used to compile the NRI. Together, the NRI, its underlying data, and the country profiles serve as an excellent complement to, and reality check for, country-level Networked Readiness Assessments performed at the behest of domestic governments and international organizations. Such assessments, whether they are quick snapshots or long-term engagements exploring the Networked Readiness of a particular community, can provide valuable input for policymaking or agenda setting, and should be aided by the NRI and the country profiles.

While the NRI rankings are indicative of the relative Networked Readiness of these 75 nations, it is important to keep in mind that this is an aggregate index capturing broad Readiness trends. As such, *we urge appropriate caution in the interpretation of the rankings*. One should not over-interpret the relative positions of nations within a few spots of each other in the rankings, since the Index does not finely distinguish between the Networked Readiness of similarly ranked countries. Likewise, when assessing the bottom group of countries on the NRI, an important point should be taken into consideration. Today, there are 151 countries in the world with a population of one million or more. Due to data limitations, in this report we are able to assess only 74 of those countries plus Iceland, with Central Asia and Africa being particularly underrepresented.[3] The other 77 are not included because of the sheer difficulty of collecting data in them, a challenge closely correlated with a lack of economic and ICT development. So while Bangladesh, Vietnam, and Nigeria might rank below other countries on this Index, they are likely doing much better than most of the other 77 countries not included. Rather than interpreting these countries' low rankings as a sign of futility, we would urge policymakers to consider these countries' inclusion in

Figure 1: **The Structure of the Networked Readiness Index**



Source: Information Technologies Group, Center for International Development at Harvard University

the NRI Index as a major step forward, providing a large amount of information for new policy priorities as well as benchmarks upon which to measure future initiatives. For our part, we hope to expand the overall number of countries covered in future editions of the *Global Information Technology Report.* While ambitious, it would seem appropriate to include all nations that have Internet access.

Furthermore, because this is the first year in which we have produced the NRI, we do not yet have access to time-series data that would allow us to track trends over time. Yet, while we are well aware of the dangers of relying too much on cross-sectional characterizations of the 75 countries that constitute the rankings in the NRI, the Index still represents a major step forward in helping understand Networked Readiness.

Finally, one has to recognize what we call "the challenge of comparing the big fish in a little pond to the big fish in a big pond." While the NRI provides important evidence for understanding relative levels of Networked Readiness, there are certain inherent limitations that stem from using the nation-state as the basic unit of measure. A direct comparison of two countries such as Iceland, which scores very highly on the index (2nd), and India, which is in the bottom third of the NRI (54th), could be misleading when one considers the relative sizes of these nations and their different impacts on the global Networked scene. It also fails to capture the wide internal variation in India's enormous economy of more than one billion people, which is quite different from Iceland's more economically homogenous population of roughly 250 thousand people.

Indeed, Iceland's total population is much smaller than the number of sophisticated IT users in India, and India is renowned for its preeminence in software programming and for providing the world with highly skilled IT workers. India is effectively penalized in our Index for its size, the scope and scale of its many social and economic development challenges, and the smaller degree of IT penetration throughout the country as a whole. In India, as in many other countries around the world, there are successful miniature "Silicon Valleys" or ICT growth zones, but in most cases the national data do not pick up the impacts of these regional endeavors. Nonetheless, many of these subnational pockets of excellence are discussed within the Country Profiles section of the Report. We look forward to finding more creative ways of incorporating such size and internal ICT density issues in CID's future Networked Readiness research.

Beneath the Aggregate Results: Network Use and Enabling Factors

While the NRI provides a novel method for assessing overall Networked Readiness, one clearly needs to go beyond a single synthetic measure to understand the underlying reasons for

countries' differing ICT performances. To uncover the source of these differences, one must look at the specific elements of our two component indexes, that is, Network Use and Enabling Factors. For further level of detail, one can then turn to the four subindexes that make up the Enabling Factors index: Network Access, Network Policy, Networked Society, and Networked Economy. At an even greater level of detail, these four subindexes can be broken into their 10 constituent micro-indexes.[4] A schematic diagram outlines the relationship among these measures in Figure 1.

The NRI data sources fall under two general categories. First, we collected a variety of measures—mainly "hard" variables but also some "soft" ones—from sources such as the World Bank, the International Telecommunications Union, Freedom House, and the Business Software Alliance. Second, we drew heavily on questionnaire responses from more than 4,500 business and government leaders surveyed in 75 countries by the Global Competitiveness Report's 2001 Global Executive Opinion Survey, conducted by Harvard University and the World Economic Forum.[5] This unique data source provides a rich array of insights on a range of ICT issues and, crucially, provides information on aspects of ICT networks for which there are no "hard" data, such as the quality of local Internet Service Provider (ISP), market competition, or the efficacy of government ICT policy.[6]

Network Use

The Network Use component index is defined as a straightforward measure of the extent of ICT proliferation in a specific country. It consists of five variables: Internet users per hundred inhabitants, cellular subscribers per hundred inhabitants, Internet users per host, percentage of computers connected to the Internet, and availability of public access to the Internet. Results for the Network Use component index are presented on the left side of Table 2. The top performers on this measure are Iceland, the U.S., Finland, Norway, and Sweden, once again showing the dominance of Scandinavia in Networked World measures. The bottom five ranked countries are Bangladesh, Honduras, Ecuador, Vietnam, and Nigeria.

As we discuss in more detail later in our analysis, relative income levels provide an excellent benchmark for comparison of countries' rankings in the NRI and its constituent indexes. In the Network Use component index, a number of countries, such as Estonia (21st), Bolivia (52nd), Taiwan (10th), Finland (3rd), and Iceland (1st) rank well above nations of equal or greater income level. Of these, Estonia is an outstanding case as a relative leader in ICT use, as it ranks on par or above wealthier nations such as Italy (19th), Japan (23rd), Israel (24th), and France (27th). Other nations with incomes similar to Estonia are found farther down the Network Use component index: Chile (34th), Russia (59th), or South Africa (41st).

Enabling Factors

The Enabling Factors component index is constructed to reflect the preconditions for high quality Network Use as well as the potential for future Network proliferation and use in a country. The four subindexes that make up Enabling Factors are (with constituent micro-indexes in parentheses):

- Network Access (Information Infrastructure and Hardware, Software, and Support)
- Network Policy (ICT Policy, Business and Economic Environment)
- Networked Society (Networked Learning, ICT Opportunities, Social Capital)
- Networked Economy (e-Commerce, e-Government, General Infrastructure)

Network Access considers the extent and quality of the network infrastructure and the existence of the equipment, programs, and support services that allow ICTs to be used. Network Policy relates to the information and communications policy environment as well as the business and economic climate. Networked Society assesses quality of learning using information and communication technologies, the extent of their use in the learning process, the extent of opportunities in the ICT industry, and societal and demographic factors. Finally, Networked Economy considers the extent to which the public and private sectors are participating in the Networked World and the quality and availability of complementary infrastructure.

Results for the Enabling Factors index are presented on the right side of Table 2. The highest scoring countries are Finland, the U.S., Sweden, the Netherlands, and Iceland. At the bottom of the index are Honduras, Vietnam, Nicaragua, Nigeria, and Bangladesh. Just as in Network Use, Estonia proves to be a strong performer at 24th. Notably, this ranking is two spots ahead of Italy (ranked at 26th), a country with twice the per capita income. Also noteworthy is that Finland's top performance in Enabling Factors is significantly higher than its 14th rank in per capita income among the sampled countries. This is a country that has made tremendous efforts, and met great success, in deploying its available resources to promote ICTs throughout its society.

Table 3 shows the rankings and scores for the four subindexes—Network Access, Network Policy, Networked Society, and Networked Economy—that make up the Enabling Factors component index. Tables 4, 5, 6, and 7 then present results for the more granular micro-indexes. The specific variables that make up these measures can be found in the technical appendix, and detailed national rankings for each variable are presented in the third part of the *GITR*. Glancing down the columns of Table 3, one sees some interesting differences in countries' rankings across the four subindexes. It is instructive briefly to consider each of these in turn.

Table 2: **Networked Readiness Index Component Indexes**

NETWORK USE			ENABLING FACTORS		
Country	**Score**	**Rank**	**Country**	**Score**	**Rank**
Iceland	6.35	1	Finland	6.11	1
United States	6.07	2	United States	6.03	2
Finland	5.71	3	Sweden	5.86	3
Norway	5.68	4	Netherlands	5.74	4
Sweden	5.67	5	Iceland	5.71	5
Netherlands	5.61	6	Denmark	5.69	6
Denmark	5.43	7	Norway	5.67	7
Singapore	5.29	8	United Kingdom	5.67	8
New Zealand	5.26	9	Canada	5.66	9
Taiwan	5.17	10	Germany	5.66	10
Austria	5.13	11	Singapore	5.65	11
Hong Kong SAR	5.06	12	Switzerland	5.60	12
Australia	5.04	13	Austria	5.50	13
United Kingdom	4.95	14	France	5.46	14
Korea	4.82	15	Hong Kong SAR	5.40	15
Canada	4.80	16	Australia	5.39	16
Switzerland	4.74	17	Belgium	5.29	17
Germany	4.57	18	Ireland	5.26	18
Italy	4.55	19	Israel	5.23	19
Ireland	4.52	20	Japan	5.22	20
Estonia	4.51	21	New Zealand	5.21	21
Belgium	4.51	22	Taiwan	5.19	22
Japan	4.49	23	Spain	5.06	23
Israel	4.45	24	Estonia	4.95	24
Portugal	4.35	25	Korea	4.90	25
Spain	4.18	26	Italy	4.85	26
France	3.95	27	Czech Republic	4.84	27
Czech Republic	3.93	28	Portugal	4.79	28
Slovenia	3.91	29	Hungary	4.68	29
Greece	3.91	30	Chile	4.65	30
Argentina	3.69	31	Slovak Republic	4.63	31
Hungary	3.60	32	Slovenia	4.58	32
Slovak Republic	3.38	33	Poland	4.38	33
Chile	3.36	34	Brazil	4.38	34
Malaysia	3.34	35	Greece	4.36	35
Poland	3.32	36	Argentina	4.34	36
Uruguay	3.30	37	Latvia	4.31	37
Latvia	3.26	38	Malaysia	4.29	38
Turkey	3.25	39	Uruguay	4.29	39
Brazil	3.21	40	Thailand	4.29	40
South Africa	3.17	41	South Africa	4.24	41
Dominican Republic	3.13	42	Jordan	4.12	42
Mexico	3.13	43	Lithuania	4.11	43
Peru	3.13	44	Turkey	4.09	44
Bulgaria	3.09	45	Costa Rica	4.09	45
Lithuania	3.08	46	Mexico	4.03	46
Paraguay	3.08	47	Trinidad and Tobago	4.01	47
Costa Rica	3.06	48	Panama	3.97	48
Trinidad and Tobago	3.04	49	India	3.93	49
Venezuela	3.01	50	Jamaica	3.92	50
Mauritius	2.95	51	Dominican Republic	3.91	51
Bolivia	2.91	52	Egypt	3.90	52
Colombia	2.89	53	Philippines	3.86	53
Thailand	2.88	54	Mauritius	3.86	54
Panama	2.88	55	Venezuela	3.82	55
El Salvador	2.87	56	China	3.79	56
Romania	2.85	57	Indonesia	3.77	57
Jordan	2.71	58	El Salvador	3.73	58
Russian Federation	2.71	59	Sri Lanka	3.72	59
India	2.71	60	Colombia	3.68	60
Indonesia	2.70	61	Bulgaria	3.67	61
Guatemala	2.69	62	Peru	3.64	62
Philippines	2.68	63	Russian Federation	3.63	63
Jamaica	2.66	64	Ukraine	3.46	64
Nicaragua	2.64	65	Romania	3.35	65
Ukraine	2.63	66	Guatemala	3.30	66
Sri Lanka	2.58	67	Ecuador	3.27	67
Zimbabwe	2.50	68	Paraguay	3.22	68
Egypt	2.50	69	Bolivia	3.17	69
China	2.41	70	Zimbabwe	3.06	70
Bangladesh	2.40	71	Honduras	3.06	71
Honduras	2.22	72	Vietnam	3.04	72
Ecuador	2.03	73	Nicaragua	3.02	73
Vietnam	1.80	74	Nigeria	2.96	74
Nigeria	1.24	75	Bangladesh	2.65	75

Measuring Network Access

The Network Access subindex includes variables related to the telecommunications and information infrastructure and the availability of software, hardware, and ICT services locally. Clearly, where the Network does not exist, and where there are no mechanisms in place to support its users, it is not possible to reap the benefits of the Networked World. The global leaders in Network Access are the U.S., Sweden, Finland, Denmark, and the United Kingdom, while Zimbabwe, Paraguay, Bangladesh, Nigeria, and Vietnam rank in the last five places. South Africa ranks quite well in Network Access compared to its overall income level, while Greece ranks poorly in the same comparison. It is also noteworthy that in some countries with highly developed software industries, the software industry and local ICT services seem to outpace local infrastructure development. These include Israel, Ireland, and India, all countries in which software industries are among the world's best known. India, for example, ranks 51st in overall Network Access, a result made worse by its 65th place in Information Infrastructure, which counters its 34th rank in Hardware, Software, and Support.

Measuring Network Policy

The Network Policy subindex considers levels of competition in the telecommunications and ICT sectors as well as the overall business and economic climate. Within this area, the best scores come from Finland, Singapore, the U.S., Iceland, and Hong Kong, nations that are also at the top of most NRI rankings. Zimbabwe, Nicaragua, Honduras, Nigeria, and Bangladesh fill out the bottom. Interestingly, as shown in Table 5, several countries exhibit wide variance between their rankings on ICT Policy and Business and Economic Environment micro-indexes. For example:

- Costa Rica ranks 53rd in Network Policy because of its relatively good score (i.e., 40th) on the Business and Economic Environment micro-index, but a much poorer showing (57th) on the ICT policy micro-index, due mainly to the nation's continuing telecommunications monopoly;
- Lithuania, Mauritius, Slovenia, Poland, and Trinidad and Tobago, all countries lacking telecommunications competition, show similar patterns of relatively good economic conditions yet poor policy environments;
- Several countries, like Brazil, Colombia, and Venezuela, exhibit the opposite tendency. These are countries where a large gap exists between a relatively effective ICT Policy and much lower quality Business and Economic Environment.

Measuring Networked Society

The Networked Society subindex is formed by combining measures of nations' demographic characteristics, educational levels, and the extent to which ICTs are incorporated into learning systems, all factors instrumental in the diffusion of ICTs. The top five performers in this area are Finland, the U.S., the Netherlands, Iceland, and Norway, while Boliva, Guatemala, Nigeria, Nicaragua, and Bangladesh occupy the last places.

Table 3: **Enabling Factors Subindexes**

Enabling Factors component index = 1/4 Network Access + 1/4 Network Policy + 1/4 Networked Society + 1/4 Networked Economy

Country	Network Access	Rank	Country	Network Policy	Rank	Country	Networked Society	Rank	Country	Networked Economy	Rank
United States	6.61	1	Finland	6.40	1	Finland	6.42	1	Finland	5.29	1
Sweden	6.39	2	Singapore	6.25	2	United States	6.22	2	United States	5.15	2
Finland	6.35	3	United States	6.15	3	Netherlands	6.07	3	Sweden	5.11	3
Denmark	6.14	4	Iceland	6.07	4	Iceland	5.96	4	Singapore	5.04	4
United Kingdom	6.08	5	Hong Kong SAR	6.06	5	Norway	5.94	5	Iceland	4.98	5
Germany	6.05	6	United Kingdom	6.06	6	Sweden	5.91	6	Germany	4.96	6
Norway	6.04	7	Sweden	6.04	7	Denmark	5.88	7	Canada	4.95	7
Switzerland	6.02	8	Canada	5.99	8	Germany	5.84	8	Netherlands	4.94	8
Netherlands	5.97	9	Netherlands	5.97	9	Austria	5.80	9	Denmark	4.93	9
Canada	5.97	10	Switzerland	5.89	10	Switzerland	5.78	10	United Kingdom	4.92	10
France	5.85	11	Denmark	5.82	11	Belgium	5.73	11	Norway	4.90	11
Iceland	5.82	12	Norway	5.81	12	Canada	5.73	12	France	4.84	12
Australia	5.81	13	Austria	5.80	13	Taiwan	5.66	13	Hong Kong SAR	4.81	13
Singapore	5.75	14	Germany	5.78	14	United Kingdom	5.61	14	Switzerland	4.69	14
Austria	5.72	15	Australia	5.78	15	Ireland	5.60	15	Austria	4.68	15
Belgium	5.70	16	New Zealand	5.69	16	Singapore	5.57	16	Australia	4.60	16
New Zealand	5.70	17	France	5.65	17	France	5.52	17	Taiwan	4.55	17
Japan	5.69	18	Ireland	5.57	18	Israel	5.49	18	Spain	4.45	18
Hong Kong SAR	5.58	19	Israel	5.44	19	Japan	5.47	19	Belgium	4.43	19
Israel	5.57	20	Taiwan	5.36	20	Czech Republic	5.44	20	Japan	4.42	20
Ireland	5.50	21	Japan	5.30	21	Australia	5.39	21	Israel	4.41	21
Italy	5.31	22	Belgium	5.29	22	Spain	5.30	22	Ireland	4.37	22
Spain	5.29	23	Estonia	5.21	23	Estonia	5.26	23	Italy	4.37	23
Korea	5.25	24	Spain	5.19	24	Hungary	5.15	24	New Zealand	4.35	24
Taiwan	5.17	25	Portugal	5.17	25	Hong Kong SAR	5.14	25	Korea	4.35	25
Portugal	5.05	26	Chile	5.05	26	Slovenia	5.10	26	Estonia	4.31	26
Czech Republic	5.02	27	Korea	5.04	27	New Zealand	5.08	27	Portugal	4.13	27
Estonia	5.02	28	Italy	4.89	28	Slovak Republic	5.03	28	Czech Republic	4.09	28
Hungary	4.96	29	Jordan	4.88	29	Korea	4.97	29	Brazil	4.01	29
Chile	4.93	30	Hungary	4.85	30	Poland	4.84	30	Slovenia	3.91	30
Lithuania	4.90	31	Slovak Republic	4.85	31	Italy	4.81	31	South Africa	3.88	31
Slovak Republic	4.86	32	Czech Republic	4.79	32	Chile	4.80	32	Poland	3.86	32
Argentina	4.75	33	Malaysia	4.76	33	Portugal	4.80	33	Thailand	3.85	33
South Africa	4.75	34	Uruguay	4.65	34	Costa Rica	4.78	34	Chile	3.80	34
Dominican Republic	4.72	35	Argentina	4.64	35	Greece	4.69	35	Malaysia	3.78	35
Slovenia	4.69	36	Slovenia	4.60	36	Thailand	4.60	36	Hungary	3.77	36
Brazil	4.68	37	Brazil	4.55	37	Latvia	4.57	37	Slovak Republic	3.76	37
Uruguay	4.67	38	Thailand	4.53	38	Trinidad and Tobago	4.32	38	Argentina	3.71	38
Greece	4.59	39	Greece	4.48	39	Brazil	4.28	39	Latvia	3.70	39
Latvia	4.53	40	Poland	4.44	40	Argentina	4.25	40	Uruguay	3.67	40
Mexico	4.50	41	Latvia	4.43	41	Malaysia	4.19	41	Greece	3.66	41
Malaysia	4.45	42	Turkey	4.42	42	Uruguay	4.17	42	Lithuania	3.63	42
Turkey	4.42	43	El Salvador	4.42	43	Lithuania	4.15	43	Jordan	3.60	43
Venezuela	4.39	44	Jamaica	4.41	44	Mauritius	4.08	44	India	3.57	44
Poland	4.38	45	Egypt	4.39	45	Panama	4.07	45	Mexico	3.57	45
Peru	4.32	46	Trinidad and Tobago	4.36	46	Mexico	4.05	46	Turkey	3.50	46
Panama	4.31	47	South Africa	4.33	47	Turkey	4.04	47	Egypt	3.48	47
Egypt	4.30	48	Philippines	4.33	48	South Africa	4.01	48	Jamaica	3.45	48
Philippines	4.26	49	India	4.30	49	Jamaica	3.99	49	Ukraine	3.35	49
Jordan	4.26	50	Dominican Republic	4.29	50	Indonesia	3.99	50	China	3.35	50
India	4.23	51	China	4.28	51	Russian Federation	3.86	51	Trinidad and Tobago	3.26	51
Colombia	4.22	52	Panama	4.23	52	Philippines	3.84	52	Panama	3.26	52
Costa Rica	4.20	53	Costa Rica	4.20	53	Jordan	3.73	53	Mauritius	3.21	53
Thailand	4.18	54	Venezuela	4.14	54	Bulgaria	3.72	54	Bulgaria	3.21	54
Mauritius	4.14	55	Sri Lanka	4.13	55	Venezuela	3.69	55	Costa Rica	3.17	55
Sri Lanka	4.12	56	Colombia	4.12	56	China	3.68	56	Russian Federation	3.12	56
Indonesia	4.10	57	Mauritius	4.02	57	Dominican Republic	3.64	57	Indonesia	3.11	57
Trinidad and Tobago	4.10	58	Mexico	3.99	58	India	3.64	58	Venezuela	3.06	58
Guatemala	3.99	59	Indonesia	3.89	59	Sri Lanka	3.58	59	Sri Lanka	3.05	59
El Salvador	3.98	60	Bulgaria	3.82	60	Peru	3.55	60	Philippines	3.02	60
Bulgaria	3.92	61	Russian Federation	3.79	61	El Salvador	3.52	61	El Salvador	3.01	61
Ecuador	3.89	62	Lithuania	3.75	62	Romania	3.51	62	Dominican Republic	2.98	62
China	3.84	63	Peru	3.73	63	Colombia	3.44	63	Peru	2.96	63
Jamaica	3.83	64	Romania	3.66	64	Paraguay	3.41	64	Colombia	2.93	64
Romania	3.77	65	Guatemala	3.55	65	Egypt	3.41	65	Paraguay	2.86	65
Russian Federation	3.73	66	Bolivia	3.49	66	Ukraine	3.40	66	Ecuador	2.65	66
Bolivia	3.67	67	Ukraine	3.46	67	Vietnam	3.35	67	Guatemala	2.65	67
Ukraine	3.63	68	Vietnam	3.37	68	Ecuador	3.32	68	Nigeria	2.63	68
Nicaragua	3.53	69	Paraguay	3.24	69	Zimbabwe	3.24	69	Vietnam	2.55	69
Honduras	3.49	70	Ecuador	3.21	70	Honduras	3.22	70	Zimbabwe	2.53	70
Zimbabwe	3.38	71	Zimbabwe	3.11	71	Bolivia	3.13	71	Honduras	2.51	71
Paraguay	3.36	72	Nicaragua	3.09	72	Guatemala	3.03	72	Nicaragua	2.48	72
Bangladesh	3.26	73	Honduras	3.03	73	Nigeria	2.99	73	Romania	2.45	73
Nigeria	3.22	74	Nigeria	2.99	74	Nicaragua	2.98	74	Bolivia	2.38	74
Vietnam	2.88	75	Bangladesh	2.74	75	Bangladesh	2.26	75	Bangladesh	2.35	75

Table 4: **Network Access Micro-indexes**

Network Access Subindex = 1/2 Information Infrastructure + 1/2 Hardware, Software, and Support

Country	Information Infra-structure	Rank	Country	Hardware, Software, and Support	Rank
Finland	6.65	1	United States	6.76	1
Sweden	6.62	2	Sweden	6.16	2
Denmark	6.46	3	Finland	6.05	3
United States	6.45	4	United Kingdom	5.94	4
Norway	6.41	5	Germany	5.88	5
Canada	6.36	6	Denmark	5.83	6
Netherlands	6.32	7	Switzerland	5.83	7
Iceland	6.27	8	Australia	5.72	8
Hong Kong SAR	6.24	9	Norway	5.66	9
United Kingdom	6.22	10	Netherlands	5.63	10
Switzerland	6.22	11	Canada	5.59	11
Germany	6.21	12	France	5.58	12
Austria	6.12	13	Ireland	5.53	13
France	6.11	14	New Zealand	5.47	14
Singapore	6.10	15	Israel	5.44	15
Belgium	6.03	16	Singapore	5.40	16
Japan	6.02	17	Iceland	5.38	17
Korea	6.02	18	Belgium	5.38	18
New Zealand	5.92	19	Japan	5.37	19
Australia	5.90	20	Austria	5.31	20
Italy	5.82	21	Lithuania	4.97	21
Spain	5.77	22	Hong Kong SAR	4.91	22
Israel	5.70	23	Spain	4.81	23
Taiwan	5.68	24	Italy	4.80	24
Portugal	5.57	25	Estonia	4.77	25
Ireland	5.48	26	Czech Republic	4.76	26
Chile	5.46	27	Taiwan	4.66	27
Argentina	5.38	28	South Africa	4.58	28
Hungary	5.37	29	Hungary	4.55	29
Greece	5.33	30	Portugal	4.54	30
Czech Republic	5.29	31	Dominican Republic	4.52	31
Estonia	5.28	32	Slovak Republic	4.50	32
Turkey	5.26	33	Korea	4.48	33
Slovak Republic	5.23	34	India	4.41	34
Malaysia	5.14	35	Chile	4.40	35
Slovenia	5.13	36	Brazil	4.35	36
Thailand	5.13	37	Uruguay	4.25	37
Uruguay	5.08	38	Slovenia	4.25	38
Mexico	5.06	39	Poland	4.21	39
Venezuela	5.03	40	Costa Rica	4.14	40
Brazil	5.00	41	Argentina	4.12	41
Indonesia	4.99	42	Latvia	4.09	42
Latvia	4.96	43	Colombia	3.95	43
South Africa	4.92	44	Mexico	3.94	44
Dominican Republic	4.92	45	Panama	3.91	45
Jordan	4.91	46	Philippines	3.89	46
Peru	4.88	47	Greece	3.85	47
Egypt	4.87	48	Peru	3.76	48
Lithuania	4.82	49	Malaysia	3.76	49
Panama	4.72	50	Mauritius	3.76	50
El Salvador	4.68	51	Venezuela	3.75	51
Philippines	4.64	52	Egypt	3.74	52
Guatemala	4.62	53	Sri Lanka	3.66	53
Sri Lanka	4.59	54	Trinidad and Tobago	3.64	54
China	4.58	55	Jamaica	3.63	55
Poland	4.56	56	Jordan	3.61	56
Trinidad and Tobago	4.55	57	Turkey	3.58	57
Mauritius	4.53	58	Zimbabwe	3.55	58
Colombia	4.49	59	Nigeria	3.48	59
Romania	4.39	60	Bulgaria	3.47	60
Bulgaria	4.37	61	Ecuador	3.46	61
Ecuador	4.31	62	Russian Federation	3.43	62
Bolivia	4.30	63	Guatemala	3.37	63
Costa Rica	4.26	64	Honduras	3.31	64
India	4.06	65	El Salvador	3.27	65
Russian Federation	4.04	66	Ukraine	3.26	66
Jamaica	4.03	67	Thailand	3.22	67
Ukraine	4.00	68	Indonesia	3.21	68
Nicaragua	3.88	69	Nicaragua	3.19	69
Paraguay	3.67	70	Romania	3.14	70
Honduras	3.66	71	China	3.10	71
Bangladesh	3.59	72	Bolivia	3.05	72
Vietnam	3.23	73	Paraguay	3.05	73
Zimbabwe	3.21	74	Bangladesh	2.93	74
Nigeria	2.96	75	Vietnam	2.52	75

Table 5: **Network Policy Micro-indexes**

Network Policy Subindex = 1/2 ICT Policy + 1/2 Business and Economic Environment

Country	ICT Policy	Rank	Country	Business and Economic Environment	Rank
Finland	6.64	1	Singapore	6.22	1
Sweden	6.34	2	Finland	6.16	2
United States	6.29	3	United Kingdom	6.08	3
Singapore	6.29	4	Iceland	6.05	4
Hong Kong SAR	6.15	5	Switzerland	6.01	5
Iceland	6.10	6	United States	6.01	6
Canada	6.07	7	Hong Kong SAR	5.97	7
Austria	6.03	8	Netherlands	5.96	8
United Kingdom	6.03	9	Canada	5.90	9
Netherlands	5.99	10	Denmark	5.83	10
Germany	5.92	11	Norway	5.80	11
France	5.89	12	Sweden	5.74	12
Australia	5.84	13	Australia	5.71	13
Norway	5.82	14	New Zealand	5.67	14
Denmark	5.81	15	Germany	5.64	15
Estonia	5.79	16	Ireland	5.62	16
Switzerland	5.77	17	Austria	5.58	17
Korea	5.76	18	France	5.42	18
New Zealand	5.71	19	Israel	5.31	19
Spain	5.66	20	Japan	5.24	20
Chile	5.65	21	Taiwan	5.09	21
Belgium	5.64	22	Belgium	4.93	22
Taiwan	5.63	23	Portugal	4.78	23
Israel	5.56	24	Spain	4.72	24
Portugal	5.56	25	Estonia	4.63	25
Italy	5.55	26	Slovenia	4.59	26
Ireland	5.51	27	Poland	4.56	27
Brazil	5.48	28	Hungary	4.54	28
Japan	5.35	29	Trinidad and Tobago	4.49	29
Jordan	5.31	30	Jordan	4.46	30
Malaysia	5.29	31	Chile	4.45	31
Slovak Republic	5.28	32	Slovak Republic	4.41	32
Argentina	5.23	33	Czech Republic	4.40	33
Czech Republic	5.17	34	Uruguay	4.34	34
Hungary	5.17	35	Korea	4.32	35
India	5.13	36	Malaysia	4.24	36
El Salvador	5.13	37	Italy	4.23	37
Dominican Republic	5.13	38	Latvia	4.22	38
Egypt	5.10	39	Thailand	4.21	39
Venezuela	5.09	40	Costa Rica	4.14	40
Colombia	4.98	41	Turkey	4.10	41
Uruguay	4.96	42	Greece	4.06	42
Greece	4.90	43	Mauritius	4.05	43
Jamaica	4.86	44	China	4.05	44
Thailand	4.84	45	Argentina	4.04	45
South Africa	4.82	46	Jamaica	3.95	46
Philippines	4.79	47	Philippines	3.86	47
Turkey	4.74	48	South Africa	3.83	48
Panama	4.70	49	Lithuania	3.83	49
Latvia	4.63	50	Panama	3.76	50
Slovenia	4.61	51	El Salvador	3.71	51
Mexico	4.61	52	Sri Lanka	3.71	52
Sri Lanka	4.56	53	Romania	3.70	53
China	4.52	54	Egypt	3.69	54
Indonesia	4.46	55	Brazil	3.61	55
Poland	4.33	56	Bulgaria	3.53	56
Costa Rica	4.26	57	India	3.47	57
Trinidad and Tobago	4.23	58	Dominican Republic	3.45	58
Russian Federation	4.22	59	Mexico	3.38	59
Guatemala	4.15	60	Peru	3.36	60
Bulgaria	4.12	61	Russian Federation	3.35	61
Peru	4.10	62	Indonesia	3.33	62
Mauritius	3.99	63	Colombia	3.27	63
Bolivia	3.98	64	Vietnam	3.26	64
Ukraine	3.86	65	Venezuela	3.19	65
Ecuador	3.69	66	Ukraine	3.05	66
Lithuania	3.68	67	Bolivia	3.00	67
Paraguay	3.64	68	Guatemala	2.95	68
Romania	3.63	69	Zimbabwe	2.85	69
Vietnam	3.49	70	Paraguay	2.85	70
Honduras	3.47	71	Nicaragua	2.83	71
Zimbabwe	3.38	72	Ecuador	2.72	72
Nicaragua	3.35	73	Nigeria	2.69	73
Nigeria	3.28	74	Honduras	2.60	74
Bangladesh	2.98	75	Bangladesh	2.50	75

Table 6: **Networked Society Micro-indexes**

Networked Society Subindex = 1/3 Networked Learning + 1/3 ICT Opportunities + 1/3 Social Capital

Country	Networked Learning	Rank	Country	ICT Opportunities	Rank	Country	Social Capital	Rank
Finland	6.23	1	United States	6.65	1	Finland	6.66	1
Sweden	5.97	2	Finland	6.35	2	Norway	6.59	2
United States	5.97	2	Netherlands	6.10	3	Switzerland	6.55	3
Iceland	5.90	4	Germany	5.95	4	Slovak Republic	6.47	4
Singapore	5.90	4	Norway	5.95	4	Denmark	6.45	5
Canada	5.70	6	Belgium	5.75	6	Austria	6.44	6
Netherlands	5.70	6	Japan	5.75	6	Netherlands	6.41	7
Denmark	5.60	8	Austria	5.70	8	Iceland	6.38	8
United Kingdom	5.60	8	Singapore	5.70	8	Canada	6.38	9
Taiwan	5.43	10	Denmark	5.60	10	Germany	6.37	10
Australia	5.33	11	Iceland	5.60	10	Sweden	6.31	11
Austria	5.27	12	Switzerland	5.55	12	New Zealand	6.28	12
Norway	5.27	12	Taiwan	5.55	12	Japan	6.27	13
Switzerland	5.23	14	United Kingdom	5.55	12	Belgium	6.27	14
Germany	5.20	15	France	5.50	15	France	6.23	15
Hong Kong SAR	5.20	15	Ireland	5.50	15	Czech Republic	6.21	16
Ireland	5.20	15	Israel	5.45	17	Ireland	6.10	17
Belgium	5.17	18	Sweden	5.45	17	Australia	6.08	18
Israel	5.13	19	Spain	5.40	19	Slovenia	6.05	19
New Zealand	5.07	20	Chile	5.25	20	United States	6.04	20
Hungary	5.07	21	Hong Kong SAR	5.20	21	Taiwan	6.01	21
Estonia	5.00	22	Czech Republic	5.15	22	Hungary	5.99	22
Czech Republic	4.97	23	Canada	5.10	23	Estonia	5.98	23
Spain	4.90	24	Costa Rica	5.05	24	Poland	5.92	24
Korea	4.87	25	Brazil	5.00	25	Israel	5.89	25
France	4.83	26	Italy	5.00	25	Latvia	5.77	26
Slovenia	4.70	27	Thailand	4.95	27	Lithuania	5.73	27
Chile	4.57	28	Portugal	4.90	28	United Kingdom	5.69	28
Portugal	4.53	29	Greece	4.85	29	Korea	5.60	29
Slovak Republic	4.53	29	Indonesia	4.85	29	Spain	5.59	30
India	4.43	31	Estonia	4.80	31	Romania	5.54	31
Japan	4.40	32	Australia	4.75	32	Bulgaria	5.53	32
Costa Rica	4.33	33	Poland	4.60	33	Italy	5.48	33
Latvia	4.23	34	Slovenia	4.55	34	Trinidad and Tobago	5.34	34
Thailand	4.23	34	Turkey	4.55	34	Greece	5.29	35
Brazil	4.10	36	Korea	4.45	36	Uruguay	5.25	36
Philippines	4.10	36	Egypt	4.40	37	Singapore	5.12	37
Argentina	4.00	38	Hungary	4.40	37	Russian Federation	5.06	38
Poland	4.00	38	Malaysia	4.35	39	Argentina	5.06	39
Turkey	4.00	38	China	4.15	40	Hong Kong SAR	5.03	40
Italy	3.97	41	Panama	4.15	40	Portugal	4.95	41
Greece	3.93	42	Slovak Republic	4.10	42	Costa Rica	4.95	42
South Africa	3.93	42	Mexico	4.05	43	Jamaica	4.78	43
Malaysia	3.90	44	Mauritius	4.00	44	Panama	4.69	44
Uruguay	3.87	45	Dominican Republic	3.95	45	Mauritius	4.67	45
Jordan	3.80	46	Trinidad and Tobago	3.95	45	Thailand	4.61	46
Mexico	3.80	46	New Zealand	3.90	47	Chile	4.59	47
Trinidad and Tobago	3.67	48	Honduras	3.80	48	Philippines	4.57	48
Indonesia	3.63	49	Russia	3.80	48	Sri Lanka	4.38	49
Jamaica	3.60	50	South Africa	3.75	50	South Africa	4.34	50
Mauritius	3.57	51	Argentina	3.70	51	Ukraine	4.32	51
El Salvador	3.50	52	Latvia	3.70	51	Malaysia	4.31	52
Venezuela	3.50	52	India	3.65	53	Mexico	4.31	53
China	3.47	54	Venezuela	3.65	53	Jordan	4.08	54
Colombia	3.43	55	Vietnam	3.65	53	Peru	4.05	55
Dominican Republic	3.43	55	El Salvador	3.60	56	Paraguay	4.01	56
Peru	3.43	55	Guatemala	3.60	56	Ecuador	3.95	57
Zimbabwe	3.43	58	Jamaica	3.60	56	Venezuela	3.92	58
Sri Lanka	3.40	59	Lithuania	3.45	59	Bolivia	3.77	59
Panama	3.37	60	Uruguay	3.40	60	Brazil	3.73	60
Egypt	3.33	61	Jordan	3.30	61	Colombia	3.68	61
Lithuania	3.27	62	Colombia	3.20	62	Turkey	3.57	62
Nigeria	3.17	63	Paraguay	3.20	62	Dominican Republic	3.54	63
Bulgaria	3.13	64	Peru	3.15	64	Indonesia	3.49	64
Ecuador	3.07	65	Nigeria	3.10	65	El Salvador	3.47	65
Paraguay	3.03	66	Nicaragua	3.00	66	Vietnam	3.46	66
Nicaragua	2.97	67	Ecuador	2.95	67	Zimbabwe	3.44	67
Ukraine	2.97	67	Sri Lanka	2.95	67	China	3.43	68
Vietnam	2.93	69	Bolivia	2.90	69	Honduras	3.36	69
Guatemala	2.83	70	Ukraine	2.90	69	Nicaragua	2.97	70
Bolivia	2.73	71	Philippines	2.85	71	India	2.83	71
Russia	2.73	71	Zimbabwe	2.85	71	Nigeria	2.70	72
Bangladesh	2.53	73	Romania	2.75	73	Guatemala	2.66	73
Honduras	2.50	74	Bulgaria	2.50	74	Egypt	2.50	74
Romania	2.23	75	Bangladesh	2.35	75	Bangladesh	1.88	75

Table 7: **Networked Economy Micro-indexes**

Networked Economy Subindex = 1/3 e-Commerce + 1/3 e-Government + 1/3 General Infrastructure

Country	e-Commerce	Rank
United States	4.91	1
Finland	4.88	2
Germany	4.86	3
Sweden	4.74	4
United Kingdom	4.56	5
Canada	4.53	6
Netherlands	4.52	7
France	4.47	8
Iceland	4.42	9
Switzerland	4.41	10
Hong Kong SAR	4.36	11
Denmark	4.33	12
Singapore	4.27	13
Norway	4.26	14
Korea	4.21	15
Israel	4.20	16
Taiwan	4.18	17
Australia	4.17	18
Brazil	4.17	18
Austria	4.13	20
Italy	4.12	21
Japan	4.10	22
Ireland	4.02	23
Belgium	4.01	24
Estonia	3.99	25
Spain	3.96	26
New Zealand	3.93	27
South Africa	3.91	28
India	3.82	29
Poland	3.81	30
Argentina	3.76	31
Czech Republic	3.66	32
Turkey	3.64	33
Portugal	3.60	34
Chile	3.49	35
Hungary	3.46	36
Philippines	3.39	37
Slovenia	3.39	38
Indonesia	3.38	39
Thailand	3.38	40
Mexico	3.37	41
Malaysia	3.37	42
Latvia	3.34	43
Slovak Republic	3.33	44
Egypt	3.26	45
China	3.18	46
Greece	3.18	47
Panama	3.16	48
Uruguay	3.16	48
Venezuela	3.14	50
Jordan	3.13	51
Sri Lanka	3.04	52
Trinidad and Tobago	3.00	53
Ukraine	2.92	54
Costa Rica	2.90	55
Dominican Republic	2.90	55
Russian Federation	2.84	57
Lithuania	2.83	58
Nigeria	2.82	59
Colombia	2.82	60
Jamaica	2.78	61
Peru	2.77	62
Paraguay	2.74	63
El Salvador	2.68	64
Guatemala	2.66	65
Bulgaria	2.66	66
Zimbabwe	2.63	67
Nicaragua	2.60	68
Bangladesh	2.57	69
Honduras	2.54	70
Mauritius	2.53	71
Ecuador	2.48	72
Vietnam	2.31	73
Bolivia	2.29	74
Romania	2.06	75

Country	e-Government	Rank
Singapore	5.43	1
Finland	5.40	2
Iceland	5.35	3
Sweden	5.10	4
Estonia	4.95	5
Canada	4.93	6
Hong Kong SAR	4.90	7
Taiwan	4.90	7
Denmark	4.88	9
United States	4.88	9
United Kingdom	4.83	11
Norway	4.70	12
Netherlands	4.65	13
Austria	4.63	14
Australia	4.58	15
Brazil	4.58	15
Ireland	4.58	15
Korea	4.38	18
France	4.35	19
New Zealand	4.33	20
Spain	4.30	21
Germany	4.28	22
Switzerland	4.28	22
Chile	4.18	24
Hungary	4.13	25
Israel	4.08	26
Italy	4.08	26
Portugal	4.08	26
Belgium	3.98	29
Czech Republic	3.93	30
Japan	3.85	31
Mexico	3.85	31
India	3.80	33
Argentina	3.75	34
Poland	3.75	34
Slovak Republic	3.75	34
Latvia	3.73	37
Slovenia	3.73	37
South Africa	3.73	37
Lithuania	3.65	40
Thailand	3.58	41
Uruguay	3.50	42
Jordan	3.48	43
China	3.43	44
Malaysia	3.40	45
Jamaica	3.35	46
Turkey	3.35	46
Costa Rica	3.28	48
Colombia	3.25	49
Peru	3.23	50
Egypt	3.18	51
El Salvador	3.18	51
Panama	3.15	53
Greece	3.10	54
Bulgaria	3.05	55
Dominican Republic	3.03	56
Philippines	3.00	57
Ukraine	2.93	58
Venezuela	2.93	58
Russian Federation	2.78	60
Mauritius	2.75	61
Indonesia	2.70	62
Nigeria	2.68	63
Nicaragua	2.63	64
Ecuador	2.60	65
Guatemala	2.60	65
Sri Lanka	2.60	65
Vietnam	2.60	65
Trinidad and Tobago	2.48	69
Paraguay	2.38	70
Bolivia	2.33	71
Honduras	2.20	72
Bangladesh	2.10	73
Zimbabwe	1.75	74
Romania	1.35	75

Country	General Infrastructure	Rank
Germany	5.76	1
Norway	5.74	2
France	5.69	3
United States	5.68	4
Netherlands	5.66	5
Finland	5.59	6
Denmark	5.58	7
Sweden	5.49	8
Singapore	5.42	9
Canada	5.39	10
Switzerland	5.39	11
United Kingdom	5.39	12
Belgium	5.32	13
Japan	5.31	14
Austria	5.28	15
Hong Kong SAR	5.18	16
Iceland	5.15	17
Spain	5.10	18
Australia	5.07	19
Israel	4.96	20
Italy	4.91	21
New Zealand	4.80	22
Greece	4.72	23
Portugal	4.70	24
Czech Republic	4.68	25
Slovenia	4.62	26
Thailand	4.59	27
Malaysia	4.56	28
Taiwan	4.56	29
Ireland	4.51	30
Korea	4.46	31
Lithuania	4.40	32
Uruguay	4.36	33
Mauritius	4.35	34
Trinidad and Tobago	4.31	35
Ukraine	4.22	36
Jamaica	4.21	37
Slovak Republic	4.19	38
Jordan	4.18	39
Latvia	4.04	40
Poland	4.01	41
Egypt	4.00	42
South Africa	4.00	43
Estonia	3.98	44
Romania	3.94	45
Bulgaria	3.91	46
Russian Federation	3.75	47
Hungary	3.73	48
Chile	3.72	49
Argentina	3.62	50
Sri Lanka	3.50	51
Turkey	3.50	52
Mexico	3.49	53
Panama	3.48	54
China	3.45	55
Paraguay	3.45	56
Costa Rica	3.34	57
Brazil	3.30	58
Indonesia	3.25	59
Zimbabwe	3.19	60
El Salvador	3.18	61
Venezuela	3.12	62
India	3.08	63
Dominican Republic	3.03	64
Peru	2.88	65
Ecuador	2.86	66
Honduras	2.78	67
Vietnam	2.74	68
Colombia	2.70	69
Guatemala	2.68	70
Philippines	2.68	71
Bolivia	2.53	72
Bangladesh	2.40	73
Nigeria	2.39	74
Nicaragua	2.20	75

Some countries show strong performance in Networked Society relative to the other three Enabling Factor subindexes. For example:

- Trinidad and Tobago scores very well in the Networked Society subindex (38th), thanks to a strong result in our micro-index of Social Capital (34th). This is significantly higher than the country's scores on the Network Access (58th), Network Policy (46th) and Networked Economy (51st) sub-indexes.
- The Czech Republic also ranks well in Networked Society (20th) relative to its performance in Network Access (27th), Network Policy (32nd), and Networked Economy (28th). This result is driven by high placements on the Social Capital (16th), ICT opportunities (22nd), and Networked Learning (23rd) micro-indexes.

There are also countries that have performed much worse in the area of Networked Society relative to other Enabling Factors. For example:

- Egypt scores much lower (65th) in Networked Society than in Network Access (48th), Network Policy (45th), and Networked Economy (47th) because of its low performance in the Social Capital micro-index (74th), despite the country's relative strength in the ICT Opportunities micro-index (37th).
- Guatemala ranks low (72nd) in Networked Society compared with its rank in Network Access (59th), Network Policy (65th), and Networked Economy (67th). This Networked Society result is due to low scores on the Networked Learning micro-index (70th) and the Social Capital micro-index (73rd).

Measuring Networked Economy

The Networked Economy subindex measures the extent to which ICTs have been incorporated into economic activity within a country, such as the use by businesses and government of the World Wide Web and the Internet in their transactions, and includes variables relating to electronic commerce, electronic government, and complementary non-ICT infrastructure. Here, the top five performers are Finland, the U.S., Sweden, Singapore, and Iceland, while Honduras, Nicaragua, Romania, Bolivia, and Bangladesh rank as the five lowest. Perhaps most notably, there are also countries in which Networked Economy is one of the primary positive drivers of their Networked Readiness, relative to their other Enabling Factors.

For example:

- Brazil has its highest subindex ranking (29th) in Networked Economy, compared with 37th on Network Access, 37th on Network Policy, and 39th on Networked Society. This strong result is caused by Brazil's global leadership in the e-Commerce micro-index, where it ranks 18th, and the e-Government micro-index, in which it ranks 15th. These high micro-index rankings contrast greatly with Brazil's poor showing (58th) in General Infrastructure.
- South Africa's strong showing (31st) in Networked Economy is comparable to its score in Network Access (34th), yet significantly higher than its performance in other Enabling Factors (47th in Network Policy and 48th in Networked Society). The nation's best result within the Networked Economy subindex is in the e-Commerce micro-index, where it ranks 28th.
- India's 44th place in Networked Economy contrasts with its 58th position in Networked Society, and is somewhat higher than its rankings in Network Policy (49th) and Network Access (51st). The country's ranking in Networked Economy is raised by its 29th place in e-Commerce and 33rd rank in e-Government, although these strong results are tempered by the country's showing of 63rd in the General Infrastructure micro-index.
- China ranks comparably in both Networked Economy (50th) and Network Policy (51st); this is better than its results in Network Access (63rd) and Networked Society (56th). One major reason for this appears to be its relatively high ranking in e-Government (44th) and e-Commerce (46th), relative to General Infrastructure (55th) and the other relevant micro-indexes.
- Although Nigeria fares rather poorly with a 74th ranking in the General Infrastructure micro-index, its relatively high ranking in the e-Commerce micro-index (59th) and e-Government micro-index (63rd) give the nation a slightly better Networked Economy rank (68th) than its 74th, 74th, and 73rd place rankings in Network Access, Network Policy, and Networked Society, respectively.

Other notable over- and under-performers

Looking at countries' relative places across subindexes helps highlight specific national strengths and weaknesses. Just as countries show varying degrees of success at leveraging the Enabling Factors at an aggregate level, a comparison of each nation's relative performance in the subindexes gives a good sense of whether it is under- or over-performing vis-à-vis the factors in question, and whether nations are leveraging specific Enabling Factors. For instance:

- Germany, which ranks between 6th and 8th places in most factors, ranks 14th in Network Policy, a phenomenon which can be explained by the country's 15th ranking in the Business and Economic Environment micro-index of the Network Policy subindex.
- While Costa Rica ranks consistently in the 50s in Network Access, Network Policy, and Networked Economy, it ranks 34th in Networked Society, driven by its respective 33rd and 24th rankings in the Networked Learning and ICT Opportunities micro-indexes of the Networked Society subindex.
- Colombia, despite its respective 52nd and 56th place rankings in the Network Access and Network Policy subindexes, suffers overall from its poor performance in Networked Economy (64th) and Networked Society (63rd). This is caused by the nation's low ranking in the General Infrastructure (69th), e-Commerce (60th), ICT Opportunities (62nd), and Social Capital (61st) micro-indexes.

Untangling Networked Readiness

Readiness is a constantly shifting phenomenon determined by a complex interaction of factors. One of the biggest challenges of constructing the NRI was to strike a balance between over-simplifying a very dynamic concept and successfully untangling the factors that lead to Networked Readiness.

Getting beyond the income effect

Looking down Table 2 might suggest something obvious to many readers–that Network Use is linked to income, and that richer countries are the greatest users of ICTs. However, our findings indicate that the Enabling Factors are very important as well. For example, when comparing Finland and France, which have roughly the same income levels, one sees two countries with radically different levels of Network Use: Finland ranks 3rd while France rates 27th in Network Use. Our analysis indicates that this difference is clearly linked to the two countries' scores on Enabling Factors, where Finland ranks 1st and France 14th.

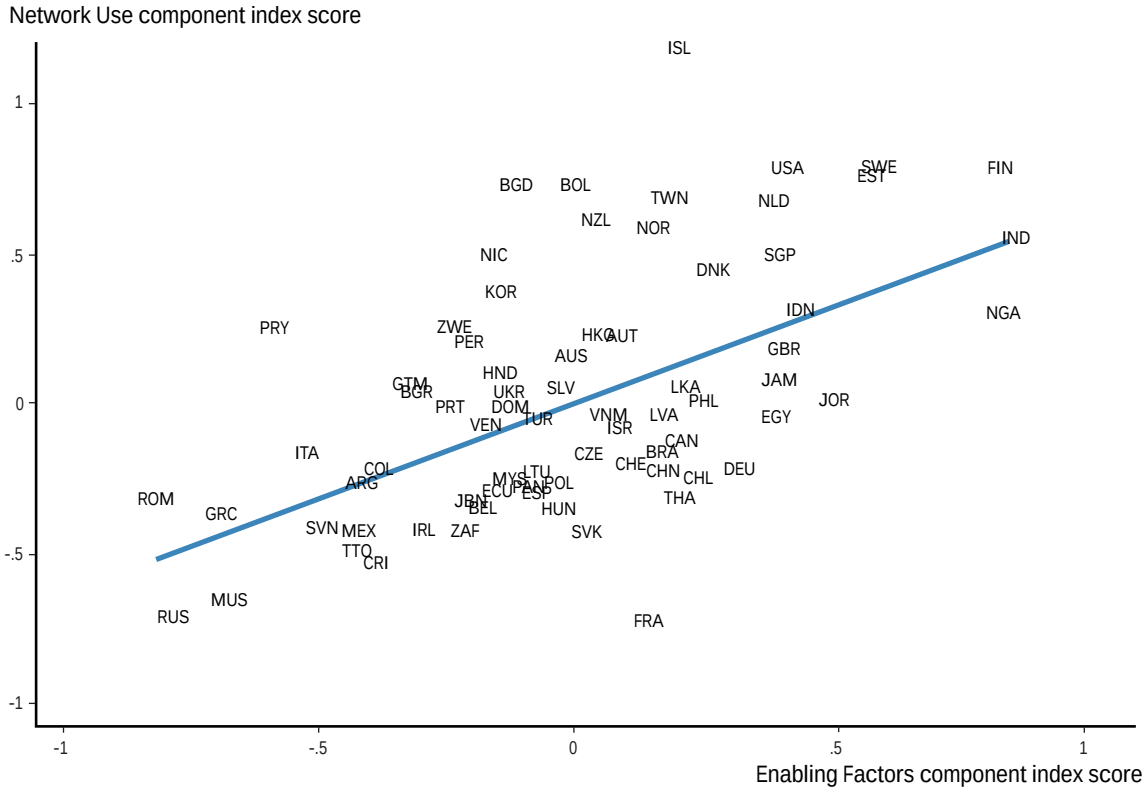
The major discrepancies in ICT use between Finland and France underscore another key finding. While income appears to be important in getting a nation to a certain level of Network Use, after reaching that point, further increases in income are less relevant and Enabling Factors play the dominant role. For example, if we look at only the 28 countries with average annual GDP per person of more than US$15,000 (measured at purchasing power parity), we find that income is statistically unrelated to Network Use but that Enabling Factors and Network Use are linked very closely.[7] Meanwhile, for the 47 countries in our sample with average GDP per person of less than US$15,000 per year, statistical tests indicate that *both* income and Enabling Factors are crucial in determining Use.

The role of Enabling Factors can be most clearly seen among countries that have Network Use levels atypical to their income level, many of which were discussed in the previous section. For example, Taiwan, Estonia, and India all score higher than expected given their income per capita. At the same time, Japan, Ireland, Mauritius, France, Greece, Russia, and Romania fare poorly on the Networked Readiness Index relative to their income level.

Leveraging Enabling Factors to generate Network Use

The relative position of nations in the Enabling Factors and Network Use component indexes forms one of the most revealing and interesting elements of the Networked Readiness Index. A high score in Enabling Factors is very important, but does not necessarily ensure good performance in Network Use, or vice versa. It seems that each country takes advantage of its Enabling Factors to a different extent in the generation of Network Use, resulting in major discrepancies between Enabling Factors and Network Use scores for a number of nations. Figure 2 illustrates the relationship between the two component indexes when controlling for the effect of income per capita. By isolating the

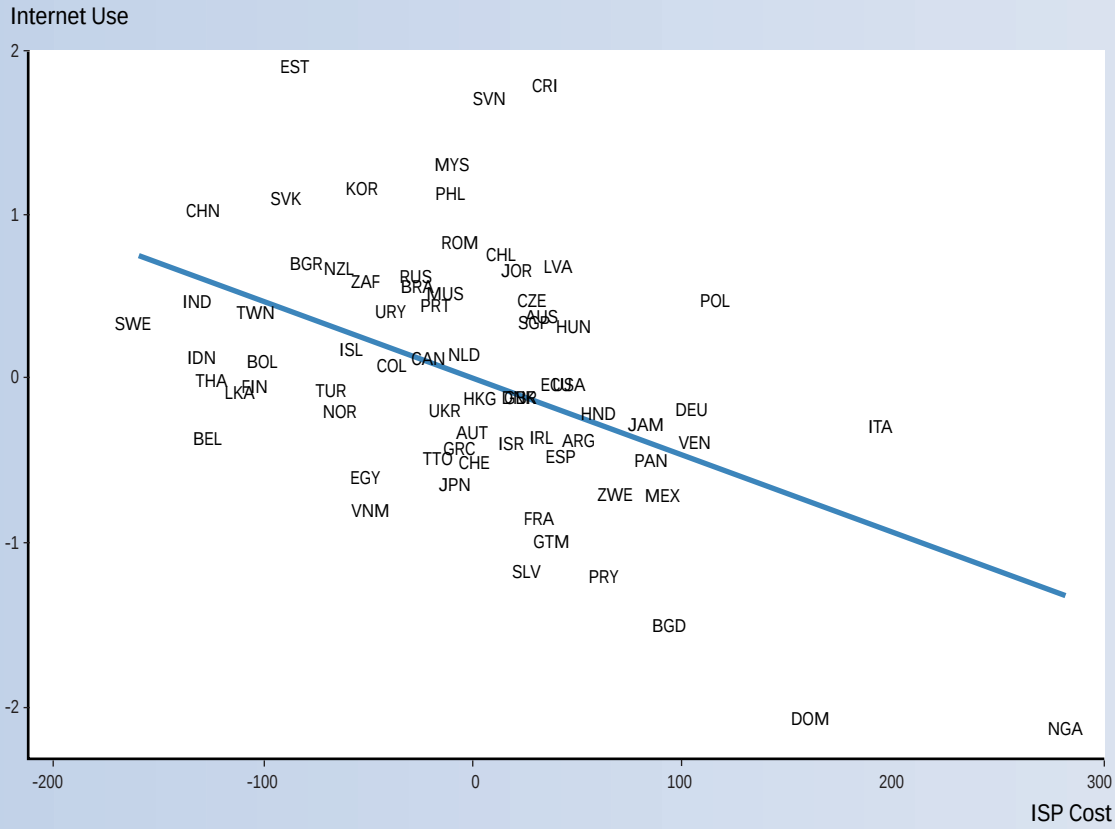
Figure 2: **Enabling Factors versus Network Use, Controlling by 2000 GDP per Capita PPP (log), Partial Regression**



Source: Information Technologies Group, Center for International Development at Harvard University.

Box 1: The Exorbitant Cost of Internet Access as a Widespread Obstacle to Network Use

Figure 3: **Annual ISP Cost for 20 Hours of Monthly Use Versus Internet Users per 100 Inhabitants (log), Controlling for 2000 GDP (log), Partial Regression**



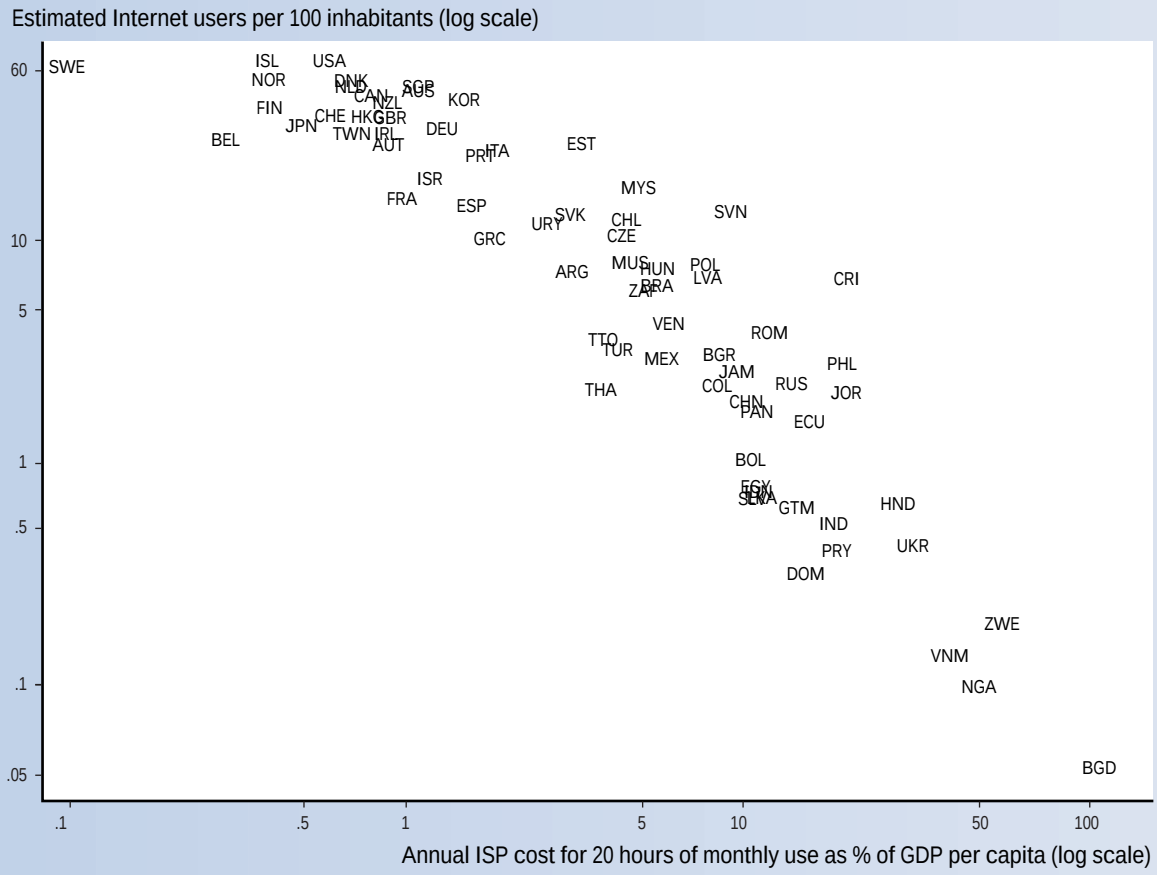
Source: Information Technologies Group, Center for International Development at Harvard University

Affordability is a clear determinant of Internet use. But affordability is a product of two things: cost of access and users' income. Our analysis has shown that both of these factors are statistically significant in explaining Internet use across countries. While it may not be surprising that Internet use is closely linked to levels of per capita income, it may be surprising to note the high variance of ISP access cost around the world. In Sweden, for example, GDP per capita is nearly US$24,000 per year, the typical ISP cost for 20 hours of monthly dial-up Internet access is roughly US$31 annually and there are 56 Internet users per 100 population. In France, GDP per capita is roughly the same, but ISP access costs more than US$250 per year and there are only 14 users per 100 population. Figure 3 shows the relationship between Internet users and ISP cost when holding income per capita constant, highlighting the negative relationship between price and use.

Regardless of the price effect, it is important to remember that the absolute cost of Internet access remains a serious stumbling block to extending connectivity in the developing world. In only 37 of the countries in our Networked Readiness sample does the average annual ISP cost for twenty hours of monthly dial-up access represent 5 percent of GDP per capita, or less, as can be seen in Figure 4. In 12 of the remaining nations, however, the cost of Internet access amounts to between 5 and 10 percent of income per capita; in 14 countries, it is between 10 percent and 20 percent of per capita GDP; and for nine countries, 20 hours of Internet use per month astonishingly represents more than 20 percent of GDP per capita. In Ukraine, Vietnam, Nigeria, Zimbabwe, Nigeria and Bangladesh, the average cost of 20 hours of monthly access represents 32 percent, 41 percent, 51 percent, 59 percent and a whopping 115 percent, respectively, of average per capita income! Considering the poor service and limited bandwidth in these countries, it would take either an extremely devoted web-surfer or a very wealthy subscriber to spend much time online.

Box 1 (continued)

Figure 4: **Internet Penetration and ISP Access Cost as Percentage of GDP per Capita**[1]



Source: Information Technologies Group, Center for International Development at Harvard University
[1]Global ISP Price Database Project, Information Technologies Group, Center for International Development at Harvard University, 2001

relationship between Enabling Factors and Network Use, numerous interesting relationships stand out. For example:

- Iceland, Finland, the U.S., Sweden, Estonia, Bolivia, Bangladesh, and Paraguay all leverage their Enabling Factors to create Network Use to a greater degree than the other nations in the Index.
- In contrast, France, Russia, Germany, Jordan, South Africa, Nigeria, and Costa Rica are among the countries with lower-than-expected Network Use given their levels of Enabling Factors and income per capita.

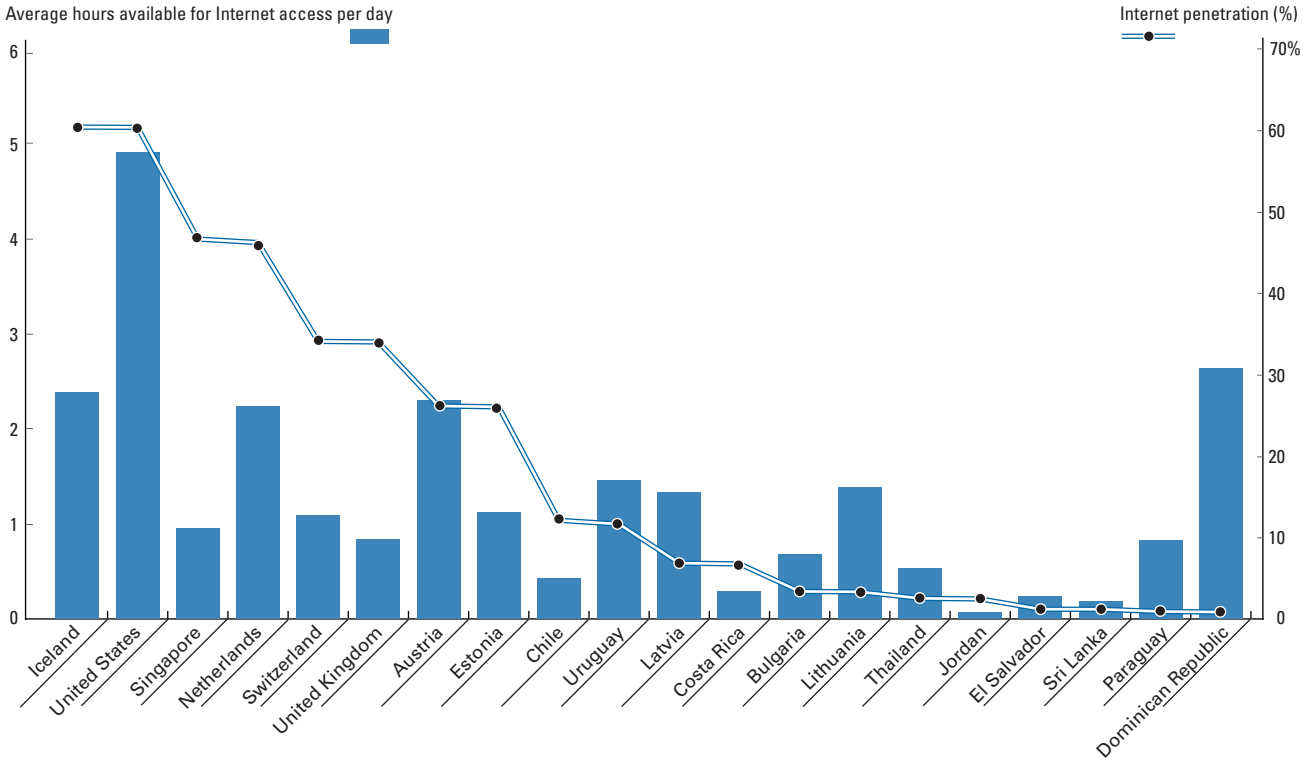
How do the Enabling Factors affect each other and overall Network Use?

It would be a mistake to think that physical infrastructure, ICT policy or any of the other individual elements within the Enabling Factors can solely determine a country's overall level of Network Use. Our research to date indicates that these are all important. However, it is difficult to disentangle the individual contributions made by each Enabling Factor since they are all highly correlated with one another. We hope that further evidence, experience and analysis will allow us in the future to delineate the specific roles of the Enabling Factors in promoting Network Use.

Open questions in measuring Network Use

Most standard, cross-country indicators of network use strictly measure the quantity of use, and focus on rates of ICT diffusion or numbers of users as the most important elements of the Networked World. Unfortunately, the latter tell us little, or nothing, about how people are using ICTs. Decision making on policies and programs to promote ICT-use often relies too much on absolute numbers rather than qualitative aspects of connectivity. There is a tendency to believe that more is better—more Internet users, more computers, more computer labs. However, a focus on extending ICT coverage without complementary

Figure 5: **Per Capita Internet Users and Available Online Hours in Selected Countries**[8]



Source: Information Technologies Group, Center for International Development at Harvard University

training or content can dilute users' experience with ICTs, leaving users with poor quality access or turning them off from the technology completely.

Likewise, Internet host density can be a poor indicator if it is not considered with respect to the numbers of personal computers, in the same way that the numbers of Internet users can be misleading if they are not considered in the context of how many computers have an Internet connection. Likewise, the number of Internet users per 100 inhabitants is considered by many to be the best indicator of Networked Readiness. This statistic only shows the number of people online, but not how many hours a day a single user could actually physically be online or use a computer. As can be seen in Figure 5, countries that have similar levels of per capita Internet users can have widely disparate numbers of available hours online. While Singapore and Netherlands have similar levels of overall Internet penetration, Netherlands comes out significantly ahead when the

Box 2: Some Preliminary Evidence about Software Piracy

We have used piracy as one of our indicators within the Hardware, Software, and Support micro-index of the NRI. Analysis around the piracy variable vis-à-vis other factors has given us preliminary indications that the causes of illegal copying of software may be linked to factors other than the oft-cited effects of income and cost. We have examined the effect of a nation's legal framework, the extent to which software products fit local needs, and competition in the domestic software market upon software piracy, controlling for the effect of income. We have found that low income is closely tied to software piracy. More specifically, software piracy appears to be closely related to the relative cost of copying versus buying software in an environment of limited financial resources. The legal framework also plays a major role in enabling piracy, relating to questions of attitude towards copyright enforcement, as do low levels of competition in the software market, and limited availability of software products that meet local needs. Software piracy likely has a negative effect on Networked Readiness by presenting disincentives for software companies to invent new products and serve new markets. But if the lack of domestic competition in local software markets and limited supply of locally relevant software are major drivers of piracy, then an additional, appropriate response from multinational software vendors to piracy in relatively untapped markets would be to enter those markets, not to shun them because of the threat of piracy or simply to focus on copyright enforcement. The best antidote to software piracy may well turn out be increased private sector activity in underserved markets, and a renewed focus on software localization.

average daily available Internet time is considered. Similarly, the Dominican Republic and Sri Lanka, which have similarly low Internet penetration rates, have marked differences in average available Internet time. When the two overall Networked Readiness leaders, the U.S. and Iceland, are compared, we find a similar pattern, with the U.S. having over twice the number of hours of available Internet time per day, despite similar penetration rates.

We introduce this concept of daily available hours of Internet access in order to stress that many of the indicators that are most commonly used to measure Network Use do not adequately capture the quality of that use. We do not mean to suggest that the situation in the Dominican Republic, in which there are low numbers of per capita Internet users who have more hours of Internet access, is the ideal. We do not even know whether or not greater number of hours translates into higher quality use. Greater possible hourly use by a small elite likely does not extend the benefits of the Networked World to an entire community. But neither is the Sri Lankan situation desirable, in which there is low Internet penetration and low average daily hours of available Internet (likely with little locally relevant content over a slow dial-up Internet connection). Decision makers should keep in mind that in most cases, there is a balance to be struck between getting people online and enhancing their experience with ICTs, and that quantitative statistics can be misleading. Given the importance of quality network use, now is the time for creative solutions to the dearth of qualitative data. More statistical agencies need to focus on the qualitative aspects of the Networked World and consider the demand side of Networked Readiness.

In Sum

A full understanding of the Networked World and its benefits is far from complete. With such a multitude of variables, aggregated effects, and systems resulting from ICTs, mapping the ways in which the adoption and use of new technologies occur remains a research challenge. If global leaders are to make responsible decisions for their governments, people, businesses, and future, better analysis is needed to understand exactly how policy and business decisions translate into greater (or less), or better (or worse), participation in the Networked World. The Networked Readiness Index embodies the first attempt to capture the complexities and nuances of Networked Readiness at the national level. The Index makes clear that Networked Readiness is about much more than technology.

Big questions remain. How can the prices of Internet access be reduced so that ICTs do not remain solely within the purview of the wealthiest in the world? How can we remove obstacles to e-commerce, given its tremendous promise, to further extend the benefits of the Network? How can we improve education and learning systems to more effectively incorporate ICTs? And how can we better understand the ways in which people are using the Internet and the new technologies, and what value these technologies are adding to their lives? Answering these and other ICT-related questions, through rigorous analysis, in order to contribute to helping the world tap into the power and promise of ICTs, is the research goal of the Information Technologies Group at the Center for International Development at Harvard University. The findings in the Networked Readiness Index are but one element in a broader, complex endeavor that extends well beyond our own work. It is a global challenge that merits the attention and effort of the world.

Technical Appendix: Constructing the Networked Readiness Index[9]

The first step we made in the construction of the NRI was to differentiate variables that enable Use (Enabling Factors) from specific indicators of Use (Network Use), building on the Networked Readiness analytical framework that we introduced in *Readiness for the Networked World: A Guide for Developing Countries.*[10,11] We originally considered 135 variables from hard data and the Executive Opinion Survey, and narrowed these down to 65 based on a variety of analytic criteria. For example, variables that were too highly correlated with or dependent upon major variables were discarded, as were others that did not appear to impact Use. Of the remaining 65 variables, the hard data were converted into a 1-to-7 scale using linear transformation to be consistent with the data from the Executive Opinion Survey, using the formula[12]

$$6 \times \frac{(\text{Country Value}—\text{Sample Minimum})}{(\text{Sample Maximum}—\text{Sample Minimum})} + 1$$

The 65 variables were grouped into 11 separate micro-indexes (based on research and experience on Networked Readiness of the Information Technologies Group at the Center for International Development at Harvard University). One micro-index comprises the Network Use component index, and the remaining 10 are used to create the Network Policy, Network Access, Networked Society, and Networked Economy subindexes, which in turn form the Enabling Factors component index.

In the definitions of the individual variables below, the numbers (1.1, 1.2…) refer to the data tables in the Data Rankings section of the *Global Information Technology Report*.

Definitions of the Networked Readiness Index, component indexes, subindexes and micro-indexes

I. The Networked Readiness Index is defined as follows:

Networked Readiness Index = 1/2 Network Use + 1/2 Enabling Factors

A. The Network Use Index is defined as follows:

Network Use = 4/5 Hard Data + 1/5 Survey Data

Hard Data

1.1 Percentage of computers with Internet connection, 2000
1.2 Internet Users per host, 2000
1.3 Estimated Internet users per 100 inhabitants, 2000
1.4 Cellular subscribers per 100 inhabitants, 2000

Survey Data

1.5 Availability of public Internet access

B. The Enabling Factors Index is defined as follows:

Enabling Factors = 1/4 Network Access + 1/4 Network Policy + 1/4 Networked Society + 1/4 Networked Economy

1. Network Access Subindex is defined as follows:

Network Access = 1/2 Information Infrastructure + 1/2 Hardware, Software and Support

Information Infrastructure micro-index = 5/9 Hard Data + 4/9 Survey Data

Hard Data

2.1 Teledensity, 2000
2.2 Years to first adopt cellular telephony
2.3 Waiting list for telephone lines
2.4 Telecommunication staff per 1,000 mainlines
2.5 Telephone faults per 100 mainlines

Survey Data

2.6 Availability of telephone lines for businesses
2.7 Perceptions of broadband Internet access
2.8 Price and quality of Internet connection
2.9 Availability and cost of mobile telephony

Hardware, Software and Support micro-index = 2/5 Hard Data + 3/5 Survey Data

Hard Data

3.1 PCs per 100 Inhabitants

3.2 Software piracy

Survey Data

3.3 Availability of specialized IT services

3.4 Software products fitting local needs

3.5 Competition in the domestic software market

2. The Network Policy subindex is defined as follows:

Network Policy = 1/2 ICT Policy + 1/2 Business and Economic Environment

ICT Policy micro-index = 1/5 Hard Data + 4/5 Survey Data

Hard Data

4.1 Internet access cost

Survey Data

4.2 Perceived effect of telecommunications competition on quality and price

4.3 Perceived effect of ISP competition on quality and price

4.4 Legal framework supporting IT businesses

4.5 ICTs as overall priority for the Government

Business and Economic Environment micro-index = 1/10 Hard Data + 9/10 Survey Data

Hard Data

5.1 Income per capita (PPP)

Survey Data

5.2 Rule of Law

5.3 Government Effectiveness

5.4 Regulatory Burden

5.5 Number of days to start a new firm

5.6 Women's participation in the economy

5.7 Minority groups' participation in the economy

5.8 Country's relative position in technology

5.9 New government's respect for previous government's commitments

5.10 Trust in public postal system

3. The Networked Society subindex is defined as follows:

Networked Society = 1/3 Networked Learning + 1/3 ICT Opportunity + 1/3 Social Capital

Networked Learning micro-index = average of Survey Data

Survey Data

6.1 Investment in employees' development of IT skills

6.2 Quality of IT training and educational programs

6.3 Internet access in schools

ICT Opportunity micro-index = average of Survey Data

Survey Data

7.1 Brain drain of IT-skilled workforce

7.2 Brain drain of scientists and engineers

Social Capital micro-index = 3/6 Hard Data + 3/6 Survey Data

Hard Data

8.1 No schooling in the total population
8.2 Average years of schooling in the total population
8.3 Illiteracy

Survey Data

8.4 Political Rights
8.5 Quality of public schools
8.6 Difference in quality of schooling for rich and poor children

4. The Networked Economy Subindex is defined as follows:
Networked Economy = 1/3 e-Commerce + 1/3 e-Government + 1/3 General Infrastructure

e-Commerce micro-index = average of Survey Data

Survey Data

9.1 Business to consumer e-commerce transactions
9.2 Business to business e-commerce transactions
9.3 Business Intranet sophistication
9.4 Commercial websites
9.5 Domestic venture capital investment in e-commerce
9.6 Competition in dotcom market
9.7 Prevalence of Internet start-ups
9.8 Use of Internet-based payment systems
9.9 Sophistication of online marketing

e-Government micro-index = average of Survey Data

Survey Data

10.1 Government effectiveness in promoting the use of ICTs
10.2 Availability of online government services
10.3 Extent of Government websites
10.4 Business Internet-based interactions with government

General Infrastructure micro-index = 4/7 Hard Data + 3/7 Survey Data

Hard Data

11.1 Electricity consumption
11.2 Electric power transmission and distribution losses
11.3 Percentage of paved roads
11.4 Television penetration

Survey Data

11.5 Typical driving speed between cities
11.6 Quality of ports' facilities and waterways
11.7 Quality of air transport

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Endnotes

1 See Kaufmann, Kraay, and Zoido-Lobaton's (1999 and 1999a) work on measuring other elusive, unobservable phenomena such as institutional strength and corruption for sophisticated approaches to these measurement challenges.

2 Information Technologies Group, *Readiness for the Networked World: A Guide for Developing Countries*, Center for International Development at Harvard University, 2000.

3 The 75 nations that we rank in our Indexes constitute the same group of countries that are measured in the *Global Competitiveness Report 2001–2002*.

4 Interested readers should contact the authors for details of their statistical analysis of the relationships discussed in this chapter.

5 The World Economic Forum and Harvard University's Center for International Development and Institute for Strategy and Competitiveness jointly undertook the Global Executive Opinion Survey.

6 Detailed results of the ICT-specific survey questions can be found in the third part of this report, and a thorough description of the Global Executive Opinion Survey can be obtained in Cornelius and McArthur (2002: 166–177).

7 See Table 5.1 in the data section at the end of this book for a listing of countries' GDP per capita.

8 Average available time for daily Internet use was calculated assuming that a personal computer with Internet connection on average works ten hours a day, multiplying this number by the number of personal computers with Internet connection, and dividing by the total number of users.

9 As we set out to construct the Networked Readiness Index and analyze the complex relationships between the numerous Readiness factors across our pool of seventy-five nations, we initially wanted to establish a cross-country comparison measure that captured the relationship between variables of Networked Readiness and economic competitiveness. However, we found very little in the literature to guide us in cementing the impact of ICTs on economic competitiveness. We are heartened to see that very recent studies have begun to link ICT diffusion and economic growth. We look forward to increasing efforts to link Networked Readiness more explicitly to economic competitiveness. For example, see Chapter 7 of this report, where Eggleston, Jensen, and Zeckhauser discuss some of the existing literature that links telecommunications and economic development, or see recent reports by McKinsey Global Institute (2001), or Organization for Economic Co-operation and Development (2001).

10 Information Technologies Group (2000).

11 We have made some modifications to *Readiness for the Networked World* (2000) definitions of the categorization of variables, based on analysis and research subsequent to the Guide's publication. These changes are reflected in the construction of the NRI.

12 See McArthur and Sachs (2002: 28–51).